

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES

EDITED BY

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THE TREATMENT OF ACID SOILS FOR RUBBER AND OTHER CULTIVATIONS.

A series of experiments have been begun by the Department of Agriculture on some low lying flat land which has abnormally acid soil, rendering it unfavourable for the rapid growth of root growth of rubber or other cultivated plants.

The presence of a too large proportion of acid in peaty soils is due to the existence of a large proportion of humic acid which is a brown or black substance produced by decaying vegetable matter. This decomposition is greatly facilitated by heat, air, and moisture and by the presence of putrefying nitrogenous matter. The conditions in many clearings in Malaya are therefore specially suited to the formation of an excess of humic acid which exists in many places to such an extent that the roots of young rubber are not able to grow and the plants grow without vigour and in some cases succumb.

Such soils are physically and in other respects, most suitable for healthy and rapid growth of rubber and when the amount of acid has been reduced they often produce exceptionally fine rubber.

The question of the neutralisation of such soils in the shortest time is of great importance. The only method used at present is to allow the sun free access to the soil and by this means and plentiful drainage to gradually eliminate a proportion of the acid.

This is however a lengthy and not always successful method and a much quicker plan is to add such proportion of basic substance such as lime as is needed to neutralize the acid in the soil.

A very large supply of natural phosphate is being extracted from Christmas Island and can be delivered comparatively cheaply at S. S. and F. M. S. ports.

This raw phosphate not converted into the superphosphate will be tried on acid soils. The advantage in using this manure is that the raw phosphate *i.e.*, phosphatic rocks exactly as they are obtained in

nature is cheaper than the manufactured superphosphate and the acid in the soil of the superacid lands will convert the phosphate into superphosphate and by so doing the soil will more rapidly lose its acid and become neutralized and the available plant food in the soil greatly increased.

The costs of such an application of raw phosphate will be determined by experimenting with different quantities per acre to discover the smallest amount necessary to render the soil favourable to root growth of rubber.

In certain cases the lack of vigour in the growth of young rubber on acid soils has been attributed to dampness of soil, fungi or other diseases of the roots and it will be well if in cases where there is reason to suspect that the chemical condition of the soil is the cause of the lack of progress of rubber plants a portion of the field be treated to reduce the acidity.

On some of the super acid soils a litmus paper pressed against a handful of the damp soil gives in a short space of time, some few minutes, a marked acid reaction i. e. is changed to a pink colour. This may be used as a rough test of the relative amount of acidity in the soil.

J. B. CARRUTHERS.

THE COPRA INDUSTRY.

It has been brought to my notice on one or two occasions recently that the Singapore market price of Copra is nearly always less than that quoted for Ceylon and the Pacific Islands. In order to ascertain the reason of this I recently made careful enquiry into the state of the market and the quality of the Copra offered for sale.

What surprised me most was the very poor quality of the Copra imported from the surrounding Islands and, the Malay states compared with that from Java and other Dutch Islands. After examining numerous samples taken from consignments from many different parts I am not surprised that Singapore prices do not compare favourably with those of other markets.

There are several causes which account for the inferior quality and price of local copra. The principal cause appears to me to be the absence of some system of supervision over the native and Chinese growers. I believe that in Java and other Dutch Islands the Dutch Government examines all Copra for export and only that which is up to standard quality is allowed to be shipped. This in a great measure accounts for the excellence of Dutch Copra. The second cause is that it is a common practice to pick the coconuts before they are quite ripe thus accounting for the large quantities of thin, soft and decaying Copra on the market. Quantities of good ripe Copra are frequently ruined by mixing it with this half matured stuff. The third reason is that the Copra is badly dried. That said to be sun-dried is only partially dried and as soon as put in bulk becomes mouldy and rots. That said to be kiln-dried is practically roasted. A fourth, and by no means least important, reason is the absence of any form of beneficial cultivation on the estates. In the majority of instances trees are never by any chance manured

nor is any form of beneficial cultivation practiced. The result of this neglect is an inferior Copra poor in oil producing qualities. I am now referring to Malay and Chinese owned estates which comprise practically the whole industry. It is well known that European owned estates produce Copra of the very highest quality, but unfortunately, for their owners, the poor quality determines the market price.

Ceylon Copra obtains a better price chiefly because the large majority of coconut estates there are owned by Europeans and under European management and every care is taken to turn out Copra of first quality.

The Pacific Islands Copra maintains its advantage in price principally because Messrs. Lever Bros. and other well known soap manufacturers have extensive interests there. They have representatives on the spot who insist on first class Copra being supplied and in return pay the highest price.

The difference in price between good and bad Copra in Singapore is about \$1 per picul. The present price for first quality is about \$7.50. As the price rises it is customary for many native and Chinese growers to resort to the injurious practice of rushing quantities of unripe badly dried Copra on the market in order to catch the higher rate. This is a practice which cannot be too strongly condemned.

The principal sources of supply are Dutch Borneo, the Natunas and Anambas Islands, Johore, the Malay Peninsula, and the Dutch Islands generally.

Singapore produces over 3,000 piculs of Copra per month chiefly from Tanjong Katong and Passir Panjang. This, with the exception of a small quantity from European estates, is badly dried and contains a large percentage of unripe nut.

Dutch Copra from Billeton and Banka is principally kiln-dried and arrives clean, well dried and of good quality.

That from Padang, Sumatra, is in small pieces well ripened, dry, dark and oily in appearance and contains more oil than any other Copra imported to Singapore. This is due to careful cultivation and none but well matured nuts being gathered.

The Celebes give us a good Copra, well dried from fully-matured nuts, yields an excellent oil and shews careful preparation.

Asahan exports fine large Copra, ripe and fairly well dried both by sun and kiln.

Pontianak produces dry Copra of fair quality containing a small percentage of unripe nut.

Saigon (Singkawang) Copra is of good quality, dry, and shews careful preparation.

Ternate Islands Copra is very good, generally dry. Kelantan Copra is good but that from Johor, (Batu Pahat) is very wet, unripe and mouldy. Rhio sends good samples of Copra but occasionally the quality cannot be depended on.

I have recently seen shipments from Malacca and Muar which were very bad indeed, in fact it is said that Copra from these two places is the worst sent in to Singapore. In one store I saw several lots heating so badly that it was impossible to bear the hand between the sacks. Quite half was unripe and little or no attempt had been made at drying. I am informed on good authority that the quantity of bad Copra from Malacca is steadily increasing.

Selangor Copra from native and Chinese sources is of fair quality but contains a good percentage of unripe nut, also sand and other impurities.

The exports of Copra are to Russia, France, Spain and other continental ports and recently to the United Kingdom. The exports of coconut oil from Singapore in 1907 reached 159,801 pikuls of which 40,163 piculs were imported chiefly from Pontianak.

The imports into and exports from Singapore in each of the 5 years 1903 to 1907, and for 9 months of 1908 are:—

Year.	Imports.		Exports.	
	Piculs.	Value.	Piculs.	Value.
1903	752,371	6,090,581	628,099	5,214,877
1904	643,603	5,234,079	493,364	4,165,957
1905	923,991	7,107,328	776,285	6,086,476
1906	635,385	5,215,593	427,307	3,620,755
1907	927,652	8,571,039	654,869	6,303,115
9 months of 1908	897,175	6,205,535	781,057	5,529,955

The Director of Agriculture has stated in his annual report for 1907 that this important branch of the Agriculture of the Federated Malay States has increased in acreage by seven per cent during that year and that the total area under coconuts at the end of the same period was 112,500 acres. These facts and the above figures demonstrate the importance of the Copra Industry to the Peninsula and surrounding Islands and also shew that there is a renewed interest in not the least important of our agricultural staple industries.

It is hoped that this renewed interest will bring about better cultivation and induce growers to take more pains in the preparation of their produce for market.

T. WILSON MAIN.

VIRUS REMEDIES AGAINST RATS.

I have carried on experiments for some time past with certain rat viruses. I have been successful with Liverpool Virus and think it well to make this known to readers of the "Agricultural Bulletin."

I know that many estate bungalows are much infested by rats and that most of the ordinary remedies have failed, and many, on account of the danger of poisoning domestic animals, cannot be used. Estate managers, Sanitary Board officials, owners of stores and many others may like to give a virus remedy a trial. It is claimed for all of them that they are harmless to domestic animals, and further that the disease which the virus induces in rats spreads from animal to animal.

The animals do not die until some days have elapsed after they have eaten the infected bread—in my experiments from 7 to 15 days were required. It is claimed by the discoverers that dying animals leave their burrows and runs and come into the open where they die or are easily caught, so that no offensive smells occur. On this point I cannot speak, as my experiments, owing to the need of having reliable "controls," were on rats in captivity.

The price of the Liverpool virus is 15/s per dozen tubes plus 4/s for the packing tin. A planter who wishes to try the virus would do best to order a dozen tubes, or two may combine to order a dozen.

It might be better if the orders were sent through me. If the supplies could send a number of consignments together to one address they could make special arrangements to store the package in a cold room on the way out. This is important as it must be remembered the virus is alive and not a dead inert thing like the ordinary rat poisons, and therefore if it is protected against heat in tropical seas, a greater number of tubes are more likely to retain their virulence.

W. J. GALLAGHER.

Government Mycologist, F. M. S.

TWO MANICOBA RUBBERS.

Manihot dichotoma, Ule, 'Jiquie Manicoba,' and *Manihot piauhyensis*, Ule, 'Romanso or Piauhy Manicoba.'

Three lots of seeds of these two little known species of *Manihot* have just reached the Botanic Gardens Singapore. One lot was kindly sent by S. T. Dunn Esq., Superintendent, Forestry and Botanical Department, Hongkong, and the other by W. N. Smith Esq., Superintendent, Royal Botanic Gardens, Calcutta.

These seeds are, I believe, a part of a consignment recently received from Brazil by the Director, Royal Botanic Gardens Kew.

A large quantity of seeds from the same consignment has just been received by us from Kew through the Crown Agents for the Colonies.

Mr. Dunn writes that they have such poor results from this tree in Hongkong (much too far north) that there is no desire to extend their experiments and he sends the seeds here as the best way of utilizing them.

Mr. Smith sends a small packet of each species with the request that we will in due course let him know what progress the plants make in Singapore.

The seed is slightly larger than that of Cearà but otherwise differs very slightly in appearance.

According to an article on these two Manicobas appearing in the Kew Bulletin, 1908, page 59, it appears that the first intimation to reach Kew of the existence of rubber yielding plants closely related to the commonly cultivated *Manihot Glaziovii* took place in the early part of 1906 when Mr. J. A. Davy, Manager of the Dumont Coffee Company, Ribeirão Preto, São Paulo, Brazil, called at the Gardens and left some seeds of the Jequié Manicoba. It further appears that on his return to Brazil he sent more seeds with the following information:—

"At present we have two kinds of rubber trees growing here, the *Manihot Glaziovii* or common Ceará Maniçoba, and the other *Manihot Jequié* (*Manihot dichotoma*) which is a native of the State of Bahia." In a subsequent letter (dated June 30th, 1906) Mr. Davy writes:—"as regards the Jequié variety of *Manihots*, this plant originates in the Municipality of Jequié, State of Bahia, and is at present looked upon as a better latex producer than the *Manihot Glaziovii* or Ceará."

The Kew Bulletin goes on to state that in October, 1906, Mr. J. P. Rowe (since deceased) of Messrs. Anderson and Rowe, Bahia, wrote:—"I have much pleasure in sending you particulars of the different varieties of Maniçoba Rubber trees which are found in great numbers in the district of Jequié.

"According to my agent in this district, who has studied the subject there for three years, there are seven varieties which he has examined. In my opinion, however, there are more.

"Of the seven varieties my agent has selected for cultivation and is planting largely two which vary but very slightly, both being of most vigorous growth, developing very quickly, flowering and seeding at an early age, with bark very smooth, soft, and easy to tap.

"Of one (*a*) called by the natives "Maniçoba blanco" (white Maniçoba) the leaves (three lobed) are pale green on the under surface with ribs of greenish white, the contrast of the leaf with the ribs being sufficiently well marked to enable the variety to be identified at a glance by the natives,.....the latex is pure white, flows freely, and coagulates immediately without the use of any agent.

"The seeds you have sown at Kew ought to be all of this variety.

"Of the other (*b*) the ribs of the leaves on the under side are of a purplish colour, the leaf itself being of a darker here than the 'white' Maniçoba. This variety is called by the natives 'Maniçoba rouxa' (purple). It is as vigorous in growth as the 'white' variety and the latex is equally white and flows and coagulates as readily.

"Of the (*a*) and (*b*) varieties we have cultivated trees the trunks of which at 14 months old were 4 inches in diameter at 3 feet from the ground, and 10 feet high. Some of these young trees were flowering and seeding at this age.

"Our plantations are mostly formed of young seedlings taken from the forests, which contain vast numbers. They are transplanted 1,000 to the acre, and do not appear to be too crowded. The transplantation causes no apparent set-back, and the close planting has a good effect in keeping down the scrub and undergrowth. At three years old cultivated trees of the first mentioned varieties (*a*) and (*b*) have yielded 7 ounces of dry rubber on the average."

A wardian case of 100 plants raised from seeds sent by Mr. Rowe was received at the Botanic Gardens, Singapore, from Kew Gardens in July 1907. These plants will be experimented with in order to ascertain if the species is suitable for planting on a large scale in Malaya.

A few of the plants have been sent to Christmas Island where Ceará flourishes so well, see (Bulletin VII No. 12).

A further supply of "Maniçoba seeds" was received from Mr. H. Stevenson, H. B. M.'s Acting Consul at Bahia, and reached Kew in March, 1907.

These seeds as well as plants raised from the seeds sent by Mr. Rowe have been distributed to the Botanical Stations and Gardens of India and the Colonies.

In consequence of this last consignment of seeds a correspondence was opened up with Mr. O'Sullivan Beare, N. B. M.'s Consul at Bahia, on the subject. The following is an extract from his report:—

“The export of rubber from the State of Bahia has increased more than tenfold within the past six years, having risen from 100 tons in 1900 to over 1,100 tons in 1906.

“It has lately been discovered that the State of Bahia is very rich in a rubber producing tree locally known as “Jiquié Maniçoba.” The tree in question is a new and distinct species of *Manihot*, which apparently is peculiar to the State of Bahia.”

“This discovery is a matter of much importance not only for this state but also for the rubber trade in general inasmuch as the rubber obtainable from the Jiquié Maniçoba when properly prepared, would seem to be equal in quality to the best product of the Pará region. (?)

It appears that this Maniçoba of Bahia is a tree attaining a height of 30 feet and more with a diameter of some 2 feet when fully matured in suitable soil. It belongs to the family of *Euphorbiaceæ* as does also *Hevea brasiliensis*, and its scientific name is *Manihot dichotoma*.”

Mr. O'Sullivan Beare says that already several Fazendeiros have begun to lay down plantations of the tree upon a large scale and that the Government of the State is shewing special attention to its systematic cultivation and to the preparation of the rubber.

He also states that a planter established in the Jiquié district recently prepared a quantity of rubber from wild trees growing in the district and despatched it to New York. The consignment was classified in the New York market as being equal to the best Pará and it fetched \$1.20 (5/-) per lb.

As to the Piahy Maniçoba, (*Manihot piahyensis*) we are told very little, but Dr. Ule in his description says it forms a smaller tree from 6 to 16 feet in height, and differs in having spartite leaves with broader tips.

The method of collecting the rubber from these two species differs considerably from that in use for *Manihot Glaziovii* (Ceará.) The greatest drawback with the latter is the extreme hardness of the bark, but in the two species under discussion the bark would appear to be much softer especially that of *M. dichotoma*. With this tree the season for collecting the rubber is said to be from August to March.

The latex coagulates very freely and requires no acid or artificial coagulant of any kind.

The trees are at their best from eight years onwards but are said to yield latex during their third and fourth years from the time of planting.

The stems are cut in wavy lines by means of a knife which from the description given resembles a farriers knife. A cup is fixed in the usual manner to collect the latex which soon coagulates and is pressed by hand in balls and afterwards thoroughly dried.

The method of obtaining the latex from Piahy or Romanso Maniçoba (*Manihot piahyensis*) is stated to be almost identical only slightly modified owing to the shorter stems and slightly harder bark.

As to the quality of their rubbers Ule says that it does not possess as great elasticity as Pará but the characteristics of these *Manihots* make them well worthy of cultivation. He also says that wherever conditions are suitable the cultivation of *Manihot Glaziovii* will gradually be replaced by that of the *Manicobas* of Bahia.

It would appear that these two *Manicobas* have many good qualities to recommend them particularly the soft tappable bark which alone should enable it to supersede Ceará. It is, however, doubtful, judging from our present knowledge, whether we will be able to grow either species successfully here in our parts of the east. *Manihot dichotoma* appears at from 12°5′—14°5′ S. lat., and the locality for *Manihot prurihensis* is from 8°—10° S. lat., both considerably south of the Pará and Ceará regions and in a drier climate. It is quite reasonable however to expect them to do in many of the drier parts and more sandy soils of the Peninsula.

Each will be given a fair trial here and we hope to be able to report favourably on them in future numbers of the Bulletin.

T WILSON MAIN.

COMMELINA NUDIFLORA, Linn.

Owing to a startling paragraph in the Westminister Gazette, in August we have had several enquiries about *Commelina nudiflora*, Linn. and its wonderful properties.

It is spoken of as "a wonderful Tropical creeper," "Weed-eating plant" etc, etc. It is said to be a splendid plant for destroying lalang and has been recommended to owners and managers of rubber plantations for this purpose. How such an unobtrusive little plant should have gained such notoriety is quite remarkable.

The habit and growth of this little creeper makes it quite unfit for such purposes. In the first place it grows best in damp swampy places, generally in small patches here and there or by the sides of ditches or small streams and I have never seen it growing on dryer lalang land or in conjunction with lalang. It is not by any means a robust growing creeper, never rising more than six or eight inches from the ground and does not even possess the property of climbing over other vegetation. It is this property of climbing over other plants and smothering them which recommends a plant as an eradicator of lalang, for example, *Passiflora foetida* is recommended by many because it possesses this habit.

Commelina nudiflora, belongs to the natural order *Commelinaceae* and is found throughout the hotter parts of India from the Punjab to Ceylon and Singapore. The stems are creeping and rooting at the nodes. Leaves glabrous scaberulous or puberulous, ciliate. Spathes acute, base round or cordate, glabrous or pubescent, striate; peduncle $\frac{1}{2}$ — $\frac{3}{4}$ in, cymes 2, branches 1-3 fid. Smaller petals blue, outer pale or white.

T. WILSON MAIN.

**“ THE TAMIL IMMIGRATION FUND ENACT-
MENT, 1908.” F. M. S.**

An Enactment to provide a Fund for the Immigration of Tamil Labour.

November 1908.

1. (i) This Enactment may be cited as “The Tamil Immigration Fund Enactment, 1908,” and shall come into operation within such area or areas, and at such date or dates, respectively, as the Resident, with the approval of the Resident-General, shall from time to time direct by notification in the *Gazette*.

(ii) The Enactment mentioned in the first schedule. Provided that nothing in such repeal shall be deemed to relieve an employer from any duty, liability, or penalty arising out of the provisions of the said Enactment so repealed in respect of any Tamil labourer employed by him or working on his place of employment during the year 1908.

2. In this Enactment each of the following terms shall have the meaning assigned to it by this section unless there be something inconsistent with such meaning in the subject or context:

“Tamil labourer” means an Asiatic native of the Madras Presidency of British India of the age of fourteen years and upwards, who is employed in any of the kinds of labour specified in the second schedule to this Enactment or in any other kind of labour which may be declared by the Resident-General to be subject to the provisions of this Enactment, and for the purpose of this Enactment every Asiatic of Indian descent shall be deemed to be a native of the Madras Presidency until the contrary is proved.

“Employer” means any person, including the Government, and any body of persons, corporate or unincorporate, who shall employ any Tamil labourers and shall in his absence include his agent or manager or other person in charge of the work on which such Tamil labourers are employed, and a person who makes payments for work executed by Tamil labourers by contract or by the piece to some person other than such Tamil labourers shall be deemed to be the employer of such Tamil labourers if such work is done in the conduct of any trade, business or industry carried on by him or on his behalf.

“Place of employment” means any place where work is carried on by or on behalf of an employer.

“The Superintendent” means the Superintendent of Immigrants appointed under “The Indian Immigration Enactment, 1904.”

“The Immigration Committee” means the Committee which shall, for the time being, be notified by the order of the High Commissioner in the *Gazette* to be the Immigration Committee.

“The register” means the books which are required to be kept under section 4 (a) of this Enactment. A register shall be deemed not to be written up to date unless by the fifteenth day of any month all entries required by section 4 (a) have been made in respect of the preceding month.

“The return” means the return which is required to be kept under section 4 (b) of this Enactment.

“ A quarter of the year ” means a quarter consisting of the months of January to March, April to June, July to September, or October to December.

3. It shall be lawful for the High Commissioner to constitute a Committee to be called the Immigration Committee and to define its duties and to appoint such persons as he may think fit to be members of such Committee and to add members to or remove members from such Committee.

4. Every employer shall comply with the following conditions :

(a) He shall keep and write up to date or cause to be kept and written up to date books in the English language showing the names of all Tamil labourers employed by him or working on his place of employment, the days on which they have worked and the amounts paid or payable to them as wages ;

(b) He shall within one calendar month after the end of each quarter of the year send to the Superintendent a return showing the number of Tamil labourers whose names are entered in his register during the preceding quarter of the year, the total amount paid in wages, and the total number of days' work done by all Tamil labourers employed by him or working on his place of employment during the preceding quarter of the year: such return shall be accompanied by a certificate signed by the employer that it is a correct summary of the entries in his register during the preceding quarter of the year ;

(c) He shall within twenty-one days after the posting to him or to his place of employment of a notice stating the amount at which he has been assessed for the last preceding quarter under section 5 of this Enactment pay to the Superintendent the amount mentioned in such notice: such amount shall be a debt due to the State and if not paid within such twenty-one days shall bear interest at the rate of eight per cent. per annum: any notice signed by the Superintendent shall be conclusive evidence that the amount stated therein is due by the employer unless it shall be rectified by the Superintendent or unless the employer shall within fourteen days after the receipt of any notice appeal to the Immigration Committee when the Immigration Committee shall consider the matter and their decision shall be final ;

(d) He shall, whenever called upon so to do by the Superintendent or by any officer authorised in writing by the Superintendent in such behalf, produce for the inspection of the Superintendent or officer so authorised his register and all other books kept by him in so far as they relate to payments made by him in respect of work done by Tamil labourers.

5. (i) The Immigration Committee may, with the consent of the Resident-General, prescribe by notification in the *Gazette* on or before

the first day of December in each year the rate to be paid in respect of each quarter of the ensuing year by the employer in respect of each Tamil labourer employed by him or working on his place of employment. Such rate shall not exceed \$1.25 in respect of each labourer.

(ii) The Superintendent shall forward to each employer a notice stating the amount at which he has been assessed in respect of the last preceding quarter. Such amount shall be reckoned by multiplying the average number of days' work done by Tamil labourers employed by him or working on his place of employment during the preceding quarter of the year by the rate notified under the last sub-section.

(iii) The average number of days' work done by Tamil labourers employed by any employer or working at his place of employment shall be the total number of days' work done by Tamil labourers employed by him or working at his place of employment during the preceding quarter of the year divided by the number of working days comprised in such preceding quarter.

(iv) The number of working days comprised in any quarter of a year shall be fixed by the Immigration Committee.

(v) The Immigration Committee may make rules determining what constitutes a day's work and such rules shall be published in the *Gazette*.

6. All moneys paid by employers to the Superintendent shall be paid into a fund to be known as "The Immigration Fund" and shall be disbursed for the following purposes only :

(a) For or towards the payment of free passages for Tamil labourers and their families from the Madras Presidency to the Federated Malay States or the Colony or Johore: such passages shall be allotted in accordance with rules to be framed from time to time by the Immigration Committee and published in the *Gazette*, and may be granted in respect of Tamil labourers who embarked from India at any time subsequent to the 1st January, 1907;

(b) For the general expenses incurred in connection with the recruiting of labour in the Madras Presidency.

7. (i) Payments out of the Immigration Fund shall be made by the Superintendent on the authority of the Immigration Committee.

(ii) The Superintendent shall present half-yearly accounts of the Immigration Fund to the Immigration Committee.

(iii) Such half-yearly accounts, when passed by the Immigration Committee, shall be published in the *Gazette*.

8. (i) Any employer

(a) Who shall fail to keep or cause to be kept a register;

(b) Whose register shall not be kept up to date unless he shall explain such omission to the satisfaction of the Court;

(c) Whose register shall contain any incorrect or incomplete entry unless he shall satisfy the Court that such entry

was not made with intent to evade payment of moneys payable under this Enactment ;

(d) Who shall fail to send in the return within the time prescribed by section 4 (b) ;

(e) Who shall send in a return containing any incorrect or incomplete statement unless he shall satisfy the Court that such statement was not made with intent to evade payment of moneys payable under this Enactment ;

(f) Who shall refuse or wilfully omit to produce any book for inspection as required by section 4 (d) ;
shall be liable to a fine not exceeding five hundred dollars.

(ii) In every case in which an employer is convicted of failure to keep or cause to be kept a register, and in every case in which an employer is convicted of keeping or causing to be kept a register which contains any incorrect or incomplete entry and the Court is satisfied that such incorrect or incomplete entry has been made with intent to evade payment, and in every case in which an employer is convicted of sending in a return containing any incorrect or incomplete statement and the Court is satisfied that such statement was made with intent to evade payment, the Court shall forthwith proceed to determine, taking further evidence if necessary, the number of Tamil labourers in respect of whom the employer is liable to assessment under this Enactment, and the employer shall, in addition to any fine imposed upon him, pay a penalty of ten dollars in respect of each such Tamil labourer. Such penalty shall be added to the fine imposed and shall be recovered and dealt with as part thereof. The payment of such penalty shall not be deemed to be a payment of the assessment due under the provisions of this Enactment in respect of such Tamil labourer, and in a suit for the recovery of assessment no set-off or defence shall be allowed on account of such payment.

(iii) No prosecution shall be instituted except by the Superintendent or by an officer authorised by him in writing in such behalf.

(iv) Every offence under this Enactment may be tried before the Court of a Magistrate of the First Class which shall have power to impose any fine or penalty provided by this Enactment, and the Superintendent or any officer authorised by him in writing in such behalf shall have the right to appear before any Court.

(v) Every fine imposed by virtue of this Enactment shall be paid to and become part of the Immigration Fund.

9. The Resident-General may from to time to time make rules for the purpose of carrying into effect the provisions of this Enactment, and such rules shall be published by notification in the *Gazette* and shall come into force on such date as may be prescribed in such notification.

THE FIRST SCHEDULE.

ENACTMENT REPEALED.

Number.	Short title.	Extent of repeal.
17 of 1907.	The Tamil Immigration Fund Enactment, 1907.	The whole

THE SECOND SCHEDULE.

- (1) Agriculture, including the treatment of produce.
- (2) The making and upkeep of roads.
- (3) The construction and maintenance of canals.
- (4) Railway construction, maintenance and working.
- (5) The construction, maintenance, and working of all works of a public nature or for the public good.
- (6) Mining and work on mines.
- (7) Quarrying and stone-breaking.
- (8) Brick-making.

Provided that—

- (a) persons employed exclusively in gardens attached to private residences; and
- (b) persons employed exclusively in administrative or clerical work;

shall not be deemed to be engaged in any of the above kinds of labour.

“THE TAMIL IMMIGRATION FUND ENACTMENT, 1908.”—It is hereby notified that, with the consent of the Resident-General, the Immigration Committee appointed under the Tamil Immigration Fund Enactment has prescribed that the rate payable in respect of each quarter of the year 1909 by an employer in respect of each Tamil labourer employed by him or working on his place of employment shall be \$1.25.

24th November, 1908.

“THE TAMIL IMMIGRATION FUND ENACTMENT, 1908.”

The following Rules determining what constitutes a day's work have been made by the Immigration Committee under section 5 (v) of “The Tamil Immigration Fund Enactment, 1908.”

1. In cases where a labourer works on daily wages, the work actually performed in respect of which he is credited in the register with one day's full wages shall constitute a day's work.

2. In cases where payment is made for overtime or for work on contract or piece-work let to a contractor or sub-contractor, a day's work shall be the amount of work performed for a total payment of 40 cents.

3. In cases where a labourer is under an agreement, written or verbal, to pay a percentage to an employer on the value of the commodities produced or won by him on a place of employment, or to sell all such commodities to an employer, each calendar month for which he works shall be reckoned at twenty-five days' work; and if such a labourer works for less than a calendar month, the work performed on every day on which he is so employed shall be reckoned as five-sixths of a day's work.

24th November, 1908.

The following Rules have been framed by the Immigration Committee under section 6 (a) of "The Tamil Immigration Fund Enactment, 1908:"

1. Free or assisted tickets for *bonâ fide* labourers and their families may be issued on behalf of the Immigration Committee in Negapatam by the Superintendent of the Emigration Depôt, and in Madras by the Emigration Agent—

(a) To all holders of kangany licenses or recruiter's licenses issued on the authority of the Committee;

(b) To all labourers and their families who have not been recruited by any kangany or recruiter, but present themselves at the Government Depôts at Nagapatam and Madras and promise to work in the Straits Settlements, Federated Malay States, or Johore.

2. Kangany licenses authorising a kangany to recruit labour for a particular estate can be obtained only from the Superintendent of Immigrants, Penang.

3. Recruiters' licenses giving a general authority to recruit labour for the Straits Settlements, Federated Malay States, or Johore can be obtained only from the Emigration Agent in Madras.

4. Every kangany license shall show the wages payable to coolies to be recruited and the maximum amount recoverable from each coolie for expenses incurred on his behalf previous to his arrival at the place of employment.

5. The Superintendent of Immigrants may refuse to issue kangany licenses and may cancel licenses previously issued for an employer—

(a) who has been convicted of an offence against the provisions of "The Indian Immigration Enactment, 1904," or "The Tamil Immigration Fund Enactment, 1908;"

(b) against whom or against whose place of employment any order or notification has been made under sections 50, 60 and 64 of "The Indian Immigration Enactment, 1904;"

(c) who has failed to observe the conditions set forth on kangany licenses previously issued to him.

Provided that an employer who is dissatisfied with the decision of the Superintendent may appeal to and appear personally before the Immigration Committee, whose decision in the matter shall be final.

6. The Superintendent of Immigrants may refuse to issue a kangany license to a kangany whom he considers to be unsuitable and may cancel the license of any kangany on reasonable proof of misconduct.

24th November, 1908.

Supplementary Rules framed by the Immigration Committee under section 6 (a) of "The Tamil Immigration Fund Enactment, 1908."

1. Subject to these rules a rebate on assessment may be granted from the Immigration Fund by the Superintendent on behalf of the Immigration Committee to employers who imported Tamil coolies from India with State-aided tickets from the 1st January, 1907, to the 12th February, 1908, provided that no such allowance shall be granted in respect of any coolies imported with free tickets.

2. The rebate shall only be granted to such employers as have paid assessment under the Tamil Immigration Fund Enactment for the first two quarters of 1908.

3. The rebate shall be at the rate of two dollars for each adult coolie imported as described in rule 1, minors counting as half adults but it shall in no case exceed the amount paid by the employer concerned as assessment under the Tamil Immigration Fund Enactment for the first two quarters of 1908.

4. Nothing in these rules shall be taken as giving any employer an absolute right to any rebate, but any employer claiming a rebate, or who may be dissatisfied with the rebate granted, may appeal from the decision of the Superintendent to the Immigration Committee, whose decision in the matter shall be final.

5. Rules 1, 2 and 3 shall not apply to employers resident in Johore. The cases of such employers will be considered individually by the Committee, provided that in no case shall the amount of the rebate to any such employer exceed two-thirds of the sum paid by him in assessment for the first two quarters of 1908.

24th November, 1908.

THE COMPOSITION OF THE MILK OF THE DAIRY COW AND BUFFALO IN THE MALAY PENINSULA.

Having read Mr. Main's interesting article in the October number of the Bulletin (Page 437) I should like to draw attention to a somewhat widespread fallacy which exists in the Federated Malay States and I presume in the Colony also, and which is also voiced by Mr. Main, with reference to the supposed poor quality of the milk from our "local," that is, Indian and Siamese or crossbred Indian and Siamese cows.

Two causes contribute to this erroneous idea.

(1) It must be admitted that the milk which is usually obtained from the vendors in this country lends confirmation to this fallacious idea, but it must be remembered that this milk is not the genuine product of the cow, but a sophisticated article consisting of a more or less judicious mixture of milk and water.

In places where no analyses of milk have been carried out in the States and Colony and consequently where there is no control or supervision as to the quality of milk sold by the owners or their coolies, the milk is often extremely poor on account of this adulteration. In Penang for instance last year samples analysed by Dr. Rose, the Assistant Municipal Health Officer, were found to contain as much as 50 per cent of added water and samples analysed in Kuala Lumpur shortly after my arrival in 1906-7 contained added water to almost this extent.

(2) The absence of colour, so often imagined by consumers to be a criterion of quality, in fact to such an extent that it has led to artificial colouring of both milk and butter in Europe with dyes such as annatto, is the second factor which contributes to this opinion.

To show how valueless colour is as a standard of quality it is only necessary to study analyses of buffalo milk. Buffalo milk is of a bluish white colour and the fat obtained from this milk is white and produces a white butter and yet many samples contain as much as 8 or 9 per cent of fat, and often 9.5 to 10.5 per cent of non-fatty solids.

My contention is however that the milk of our locally bred cows is equal in quality on the average to that of the British breeds with perhaps the exception of the Jersey cow and this is I think upheld by reference to Tables I-VI.

In 1906 and 1907 Dr. Thornley and the writer carried out a number of analyses of milks obtained from individual cows and buffaloes of different dairies in the vicinity of Kuala Lumpur, the samples being collected by a trustworthy man who saw the animals milked. It was hoped to undertake a very large number of such analyses and to publish the results later, when the examinations were made more complete—unfortunately the pressure of other work has prevented a continuation of these analyses, but perhaps the few already carried out will be of interest and will show at any rate that the locally bred cow does not merit the general deprecatory opinion with reference to any rate to the quality of the milk it yields.

In connection with these analyses I would also like to quote a paper submitted to the Society of Public Analyses by Dr. Leather, Imperial Agricultural Chemist to the Government of India, on "The Composition of Indian Cows' and Buffaloes' Milks," contained in The Analyst of February 1901.

His remarks on the milk of Indian cows are as follows:—

"It is found to differ in no essential particulars from that met with in Europe. The relations existing between the specific gravity and solids-non-fat and the fat agree well in all cases with those which Richmond and others have found from English cows, as also does the

relationship between the milk sugar, proteids and mineral matter agree well with the proportions 13 : 9 : 2. The percentage of butter fat is high, varying from 4 to 6. Indian cows' milk is invariably very nearly white and the butter very pale yellow, unless coloured artificially."

The following table (Table I) contains the analyses made by Dr. Thornley, late Health Officer F. M. S., and the writer, the analyses of buffaloes' milk (Table II) being appended in a separate table for comparison with that of cows' milk.

The results obtained by Dr. Leather are also tabulated for comparison, with slight alterations in the method of tabulating the results in order to be more easily compared with the analyses carried out by us.

TABLE I.

Composition of milks of individual cows from dairies in the vicinity of Kuala Lumpur.

No. of Cow.	Age of Calf.	Spec. Grav.	Total Solids.	Fat %.	Solids non fat.
1	3½ mons.	1029.00	14.00	5.5	8.50
2	2 "	1034.00	12.60	3.3	9.30
3	-----	1032.00	13.25	4.1	9.15
4	-----	1032.00	13.60	4.5	9.10
5	2½ mons.	1032.00	11.00	2.4	8.60
6	1½ "	1035.00	12.20	2.7	9.50
7	8 "	1029.50	15.50	6.6	8.90
8	3 "	1035.00	12.40	2.9	9.50
9	9 "	1032.50	11.90	3.0	8.90
10	9 "	1031.00	12.40	3.7	8.70
11	8 "	1036.00	11.45	1.9	9.55
12	7 "	1036.00	11.00	1.5	9.50
13	4 "	1031.00	16.30	7.0	9.30
14	5 "	1033.00	14.40	5.0	9.40
15	4 "	1033.50	12.20	3.1	9.10
16	15 days.	1034.50	11.30	2.1	9.20
17	12 "	1032.00	11.50	2.8	8.70
18	12 "	1032.50	14.70	5.4	9.30
19	10 "	1029.30	15.80	7.0	8.80
20	15 "	1031.30	14.10	5.1	9.00
21	9 "	1030.30	15.60	6.6	9.00
22	2 mons.	1032.30	12.40	3.5	8.90
23	1 "	1032.60	12.00	3.1	8.90
24	1 "	1031.50	11.70	3.1	8.60
25	9 days	1030.30	12.60	4.1	8.50
	Average	1032.34	13.03	4.0	9.03
	Highest	1036.00	16.30	7.0	9.55
	Lowest	1029.00	11.00	1.5	8.50

TABLE II.

Composition of milks of individual buffaloes from dairies in the vicinity of Kuala Lumpur, F. M. S.

<i>No. of Buffalo.</i>	<i>Age of Calf.</i>	<i>Spec. Grav.</i>	<i>Total Solids.</i>	<i>Fat %.</i>	<i>Solids non fat.</i>
1	2 mons.	1033.6	15.60	5.9	9.70
2	15 days.	1033.5	14.50	5.0	9.50
3		1029.6	16.54	7.5	9.04
4	3 mons.	1038.0	13.25	2.9	10.35
5	3 "	1035.0	15.20	5.2	10.00
6		1037.0	14.25	3.9	10.35
7	3½ "	1035.0	16.15	6.0	10.15
8	3½ "	1033.0	17.03	7.2	9.83
9	2 "	1040.0	12.10	1.6	10.50
10	3 "	1038.0	13.60	3.3	10.30
11	7 "	1033.0	18.59	8.5	10.09
12	2 "	1037.5	13.30	3.1	10.20
13	10 "	1038.0	16.25	5.5	10.75
14	12 "	1036.0	15.00	4.9	10.10
15	8 "	1034.0	17.20	7.0	10.20
16	7 "	1032.0	18.58	8.7	9.88
17	1 "	1033.0	16.70	6.9	9.80
18	8 "	1034.0	16.20	6.3	9.90
19	7 "	1033.5	20.75	10.2?	10.50
20	3½ "	1032.5	17.38	7.6	9.78
21	9 "	1037.0	20.19	9.0	11.19
22	2 "	1034.0	16.80	6.8	10.00
23	1½ "	1035.0	17.65	7.3	10.35
24	2 "	1035.0	16.33	6.2	10.13
25	3 "	1032.5	18.10	8.2	9.90
	Average.	1034.78	16.29	6.8	10.09
	Highest.	1040.0	20.75	10.2	11.19
	Lowest	1029.6	12.10	1.6	9.04

These analyses are from individual cows and it is to be expected that some of them will be abnormally low. The milk of an average herd of say four to six cows will contain from 4 to 5 per cent of fat and about 9 per cent of non-fatty solids.

For comparison, Dr. Leather's tables are added giving only the figures for "Total Solids" "Non-fatty Solids" "Fat" and "Specific Gravity" as our analyses were not complete and detailed as to the percentage of proteid, milk sugar and mineral ash,

TABLE III.

Composition of Indian cows' milk. Poona Herd (Bombay) 1899 and Saidapet Herd (Madras) 1900 by Dr. Leather.

		<i>Specific Grav. at 60° F.</i>	<i>Total solids %.</i>	<i>Fat %.</i>	<i>Non-fatty solids %.</i>
No. 1	Sind Cow Not given.	12.65	3.46	9.19	
" 2	" " " "	12.49	3.65	8.84	
" 3	" " " "	14.24	4.89	9.35	
" 4	" " " "	14.12	4.88	9.24	
" 5	" " " "	14.33	5.20	9.13	
" 6	" " " "	13.18	4.10	9.08	
" 7	" " " "	15.28	6.11	9.17	
" 8	" " " "	14.73	5.59	9.14	
" 9	Half bred "	15.11	5.77	9.34	
" 10	Aden cow "	13.32	4.43	8.89	
" 11	" " " "	12.73	4.28	8.45	
" 12	Aden-Sind "	13.98	4.64	9.34	
Average milk of cows on one date		13.65	4.75	8.90	
Average milk of cows three weeks later		13.68	4.91	8.77	

TABLE IV.

Composition of cows' milk Saidapet Herd (Madras) 1900.

		<i>Spec. Grav. at 60° F.</i>	<i>Total Solids %.</i>	<i>Fat %.</i>	<i>Non-fatty Solids %.</i>
Milk of cow No. 1	1033.0	13.86	4.41	9.45	
" " " " 2	1031.0	14.48	5.48	9.09	
" " " " 3	1033.0	15.52	6.07	9.45	
" " " " 4	1032.0	13.87	4.57	9.30	
" " " " 5	1034.0	13.02	3.52	9.50	
" " " " 6	1033.0	13.92	4.62	9.30	
Average milk of herd on 29.3.00.		1033.5	13.73	4.00	9.73
Average milk of herd on 4.4.00		1032.0	13.13	4.14	8.99
Average milk of herd on 7.4.00.		1032.0	14.03	4.68	9.35

TABLE V.

Composition of Indian buffaloes' milk (Bombay)

	<i>Spec. Grav.</i>	<i>Total Solids %.</i>	<i>Fat %.</i>	<i>Non-fatty solids %.</i>
Buffalo No. 1	—	13.57	4.08	9.49
" " 2	—	14.91	5.78	9.13
" " 3	—	16.38	7.32	9.06
" " 4	—	16.52	6.89	9.63
" " 5	—	17.37	7.74	9.63
" " 6	—	16.62	6.86	9.76
" " 7	—	18.26	8.66	9.60
" " 8	1034.5	14.22	5.17	9.05
" " 9	1032.1	17.84	8.14	9.70
" " 10	1031.2	19.84	9.95	9.89
" " 11	1032.0	18.43	8.79	9.64
" " 12	1032.9	17.11	7.56	9.55
" " 13	1032.9	18.85	8.81	10.04
" " 14	1032.7	17.37	7.59	9.78
" " 15	1034.3	17.26	7.42	9.84
" " 16	1033.8	17.48	7.52	9.96
" " 17	1033.9	16.79	6.95	9.84
Mixed milk of Buffaloes	1032.1	17.78	8.09	9.69

In no instance does the non-fatty solid value in Table I fall below 8.5 per cent although the fat is low (below 3 per cent) in seven cases. This however often applies to cows in Europe.

In a recent paragraph in the agricultural columns of an English country paper, under the title of "An appeal to the Cow" is a striking instance of low fat values in a breed of British cows in the north of England. In the morning milk from a dairy of thirty six cows, no less than twenty-three proved to be below the standard in fat while two gave milk deficient in fat in the afternoon milking. The mixed milk from nineteen cows in the same dairy taken in the presence of an inspector showed only 2.77% of fat, while the mixed milk from another batch of fourteen cows is stated to have given a fat value of 2.34 per cent only.

The above figures are quoted merely to show that low fat value are often obtained from even herds of cows at home.

The following table gives the average percentage of solids in milk of cows of different breeds in England as examined by Vieth and taken from Richmond's "Dairy Chemistry."

TABLE VI.

	<i>Total Solids %</i>	<i>Fat %</i>	<i>Non-fatty solids %</i>
Dairy Shorthorn	12.9	4.03	8.87
Pedigree „	12.86	4.03	8.83
Jersey	14.89	5.66	9.23
Kerry	13.70	4.72	8.98
Red Polled	13.22	4.34	8.88
Sussex	14.18	4.87	9.31
Montgomery	12.61	3.59	9.02
Welsh	14.15	4.91	9.24
Ayrshire	12.70	3.68	9.02

Conclusions:—

As the previous remarks in this paper may appear to consist only of destructive criticism of Mr. Main's remarks on the quality of milk in the Malay Peninsula I would endeavour to add a few others of a constructive nature.

With reference to Mr. Main's remarks on the general insanitary conditions under which the milk is obtained this also applies to an equal extent to many small dairies at home, where cows are often milked in closed, ill-ventilated sheds and the excreta both on the cows and in the floors of the stalls is rarely removed before the milking process begins.

In visiting several small dairies kept by Tamils in the vicinity of Kuala Lumpur I have on nearly every occasion seen the udder, at any rate, of the cows washed in water before the milking was commenced and the cans which are distributed by the Sanitary Board and are of a standard pattern are apparently scrupulously clean. The floors which have to be cemented according to Sanitary Board by-laws are also usually cleaned out before milking.

The chief difficulty is naturally that of obtaining a good supply of water for washing the utensils etc.

With good supervision and a little advice from Sanitary inspectors, coupled with fines for breach of by-laws with regard to cleanliness, I think improvement in sanitation will come.

The only alternative to this is the establishment of Government dairies of which there are already two in the State of Perak—one on the Taipeng Hill mentioned by Mr. Main and the other in Parit Buntar, and I understand there will be shortly an extension in the establishment of other Government dairies in the larger towns, but even in such cases one would be inclined to advocate the selection of good Indian or Siamese cows, which must be more adapted to the climate of the low country of the Peninsula than any other imported cattle.

A large number of Europeans—at any rate in Kuala Lumpur—still buy milk from the local dairies, in preference to using the various brands of tinned milk, excellent as they are; this applies particularly to those having infants, as most people prefer natural fresh cows' milk to the sterilized brands for infant feeding. In one town in the F. M. S. viz., Ipoh, a dairy is kept by a private individual and the milk sent out daily in bottles.

In the absence of Government dairies which can only be established in the larger towns, a more rigid control both from the hygienic and analytical point of view is the alternative, if pure milk of a good quality is to be obtained.

If one may judge of the effect of such control by the results of analyses and the reduction of convictions obtained for adulteration, my opinion is that such control is sufficient to ensure milk of a good quality from our local cattle.

Such control can now be carried out in most districts in the F. M. S. by the appointment of health officers and sanitary inspectors as is now being done. The health officer can train his inspectors sufficiently to carry out a routine milk analysis with the outlay of only a small sum on apparatus etc., and in many places the District Surgeons who are also District Health Officers holding the Diploma of Public Health are already qualified. With a good train service milks can be sampled, sealed and despatched to the nearest central station for analysis quite easily in many cases without any danger of becoming sour on the way (sour milks require a much more elaborate analysis to obtain accurate results) as I have found by experience. Samples collected in the morning probably about 6 a.m., despatched from Seremban Station at 6.15 p. m., and arriving at Kuala Lumpur at 8.38 by train and received in the laboratory about 9.30 a.m., or later have been quite satisfactory, after travelling a distance of nearly 50 miles and not having been packed in ice.

Samples collected in Klang about 6.30 a.m., a distance of over 20 miles, and received in the laboratory sometimes as late as midday and analysed in the afternoon have also travelled without becoming sour on the way, although not packed in ice.

Even in cases where samples have to be despatched over longer distances the addition of a few drops of formalin or other preservative would not interfere with the analysis if the additions were made by some reputable person.

B. J. EATON,
Government Chemist, F. M. S.

SINGAPORE MARKET REPORT.

December, 1908.

Articles.	Quantity	Highest	Lowest
	sold.	price.	price.
	Tons.	\$	\$
Coffee Palembang ...	...	...	...
Bali ...	2	23½	...
Liberian ...	77	25	23½
Copra ...	4,310	7.80	7.10
Gambier ...	2,082	8.05	7.65
Gambier Cube, Nos. 1 & 2 ...	372	12.60	11.25
Gutta Percha, 1st quality ...	...	300.00	240.00
Medium ...	...	240.00	80.00
Lower ...	...	80.00	12.00
Borneo Rubber, 1, 2 & 3 ...	...	115.00	48.00
Gutta Jelotong ...	...	7.00	5.60
Nutmegs, 110s ...	...	20.50	19.50
80s ...	...	21.50	19.50
Mace, Banda ...	...	90.00	87.00
Amboyna ...	...	64.00	60.00
Black Pepper ...	668	10.32½	9.95
White Pepper (Sarawak) ...	593	15.87½	15.37½
Pearl Sago, Small ...	25	3.55	3.50
Medium ...	...	...	...
Large ...	...	...	...
Sago Flour, No. 1 ...	4,648	3.04	2.80
No. 2 ...	395	1.60	1.45
Tapioca Flake, Small ...	554	5.05	4.90 fair.
Medium ...	30	...	...
Pearl, Small ...	210	8.25	4.30 fair.
Medium ...	430	5.10	4.90 "
Bullet ...	25	8.25	...
Tin ...	2,365	68.37½	67.50

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

				Tons.	
				15th.	31st.
Tin	Str.	S'pore. & Penang to U. Kingdom &/or		1,700	1,826
do.	"	do.	U. S. A.	300	250
do.	"	do.	Continent	285	181
Gambier	"	Singapore	Glasgow	...	...
do.	"	do.	London	100	50
do.	"	do.	Liverpool	100	200
do.	"	do.	U. K. & or Continent	125	...
Cube Gambier	"	do.	United Kingdom	80	65
Black Pepper	"	do.	do.	...	5
do.	"	Penang	do.	40	40
White Pepper	"	Singapore	do.	120	190
do.	"	Penang	do.	...	...
Pearl Sago	"	Singapore	do.	35	80
Sago Flour	"	do.	London	375	325
do.	"	do.	Liverpool	1,300	430
do.	"	do.	Glasgow	100	150
Tapioca Flake	"	do.	United Kingdom	150	85
T. Pearl & Bullet	"	do.	do.	120	120
Tapioca Flour	"	Penang	do.	180	400
Gutta Percha	"	Singapore	do.	10	15
Buffalo Hides	"	do.	do.	100	55
Pineapples	"	do.	do.	Cases 2,500	...
Gambier	"	do.	U. S. A.	1,150	490
Cube Gambier	"	do.	do.	85	100
Black Pepper	"	do.	do.	725	230
do.	"	Penang	do.	...	...
White Pepper	"	Singapore	do.	250	60
do.	"	Penang	do.	...	...
Tapioca Pearl	"	Singapore	do.	330	240
Nutmegs	"	S'pore., Penang	do.	25	9
Sago Flour	"	Singapore	do.	550	310
Pineapples	"	do.	do.	Cases 900	1,000
do.	"	do.	Continent	700	2,500
Gambier	"	do.	South Continent	110	25
do.	"	do.	North Continent	275	470
Cube Gambier	"	do.	Continent	60	80
Black Pepper	"	do.	South Continent	320	50
do.	"	do.	North do.	160	75
do.	"	Penang	South do.	30	...
do.	"	do.	North do.	70	...
White Pepper	"	Singapore	South do.	35	...
do.	"	do.	North do.	125	30
do.	"	Penang	South do.	20	5
do.	"	do.	North do.	...	5
Copra	"	S'pore., Penang	Marseilles	50	100
do.	"	do.	Odessa	1,400	400
do.	"	do.	Other S. Continent	1,225	300
do.	"	do.	North Continent	1,300	1,400
Sago Flour	"	Singapore	Continent	1,800	600
Tapioca Flake	"	do.	do.	180	160
do. Pearl	"	do.	do.	5	10
do. Flake	"	do.	U. S. A.	100	..
do. do.	"	Penang	U. K.	90	50
do. Pearl & Bullet	"	do.	do.	40	30
do. Flake	"	do.	U. S. A.	40	...
do. Pearl	"	do.	do.	150	...
do. Flake	"	do.	Continent	10	20
do. Pearl	"	do.	Continent	110	150

				Tons.	
				15th.	31st.
Copra	Str.	S'pore., Penang	England	440	400
Gambier	"	do.	U. S. A.	..	..
Cube Gambier	"	do.	do.	..	..
T. Flake & Pearl	"	do.	do.	..	..
Sago Flour	"	do.	do.	..	..
Gambier	"	do.	South Continent	..	..
Copra	"	do.	Marsilles	..	..
Black Pepper	"	do.	South Continent	..	..
White Pepper	"	do.	do.	..	..
do.	"	do.	U S. A.	..	..
Pineapples	"	do.	do.	..	..
Nutmegs	"	do.	do.	..	..
Black Pepper	"	do.	do.	..	..
do.	"	Penaug	do.	..	..
White Pepper	"	do.	do.	..	..
T. Flake & Pearl	"	do.	do.	..	..
Nutmegs	"	do.	do.	..	..
Tons Gambier				1,100	1,650
Black Pepper				460	370

Wired on 15th & 31st October.

GOW, WILSON & STANTON, Limited—

India Rubber Market Report.

13 & 23, ROOD LANE, LONDON, E.C.

27th November, 1908.

The market has shown a rather sharp decline from the high basis established at the last sale, and only a little business has been passing in Plantation kinds privately.

To-day's Plantation Auction was the largest that has yet been held, nearly 90 tons being advertised. There was a good general demand for all descriptions at the decline, and the sale passed with satisfactory competition, most of the offerings being sold at prices showing a reduction of from 4d. to 6d. per lb. on those ruling a fortnight ago.

A parcel of Gikiyanakande Worm realised the highest price of the sale, viz., 5/7, some Ayer Angat Crepe coming next with 5/6 $\frac{3}{4}$ per lb. 5/6 was offered for a large parcel of 159 cases Lanadron Block, which was withdrawn for a higher limit.

Scrap was in request, and sold at prices showing very little alteration on last rates.

NUMBER OF PACKAGES ADVER- TISED.	Quantity in Tons.			Average Price of Plantation Rubber.		Comparative Prices.		
	Ceylon.	Malaya.	Totals.	No. of Packages sold.	Price.	Hard Fine Para.	Plantation.	
							Fine	Scrap.
To-day 1724	12½	76½	89	1442	5/1¼	5/1	5/3 to 5/7	3/4 to 4/5
Corresponding } Sale Last year }	602	7	23½	39½	90	3/1½	3/4½ to 3/10	2/2 to 2/8½

TO-DAY'S QUOTATIONS.

SHEET AND BISCUITS.		CREPE.		UNWASHED SCRAP.	
Fine Pale Worm	5/7	Very Pale	5/5 to 5/6¾	Good to Fine	4/2¼ to 4/5
Good to Fine Biscuits	5/3 to 5/4	Medium and Palish	4/11½ to 5/4½	Medium	3/4 to 3/10¼
Good to Fine Sheet	5/3 to 5/4	Dark and Brown	4/3 to 4/9		
		Rambong	3/7 to 4/11½		

PLANTATION EXPORTS.

CEYLON—1st January to 2nd November.				MALAYA—1st January to 23rd October.		
				Singapore.	Penang.	Total.
1908	...	...	274½ tons	1908... 720¼ tons	...465¼ tons	1186½ tons
1907	...	...	180¾ tons	1907... 498¼ tons	...139¼ tons	638 tons
1906	...	...	126¼ tons	1906... 241½ tons	... 31¼ tons	273 tons

PARTICULARS AND PRICES OF TO-DAY'S SALE.

CEYLON

MARK.	PKGS.	DESCRIPTION.	PRICE.
Welkandala	2	Biscuits	... 5/1 to 5/3
Verulapitiya	1	Sheet	... 5/3
Marakona	3	Fine pale and palish biscuits	... 5/3
Aberdeen	4	Biscuits	... 5/3
	1	Scrap	... 4/4
Rangalla	1	Good rejection's	... 3/6
Roschaugh	12	Fine thick pale crepe	... 5/5¾
	6	Palish	... 5/2½ to 5/5¼
	14	Good dark	... 4/7½ to 4/10
	2	Black	... 4/6
Ingoya	8	Sheets and biscuits	... 5/3½
	4	Dark crepe	... 4/3½ to 4/9¼

MARK.	PKGS.	DESCRIPTION.	PRICE.
Arapolakande	4	Biscuits	... 5/3½
	20	Crepe	... 5/1½ to 5/4
	7	Darkish to dark	... 4/3 to 5/1
Hattangalla	2	Biscuits	... 5/3½
	2	Crepe	... 4/8 to 5
Kumbukkan	3	Good brown crepe	pt. sold, ... 4/9½
Gikiyanakande	14	Fine pale and palish worm	... 5/7
	2	Brownish crepe	... 5/4½
Kepitigalla	26	Good and rough sheet	... 5/3¼ to 5/3½
	2	Scrap	... 4/1¼
Su luganga	3	Fine sheet	... 5/3½
	2	Dark crepe (pressed)	... bought in
Old Haloya	1	Biscuit	... 5/3¼
Rosehaugh	13	Good thick crepe	... 5/4½ to 5/5½
C. L.	1	Black pressed crepe	... bought in
Tudugalla	2	Brownish crepe	... 5/2¾
Kumaradola	2	Dark crepe	... 4/10½ to 4/11
Elston	1	Fine pale biscuit	... 5/4
	1	Dark crepe	... 4/11
Yogama	2	Biscuits	... 5/3½
	1	Black crepe (pressed)	... bought in
Rosehaugh	4	Good thick pt. sold	... 5/4¼
	8	Dark crepe	... 5/1¼
Doranakande	6	Biscuits and sheet	... 5/- to 5/3½
	7	Scrap	... 4/- to 4/5
Tallagalla	6	Biscuits	... 5/3½
	2	Scrap	... 4/4
Ayr	1	Biscuit	... 5/3½
Sunnycroft	4	Biscuits and sheet	... 5/3½
	1	Scrap	... 4/3½
Sorana	9	Good biscuits	... 5/3½ to 5/3½
Warriagalla	3	Block	... 3/6

MALAYA.

MARK.	PKGS.	DESCRIPTION.	PRICE.
Bila	19	Sheets	... 5/3½
	14	Brown & black crepe	pt. sold ... 4/9¼
Linggi	28	Fine pale and palish crepe	pt. sold ... 5/2½ to 5/4¾
	5	Brown crepe	... 4/11½
	11	Dark	... 4/5½
Sungei Krudda	10	Good palish & mottled crepe	... 4/11½ to 5/3½
	5	Brown crepe	... 4/9
V. R. Co., Ltd.	23	Fine sheet	... 5/3½
Klang	8	Fine pale and palish crepe	... 5/4½ to 5/4¾
F. M. S.	66	Good brownish to dark	... 4/9¼ to 5/3½
	28	Dark crepe	... 4/9¼ to 4/11
S. R. Co., Ltd.	8	Fine sheet	... bought in
	24	Fine palish and brownish crepe	... 5/1 to 5/4
	3	Good dark crepe	... 4/5
R. R. etc.	9	Rough sheet	... 5/3¼ to 5/3½
S.	1	Scrap	... 4/3¼
	5	Rejections	... 3/4 to 4/6
K. M.	1	Thick sheet (Virgin)	... 5/1
P. R.	8	Sheets	... 5/3½
S. B.	3	Scrap, etc.	... 3/6 to 4/4¾
P. R.	17	Fine sheets	... 5/3½
P. S. E.	1	Fine crepe	... 5/5½
	14	Brown crepe	... 3/11 to 4/9¾

MARK.	PKGS.	DESCRIPTION.	PRICE.
C. M. R. E. Ltd.	29	Fine pale and palish crepe	... 5/2 to 5/6
	6	Mottled crepe	... 5/1 to 5/1 $\frac{1}{4}$
	31	Dark pt. sold,	... 4/7
	14	Good sheet	... 5/3 $\frac{1}{2}$
R.	3	Crepe	... 4/6
S. S. C.	1	Dark crepe (dirty)	... 3/7 $\frac{1}{2}$
P. S. E.	3	Sheet	... 5/3 $\frac{1}{2}$
Selaba	1	Dark crepe	... 3/11 $\frac{1}{2}$
Sungei Choh	1	Black crepe pressed	... bought in
B. R. R. Co., Ltd.	42	Sheets part sold	... 5/3 $\frac{1}{2}$
	33	Good crepe	... 5/0 $\frac{3}{4}$ to 5/1
	46	Dark "	... 4/10 to 4/10 $\frac{1}{4}$
F. (S.) R. Co., Ltd.	17	Sheets	... 5/3 $\frac{1}{2}$
	31	Palish to dark crepe part sold	... 4/8 $\frac{1}{4}$ to 5/1 $\frac{3}{4}$
	13	Fine pale crepe	... 5/6
K. E.	20	Palish to darkish crepe	... 4/10 $\frac{1}{4}$ to 5/2
G. & C. L., etc.	2	Sheet	... 5/3 $\frac{1}{2}$
	19	Pressed Rambong crepe	... 4/10 $\frac{1}{4}$ to 4/11 $\frac{1}{2}$
United Serdang	21	Dark crepe	... 4/4
Linggi Plants.	17	Darkish crepe	... 4/10 to 5/0 $\frac{3}{4}$
L. A. R. Co.	5	Sheets	... 5/3 $\frac{1}{2}$
Ayer Angat	23	Fine pale crepe	... 5/6 $\frac{1}{4}$ to 5/6 $\frac{3}{4}$
	12	Darkish	... 4/5 to 5/1
Bantang Kali	14	Fine pale and palish crepe	... 5/2 $\frac{1}{2}$ to 5/6 $\frac{1}{2}$
	7	Brownish to dark	... 4/9 $\frac{1}{4}$ to 5/0 $\frac{1}{2}$
R. W. & Co.	4	Fine sheet	... 5/3 $\frac{1}{4}$
	28	Fine palish crepe	... 5/5 $\frac{1}{2}$
	14	Brown crepe	... 4/3 $\frac{1}{2}$ to 5/1 $\frac{1}{2}$
Terentang	84	Fine pale and palish crepe	... 5/5 $\frac{1}{2}$ to 5/6 $\frac{1}{4}$
	34	Darkish crepe	... 4/9 to 5/1 $\frac{1}{2}$
Linsum	43	Fine pale and palish crepe	... 5/4 to 5/6
	14	Darkish crepe	... 4/8 to 5/1 $\frac{1}{4}$
Pataling	2	Black crepe	... 4/9 $\frac{1}{4}$
	3	Fine pale crepe	... 5/6 to 5/6 $\frac{1}{2}$
	1	Mottled -	... 5/2 $\frac{1}{4}$
K.	21	Fine sheet	... 5/3 $\frac{1}{4}$ to 5/4
Highlands	39	Good brown to dark crepe	... 4/9 to 5/2 $\frac{1}{2}$
S. S. B. R. Co., Ltd.	9	Fine sheets	... 5/3 $\frac{3}{4}$
	6	Dark crepe	... 4/6 to 4/9 $\frac{1}{2}$
	3	Sheets	... 4/31 $\frac{1}{2}$
	7	Sheets	... 5/2 $\frac{3}{4}$
Golconda	15	Brown and dark crepe part sold	... 4/4 to 4/9 $\frac{1}{4}$
	1	Rough biscuits	... bought in
L. E.			
Muar Straits	159	Fine block	... "
M. B.	42	Dark crepe	... 4/9 $\frac{1}{4}$ to 5/2 $\frac{3}{4}$
E.	21	Good brownish crepe	... 5/0 $\frac{1}{4}$ to 5/5
R. M. P., Ltd.	6	Sheets	... 5/3 $\frac{1}{2}$
Jugra Est.	8	Dark and pressed crepe	... 3/3 to 5/0 $\frac{1}{4}$
Batu Caves	4	Sheets	... 5/3 $\frac{3}{4}$
	8	Brown crepe	... 5/- to 5/1 $\frac{1}{4}$
	2	Dark crepe	... 4/6
Damansara	33	Good to fine crepe	... 5/3 to 5/5 $\frac{1}{2}$
	15	Dark and pressed	... 4/2 to 5/-
S. K. R. Co., Ltd.	15	Good brown	... 5/1 $\frac{1}{2}$ to 5/4 $\frac{1}{4}$
	5	Darkish	... 4/9 to 4/10
	1	Block	... 4/9
	6	Fine palish	... 5/4 to 5/4 $\frac{1}{4}$
	10	Dark sheets	... 5/3 $\frac{1}{2}$
Perhentian	5	Dark crepe	... 4/4 $\frac{1}{2}$ to 4/10
Tinggi	5	Fine sheets	... 5/3
E. K. K. P.	2	Scrap and rejections	... 4/3 $\frac{1}{4}$

MARK.	PKGS.	DESCRIPTION.	PRICE.
B. & D.	1	Sheet	... 5/-
	17	Good to dark crepe	... 4/8 to 5/3½
	3	Sheets	... 4/- to 5
	1	Rambong	... 3/7
	1	Rejected sheet	... 4/-
	1	Fine pale sheet	... 5/3¾

JOHN HADDON & CO. SPECIAL PRODUCE LETTER.

London, November 6th, 1908.

STRAITS REPORT.

- BEESWAX** The bleaching season is over, in consequence, yellow Wax has been slow of sale and may be quoted at 2/6d to 5/- per cwt down.
- CAPSICUMS** Have shown a firmness, fine grown beans have sold well, and are wanted, buyers being prepared to pay 50/- to 60/- per cwt, but common, badly grown and dried move off slowly.
- CAMPHOR** After improving has eased off considerably until spot is only worth 147/6 per cwt and early shipment 147/6 per cwt.
- CHILLIES** Have been a strong market, Mombassa and Zanzibar advancing to 33/- per cwt, fine bright Nyassaland selling at 55/- per cwt.
- COPRA** A good trade has been done but during the past fortnight prices have been a little irregular, and rather in buyers favour. Closing, F. M. Straits at £17. 2. 6. Java £18. 2. 6.
- GUM COPAL** Supplies have been heavy and only a small proportion sold owing to a very dull market.
- Manila and Macassar: Pale amber scraped at 42/-, amber and brown at 40/-, amber and dark softish at 37/- to 38/6, pale pipey scraped at 35/-, ambery ditto at 23/- to 28/6, rough pipey sorts at 20/-, pale block at 21/-. Nubbles, good ambery at 24/6d, blocky at 21/6, rough dark at 18/6, blocky at 17/-. Chips, good pale small at 5/-, blocky at 21/6d. Dust, block at 13/-.
- Pontianac: Medium and bold pale and amber scraped at 70/-; Chips, fine bold ambery at 46/6d, ditto small at 42/-; Nubbles, good coated at 39/-.
- Sambas: Medium and bold pale hard scraped at 66/-.
- Amboyna: Medium pipey scraped at 30/-, rough dark blocky sorts at 19/-; Chips, bold dark at 20/-.

GUM DAMAR

Quiet and prices easier.

Singapore and Penang: Of 324 cases 110 baskets and 315 bags, 370 packages sold, fair grayish sorts at 48/- to 48/6, pickings at 36/6 to 37/-. Siftings, pale bold specky at 32/6 to 34/-, small dusty syecky at 27/- to 28/6d, dust at 17/6 to 21/-, block at 13/.

Batavian: 100 Cases offered and mostly sold, pale bold pale sifted at 85/-, medium ditto at 78/-, pea-size at 55/-, and assortment bulked at 70/-.

ISINGLASS

The tone generally has been quiet and prices favourable to buyers. Moderate supplies of Penang brought forward sold, good quality Leaf at 2d to 3d down but other grades about steady. Tongue which is scarce sold well.

Purse steady; Saigon met with a fair demand, long leaf barely steady, but round leaf fully 3d down.

PENANG:—94 packages offered (about 21,700 lb) and 61 sold: Round leaf, fair to good heavy pale at 3/11d to 4/2d, middling to fair palish at 3/2d to 3/10d, ditto reddish at 2/3d to 2/11d, small part thin and rough, dark at 1/7d to 2/1d, pickings at 9½d to 1/5d. Tongue, fair to good heavy at 3/4d to 3/11d, middling ditto at 2/4d to 2/8, small thin at 1/9d; long, fair to good pale at 2/4 to 3/-, thin pickings at 1/2d. Tails, fair pale at 1/5d to 1/6d. Purse, fair heavy at 1/1d, ordinary to middling at 9d to 11d.

SAIGON:—61 packages offered (about 14,300 lb.) and 35 sold: Long Leaf, good heavy pale at 5/5d to 5/6d, fair ditto at 5/1d to 5/3d, middling at 4/6d to 4/9d, reddish and dark at 4/2d to 4/3d, dark rough part small and thin at 3/7d. Round Leaf, good heavy pale at 4/1d, middling to fair yellow and reddish at 3/6d to 3/10d, reddish part rough and thin at 2/4d to 2/8d, small thin at 1/8d.

PEPPER

Little change can be noted here. A fair business has taken place in Black Singapore, closing January, March shipment at 2¼d per lb. c.i.f. delivered weights.

WHITE PEPPER:—is firm closing near at hand at 4½d per lb. c.i.f. October December at 4½d c.i.f. delivered weights.

RUBBER

Has been a strong and advancing market. The shipments of Plantation Para selling at improving rates. At the present time fine hard Para is worth 4/9d per lb. but may be expected to reach 5/- per lb. before long.

The last offerings of Malay and Straits amount to about 44 Tons.

RUBBER *(continued)*

Malay and Straits (about 44 Tons.) Sheet, fair to fine 5/- to 5/2d, dark mixed immature at 4/2d, to 4/8d. Crepe, good to very fine pale at 5/2d to 5/3d, fair to good palish at 5/- to 5/1d, palish mottled at 4/8³/₄d to 4/11³/₄d. clean brown at 4/6¹/₂d to 4/8³/₄d, dark brown at 4/1³/₄d to 4/5d dark and black at 4/- to 4/1d. Scrap, fair to fine at 3/8 to 3/10¹/₄d, mixed part inferior at 2/6¹/₂d to 3/4d, virgin pieces at 3/8d to 3/10¹/₂d. Rambong, sheet at 3/10¹/₄d, fair crepe at 3/8¹/₂d to 3/11d. per lb. Since then private sales at improved rates.

SAGO

Market has continued quiet with only a small business passing both for spot and arrival.

TAPIOCA

Market has been quiet. We close barely steady, Singapore November, December and January, March shipment at 1¹/₃³/₄d also February, April at 1¹/₃³/₄ c.i.f. On this basis there is a fair business 32 to be done.

Pearl also easier. Singapore October, December closing sellers at 12/9d, and fair Penang at 11/9d c.i.f. Buyers ideas are about 3d below these rates.

All descriptions of Produce sold to the best possible advantage.

Perak.

Abstract of Meteorological Readings in Perak for the Month of November, 1908.

32

DISTRICT	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taipeng	...	148	79°17	90	70	20	75°83	850	...	85	...	27.27	5.20
Kuala Kangsar	77°63	88	71	17	74°90	832	...	87	...	16.13	3.59
Batu Gajah	...	152	78°25	89	73	16	75°67	854	...	89	...	9.29	3.48
Gopeng	77°86	88	62	26	74°41	806	...	84	...	16.59	2.57
Ipoh	78°26	89	70	19	75°32	838	...	86	...	11.47	3.97
Kampar	78°52	91	69	22	75°36	837	...	86	...	20.74	4.20
Teluk Anson	80°29	93	69	24	76°12	845	...	82	...	8.32	1.90
Tapah	79°14	92	68	24	75°33	828	...	83	...	11.96	2.65
Parit Buntar	79°81	88	70	18	76°40	866	...	85	...	10.43	2.41
Bagan Serai	79°75	90	71	19	76°15	854	...	85	...	10.30	2.03
Selama	78°90	89	72	17	75°73	849	...	86	...	15.22	2.45

STATE SURGEON'S OFFICE,

Taipeng, December 14th, 1908.

M. J. WRIGHT,

State Surgeon, Perak.

Penang.

Abstract of Meteorological Readings in Criminal Prison Observatory for the month of November, 1908.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison	29.885	140.9	80.1	85.8	70.4	15.4	76.4	0.851	77.9	83	N. W.	4.23	1.10
Fort Cornwallis	5.91	...
Government Hill	11.18	...
Balik Pulo	8.00	...
Lepu Asylum	7.09	...
Pangkore	14.74	...
Bruas	3.70	...
Lamut	10.98	...

CRIMINAL PRISON PENANG,
Penang, 14th December, 1908.

W. H. FRY,
Senior Medical Officer Penang.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of October, 1908.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Mean Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis	79.1	92	68	19.9	75.7	...	...	...	...	5.98	1.25
Raub	79.1	91	66	19.9	74.1	...	...	...	...	13.65	3.60
Bukit Fraser	15.66	2.41
Bentong	81.1	92	69	17.4	75.9	...	...	...	...	13.45	3.37
Temerloh	94	71	16.9	...	...	...	...	...	7.9	2.51
Pekan	83.0	92	71	16.0	78.0	...	...	...	...	11.37	1.84
Kuantan	84.6	93	71	16.5	77.9	...	...	...	..	11.94	1.57

STATE SURGEON'S OFFICE,

W. FLETCHER,

Kuala Lipis, 25th November, 1908.

State Surgeon, Pahang.

Seremban.

Table Showing the Daily Results of the Reading of Meteorological Observation taken at the General Hospital, Seremban, for November, 1908.

DATE.	TEMPERATURE OF RADIATION.						TEMP T RA- DIATION.		WIND. DIRECTION.		TEMP T OF EVAPORATION.			COMPUTED VAPOUR TEN- SION.			RELATIVE HUMIDITY.			CLOUDS 0 TO 10			WEATHER INITIALS.			RAIN Inch		
	9	15	Mean.	Maxi- mum.	Mini- mum.	Range.	Sun.	Differ- ence Sun & Shade.	9	15	9	15	Mean.	9	15	Mean.	9	15	Mean.	9	15	21	9	15	21			
	H.	H.							H.	H.	H.	H.		H.	H.		H.	H.		H.	H.	H.	H.	H.	H.			
1	78	83	80.5	84	71	13	134	55	N W	N W	72.9	74.7	73.8	810	806	833	84	76	80.0	3	4	0	S	N	C			
2	74	85	79.5	90	69	21	134	44	N W	N W	70.5	81.7	76.1	748	1.082	915	89	90	89.5	8	7	6	S	C	C	2.50		
3	75	84	79.5	91	71	20	135	44	N	N W	69.8	76.0	72.9	731	897	814	84	85	84.5	5	6	4	S	C	C	.50		
4	75	88	81.5	89	72	17	148	59	N	N W	71.6	79.8	75.7	774	1.018	896	89	77	83.0	6	4	4	S	C	C			
5	74	84	79.0	90	71	19	140	50	N W	N W	70.9	79.0	74.9	76	990	873	84	85	84.5	3	4	6	S	C	C			
6	75	86	80.5	91	72	19	138	47	N W	N W	72.3	77.0	74.6	793	955	874	94	76	85.0	2	6	9	S	C	C			
7	77	87	82.0	92	73	19	114	22	N W	N W	75.3	80.4	77.8	877	1.040	958	94	81	87.5	2	4	7	S	C	C			
8	74	86	80.0	90	70	20	143	53	N	N W	70.2	79.4	74.8	739	1.068	873	94	80	87.0	2	3	8	S	C	C	1.20		
9	75	85	80.0	91	71	20	145	54	N	N W	71.6	83.4	77.5	774	1.141	957	89	95	92.0	2	4	6	S	C	C	.76		
10	80	84	82.0	92	71	21	144	52	N W	N W	76.6	82.3	79.4	916	1.103	1.009	90	95	92.5	4	3	7	S	C	C	.24		
11	72	83	77.5	91	72	19	135	44	N W	N W	68.5	79.7	74.1	696	1.010	856	89	90	89.5	2	3	2	S	C	C	.76		
12	76	85	80.5	86	70	16	142	56	N W	N W	72.6	81.7	72.1	801	1.032	941	89	90	89.5	3	6	6	S	C	C	.31		
13	76	83	79.5	85	70	15	132	47	N W	N W	72.6	78.0	75.3	811	956	878	89	85	87.0	3	7	4	S	C	C			
14	77	82	79.5	83	70	13	131	48	N W	N W	71.9	78.7	75.3	783	978	885	84	90	87.0	3	5	4	S	C	C			
15	78	84	81.0	85	69	16	114	29	N	N W	72.9	76.6	74.7	810	916	813	84	90	87.0	2	6	7	S	C	C	.40		
16	77	81	79.0	84	69	15	139	55	N	N W	73.6	74.3	73.9	829	849	839	89	80	84.5	5	6	7	S	C	C	.90		
17	78	83	80.5	91	70	21	144	53	N	N W	72.9	68.0	75.4	810	684	747	84	60	72.0	7	0	6	S	C	C			
18	79	82	80.5	85	71	14	143	58	W	S W	77.3	78.7	78.0	937	978	957	95	90	92.5	5	4	3	S	C	C			
19	78	83	80.5	84	70	14	142	58	S W	N W	73.9	76.3	75.1	839	995	872	85	80	82.5	4	6	4	S	C	C	.50		
20	79	84	81.5	86	71	15	145	59	N W	N W	73.9	79	76.4	889	990	814	85	85	85.0	4	6	6	S	C	C			
21	79	83	80.5	85	71	14	144	59	N	N W	75.6	78.7	77.1	888	978	933	90	90	90.0	3	4	3	S	C	C			
22	78	82	80.5	84	71	13	146	62	N	N W	74.6	79.7	77.2	857	1.010	932	89	90	89.5	4	5	7	S	C	C	.15		
23	72	86	79.0	86	70	16	143	57	W	N	70.2	71.2	75.7	739	763	751	94	61	77.5	2	5	7	S	C	C			
24	73	83	78.0	85	72	13	144	59	N	N W	65.5	76.3	72.9	722	905	814	94	80	87.5	4	7	8	S	C	C			
25	72	82	77.0	84	71	13	140	56	N	N W	68.5	77.0	72.7	696	926	811	89	85	87.5	3	4	2	S	C	C	.60		
26	73	82	77.5	85	71	14	140	55	N W	N W	67.8	72.0	69.9	600	755	732	84	72	78.0	4	3	2	S	C	C	.10		
27	74	84	79.0	84	71	13	144	60	N W	N W	68.8	82.3	75.6	705	1.103	904	81	95	89.5	4	2	3	S	C	C			
28	76	84	80.0	85	71	14	142	57	N W	N W	72.6	74.0	73.3	801	840	820	89	72	80.5	2	4	2	S	C	C			
29	74	82	78.0	86	70	16	140	54	N W	N W	68.8	72.0	75.0	705	785	745	84	72	79.0	2	3	2	S	C	C	.56		
30	76	80	78.0	84	70	14	142	58	S W	N W	70.9	73.3	72.1	756	820	788	84	80	82.0	2	4	2	S	C	C			
Total..	75.8	80.4	78.1	86.9	70.7	16.2	138 9	52			72.0	77.4	74.7	787	945	866	88.1	82 6	85.3									8.71

Seremban, 12-10-1908.

D. MELCHIZEDEK.
Apothecary.

Negri Sembilan.

Abstract of Meteorological Readings in Negri Sembilan Hospitals for the month of November, 1908.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Seremban	...	148	73.5	86.9	70.7	16.2	78.7	866	74.7	85.3	N. W.	8.71	2.50
Ayer Kuning	10.87	2.70
Tampin	8.94	2.50
Jelevu	7.10	1.00
Kuala Pilah	8.25	1.28
Port Dickson Beri-Beri Hospital	8.59	1.73
Port Dickson town	7.85	1.48
Mantin	6.42	1.93

STATE SURGEON'S OFFICE,
Seremban, 10th December, 1908.

S. LUCY,
State Surgeon, Seremban.

Kelantan.

Abstract of Meteorological Readings in Kelantan for the month of November, 1908.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
				Mean F°	Mean F°	Mean F°						Inches	Inches
Kuala Lebir	83.95	72.28	11.67	...	...	...	...	...	11.24	1.95
Kuala Pergau	12.54	1.74
Kuala Kelantan	80.50	72.27	8.23	...	...	...	...	...	27.38	5.35
Taku Plantation	11.03	1.73

STATE SURGEON'S OFFICE,
Kelantan, 10th December, 1908.

JOHN D. GIMLETTE,
State Surgeon, Kelantan.

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AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

No. 2.]

FEBRUARY, 1909.

[VOL. VIII.]

**REPORT ON THE INTERNATIONAL RUBBER
AND ALLIED TRADES' EXHIBITION HELD
IN LONDON Sep. 14th-26th, 1908.**

Part I.

This, the first International Rubber Exhibition was convened with the object of demonstrating the present position of a comparatively new industry and of furnishing an opportunity for its further development by an interchange of ideas between all concerned.

To comprehend the present position of the industry it is well to remember that, in 1827, or 80 years ago, the world's demand for raw rubber amounted to 50 tons, and for the year 1907-8 it is computed at 65,000 tons, of an approximate value of £20,000,000. As a matter of fact this enormous industry has been developed during the last 50 years or less, for—although there has been a small demand for raw rubber since 1827—real commercial enterprise did not commence until the discovery and perfecting of the process of vulcanization by Goodyear, Hancock, and Parkes, about 30 years later. Since that time the demand for raw rubber has annually increased while some sources of supply have been practically exhausted, and in others, the future output is not assured. It should be said too, that the remaining areas of the world as a probable source of wild rubber is not considerable.

RUBBER PRODUCING PLANTS.

Until the recent discovery of "Guayule" all known rubber producing plants* were included in the four Natural Orders of *Euphorbiaceae*, *Moraceae*, *Apocynaceae*, and *Asclepiadaceae*. The addition of "Guayule" (*Parthenium argentatum*) and Colorado rubber (*Actinella Richardsonii*) introduces another order, viz. *Compositae*. An addition to the *Asclepiadaceae* is furnished by a new introduction from Angola and Zambesi called Encanda rubber, and described as *Raphionacme utilis*. There are five other Natural Orders of which some genera are said to be lactiferous plants but of theoretical interest only.†

The arrangement of the different families of commercial rubber plants is as follows:—‡

Euphorbiaceae:—*Hevea*, *Manihot*, *Micrandra*, *Sapium*.

Moraceae:—*Ficus*, *Castilloa*.

Apocynaceae:—*Landolphia*, *Funtumia*, *Carpodinus*, *Clitandra*, *Tabernamontara*, *Mascarenhasia*, *Hancornia*, *Forsteronia*, *Willughbeia*, *Urceola*, *Leuconotis*, *Melodinus*, *Parameria*, *Chonemorpha*, *Chilocarpus*, *Dyera*, *Alstonia*.

Asclepiadaceae:—*Cryptostegia*, *Raphionacme*.

Compositae:—*Parthenium*, *Actinella*.

RUBBER SOURCES.

The world's output of raw rubber is stated to be as follows:—

South America (including Mexico)	43,000 tons.
Africa	22,000 tons.
Eastern and Indo Malaya	500 tons.
Total	<u>65,000 tons.</u>

All of this output is forest or wild rubber.§ From South America the bulk of rubber is obtained from Para rubber (*Hevea Braziliensis*). Other supplies are Ceara rubber (*Manihot Glaziovii* and *Manihot* sp.) Caucho ball,

*The guttas (or getah percha) belong to the N. O. of *Sapotaceae* and include *Dichopsis*, *Plaquium*, *Payena*, and *Mimusops*.

† Kew Bulletin No. 4, 1908, P. 199.

‡ The Malayan species of *Artocarpus* (*getah tarap* and *tampang*) are not classed as commercial rubbers.

§ About 1000 tons of plantation rubber is not included in this estimate.

or Ule in Mexico, (*Castilloa Elastica*) Mangabeira rubber (*Hancornia speciosa*) and recently from Mexico "Guayule" —(*Parthenium argentatum*). The following genera also produce valuable rubber which is probably mixed with Para—*Micrandra*, *Sapium*, and *Forsteronia*.

The South American export of rubber for the last fiscal year is said to be 36,000 tons (of this 7,500 tons is Caucho ball), by way of Brazil, and about 5000 tons from Mexico, most of which is said to be "Guayule" and one-fourth is exported to Europe (principally Germany) and the remainder to the United States.

In Africa the principal rubber producing plants are several species of *Landolphia*, and Lagos silk rubber (*Funtumia elastica*). Other rubbers are the root rubbers—*Carpodinus lanceolatus* and *Clitandra Henriquesiana*. N'-Harasika rubber tree (*Mascarenhaisa elastica*). Some rubber is also obtained from *Ficus Vogelii* and the genus *Tabernamontana*

These are widely distributed over tropical Africa. On the West Coast from Senegambia, Sierra Leone, Gold Coast, Ivory Coast, Lagos, Cameroons, Nigeria, Congo, Gaboon, to Angola and Benguela. On the East Coast from Mozambique, Madagascar, Zanzibar, Nyasaland to German East Africa. From the interior of Africa, rubber is exported from Uganda. The following trade names indicate from where African rubbers are exported:—Madagascar-niggers, Mozambique ball, Hausa thimbles, Niger cake, Ivory Coast lump, Hausa tail, Benin lump, and others.

The total output of African rubber is stated to be 23,000 tons (which is said to be excessive by some authorities) of this 4,800 tons is supplied by the Congo State, about 1,500 tons from the Gold Coast (a considerable shrinkage from previous years) and the balance from other parts of Africa, chiefly Madagascar Mozambique, Uganda, Lagos, Angola, and the Cameroons.

Asiatic or Eastern rubbers include Assam rubber, i.e. Malayan Rambong, (*Ficus elastica*), Gerip, Singarip, or Bornean rubber (*Willughbeia* sps:). Other genera are *Leuconotis*, *Urceola*, *Melodinus*, and *Parameria*. There are other rubbers but these do not appear to be included in the usual records and are not mentioned now. At the present time the most important sources of wild rubbers are Sumatra, Borneo, and possibly New Guinea. Figures shewing the output are given from British India only and are placed at 200 tons.

I would, however, call attention here to an important discrepancy between the figures stated to represent the output of Asiatic rubber and the actual exports. It has been ascertained that not less than 10,000 tons of Jelutong (*Dyera costulata*) are used annually, and is exported via Singapore and ports to America and Germany. Jelutong, is a low grade rubber, but it is of as much importance as the Mexican Guayule;—indeed, there is strong inquiry for it—and I can only suppose the omission occurs because none of the rubber is used in Great Britain.

If therefore Jelutong is added to the estimated output of wild rubber the grand total would be 75,000 tons instead of 65,000 tons.

It should be remarked that this output of 65/75000 tons is not only the world's demand but also the world's supply of wild rubber, and at the time of writing the former exceeds the latter—especially for fine grades of rubber—but a change is at hand; already—during the last fiscal year—1000 tons of cultivated rubber have been marketed; rubber cultivation is being attempted in the tropics all over the world; the annual output of rubber from plantations in—and coming into—bearing, is certain to increase enormously; and a brief review of the economic situation with the aid of observations made at the exhibition may be opportune.

COMMERCIAL RUBBER.

At the exhibition there were 30 countries represented and samples of nearly all commercial rubbers were on view for comparison or study. The first impression that would be formed by even a casual inspection, was the preponderance of Para over all other rubbers. There could have been an interesting exhibition of Para rubber only, and without it an equally disappointing one. It is however, very important that the possibilities of all commercial rubbers are examined, but in this review I will leave Para rubber for the last.

EUPHORBIACEÆ.

Manihot Glaziovii (Ceara rubber) was only sparingly exhibited but the few perfect biscuits and small samples, in the Ceylon and West Indies' sections, received much attention. This species was obtained from the Province of Ceara by Cross and distributed to the West-Indies, India, Ceylon, Africa, and the Straits, about the year of 1877. Until quite recently all reports in respect of yield were

disappointing and its introduction being contemporary with the introduction of *Hevea brasiliensis* very little progress had been made. From several different countries from the East, Africa, and West Indies, reports agree in respect of luxuriant growth, but a scanty yield of latex. This may be due to excessive humidity or to variety—as there are some favourable reports from Southern India—and as there are varieties of *Manihot*, it may be that most of the Eastern species is of a poor strain, or as said before, the climate is too damp. Future trials in Malaya would stand the best chance of success if planted at Port Dickson, or the Northern part of Province Wellesley.

It should not be forgotten that this rubber, when well prepared obtains the highest price. It grows best in dry tropical countries on the poorest soils and if it can be successfully cultivated it would have to be reckoned with as a rubber of the finest grade.*

Formerly Ceara rubber appeared on the market in the form of "serap," being coagulated on the trees by natural heat in tears or strips and subsequently collected and rolled into balls. In this scrappy and impure condition its value naturally depreciated but the rubber now prepared in India, Ceylon, and German East-Africa, is valued about the same as the best plantation Para. The Imperial Institute published the analyses of some samples recently examined. I quote the highest and lowest:—

Ceara Rubber	highest	lowest.
Caoutchouc per cent	85.6	82.8
Resin	6.3	5.5
Proteids	6.2	9.4
Ash	1.9	2.3

Other species—perhaps more valuable are:—

Manicoba rubber (*Manihot dichotoma*) and *M. Piauhyensis*.

* It will be remembered that, at the Ceylon rubber exhibition the novelty of Lanadron block rather than intrinsic quality obtained for it the gold medal over a sample of Ceara rubber.

Micrandra siphonoides† is obtained from the far interior of Brazil. It is believed to be a fine grade rubber but native collectors mix the latex with that of *Hevea* and consequently very little is known of its actual value.

Sapium is a genus extending over all the rubber growing districts of Brazil, Colombia, Venezuela, and British Guiana. There are a few species containing latex which is used in Brazil for mixing with the latex of *Hevea*. *Sapium biglandulosum*—the most common species of Brazil has been reported on at different times and its rejection as a commercial rubber has led to some confusion as to the value of other species; particularly, *Sapium Jenmani*—(Touckpong) a native of Guiana and extending to Venezuela and N. Brazil. This plant supplies a high grade rubber but a chemical analysis had not been published at the time of the exhibition. It is anticipated that its cultivation will be taken up extensively in different parts of the West Indies, seedling plants, however, compared with the robust *S. biglandulosum* did not impress me as possessing the constitution of a vigorous growing tree for plantations. Other species of value are *S. utile* (Palo de leche) from Ecuador and Peru, and *S. verum* (Virgin caucho) from Colombia. Price variable, about 3/2 against 4/6 for fine, hard Para.

MORACEAE.

Ficus is an extensive old world genus but only a few of the many species produce rubber of commercial value. *Ficus elastica* (Rambong or Assam rubber) is the most valuable species and is now cultivated in India, Ceylon, British Malaya, Java, and Sumatra, but not so extensively as was expected a few years ago—possibly due to the higher price obtained for Para rubber and its most regular yield of latex. This *Ficus* is one of the earliest known of Asiatic rubbers and was first brought to notice by Dr. Roxburgh over a century ago. In a wild state the plant is epiphytic, growing on other trees or rocks, and appears as a small crown or crest of short branches on long rambling aerial roots. Under cultivation it is grown as an arborescent tree and develops stout lateral branches and a consequent larger area of bark for tapping. On some estates in the Netherlands the aerial roots are pruned off and the tree is cultivated as a standard, i.e., a bushy crown and large main stem. Its habitat extends from the Sikkim

† *Micrandra siphonoides* = *Hevea* sp, but is regarded as distinct by the Seringuieros of Brazil.

Himalaya, Assam and bordering States to Upper Burmah, the Malay Peninsula and Sumatra. In habit there is well marked varietal types of this species;

- (a) The Assam type has a straggling habit with pale green rather narrow leaves and the yield of latex is only moderate.
- (b) The Malayan type is of compact habit with larger green leaves (on young trees) and brilliant coloured stipules. The yield of latex is considerable, provided the period of recuperation is a lengthy one.
- (c) The Sumatra type resembles the Malayan plant but is a more ornamental form, the leaves are deep shining green and more elliptic, and like its Malayan congener the yield of latex is large if not tapped too frequently.

Formerly Rambong rubber appeared on the market in the form of scrap only—as the bulk of it does at the present time—but other forms of preparation are forthcoming and improving prices are being obtained. With old trees there is a short flow of latex, followed by a slower exudation which coagulates in tears and strips by natural heat on the incisions made on the tree. This if removed as soon as agglutinated may be boiled and prepared in the form of biscuit or sheet. On younger trees, there is, comparatively a better flow of latex and this can be treated with liquid ammonia, when the particles of caoutchouc, (after stirring) gradually separate into a thin layer and can then be skimmed, washed, rolled into biscuits, or passed through a crepe machine and dried.

A long period of rest is necessary owing to the thick latex peculiar to this tree and the more concentrated form in which the caoutchouc is obtained, despite this drawback the average yield per tree is probably higher than Para rubber, and considering the immunity of the tree to disease, its simple culture and light cost of working, as well as the fine grade of rubber when well prepared, Rambong has many claims for more extended cultivation in British Malaya. At the exhibition the Netherlands' section included sheets, cakes—and in bulk,—crude Rambong balls, or rolled scrap pickings bound up with Rambong ribbons obtained by slicing pressed scrap. In the Malayan section Rambong was exhibited in crepe form but only a few estates were represented. The low price of 3/8 against 4/6 for 'fine hard Para' is stated to be due to the small quantity

of plantation Rambong on the market. An analysis of well prepared Rambong compares favourably with the best Para, there is very little difference in respect of caoutchouc, but the percentage of resin and proteids is slightly higher.

In Java the Netherlands' government have rubber plantations comprising nearly 15,000 acres of mostly Rambong.

In Africa moderate grade rubber is obtained from *Ficus Vogelii*.

Castilloa elastica (Ule, Central American rubber, or caucho-ball) is a native of Central America including Mexico, Guatemala, Nicaragua, Panama, Honduras, parts of Colombia to Peru; and when fully grown is the largest of all rubber trees. Owing to excessive trapping—and very often felling—most of the large indigenous trees are already exterminated, but a considerable area in Mexico—estimated at 100,000 acres—is already under cultivation—a factor which must not be lost sight of in considering the future prospects of the rubber market. In the West Indies, too, cultivated *Castilloa* is a rubber which it is expected will be heard of in the future. The yield of rubber from *Castilloa* is high, being about the same as Para and varies from 2—16 lbs. according to the size and age of the tree. The latex has an acid re-action and cannot be cured by smoking. It is coagulated by boiling, or sometimes with the addition of alum or salt, or a decoction made from the stems of the moon-flower. A much improved process for coagulating the latex by means of separation is now adopted. With the aid of a machine rotating about 6000 times per minute the particles of caoutchouc are separated in a few minutes into a white layer and can then be taken off and dried. It is expected that all the future plantation *Castilloa* will be prepared by centrifugalising and a better marketable rubber will thus be obtained, as by this method of preparation the high percentage of resin can be disposed of. The nerve or tensile strength of *Castilloa* is not so good as Para, neither has the rubber ever obtained so high a price. At the time of writing caucho ball (dirty scrappy *Castilloa*) is quoted at 3/10 against 5/4½ for fine hard Para.

The attempted cultivation of this species in British Malaya can only be described a failure.

APOCYNACEAE.

The genus *Landolphia* include several valuable species, the most important being *L. florida* (*Vahea comorensis*) *L. ovariensis* (white rubber vine) and *L. Kirkii* from East tropical Africa.

Other species are:—*L. Thollonii*, Southern Congo, *L. Buchananii*, East tropical Africa, *L. petersiana*, Trop Africa, *L. senegalensis*, and *L. tomentosa*, W. Coast, *L. madagascariensis*, East Coast. The *Landolphias* possibly occur all over tropical Africa including Madagascar and Zanzibar. All are climbing plants resembling the Malayan *Willughbeias* and require a post or other tree to support the vine or liane and consequently are not of easy cultivation. The supply of rubber from indigenous plants owing to excessive and uncontrolled tapping—has considerably diminished. In German East Africa more control is exercised and worked areas are stated to be closed for a period of 3 or 4 years after tapping. Plantations, too, are being formed at the Botanic stations of British African possessions but it is doubtful if these can do more than reserve seeds.

So far, only dirty, badly prepared rubber has been put on the market from Africa and some of this loses as much as 50% weight in washing. In some parts of Africa the native collectors allow the latex to flow on the ground, where some of the moisture is adsorbed or evaporated and when coagulated is afterwards gathered regardless of dirt. In other parts the negroes smear the latex over their bodies and when sufficiently agglutinated, tear it off and roll into balls. From the Congo some *Landolphia* rubber is obtained by diluting the latex with water and as the caoutchouc separates it is skimmed off and kneaded into various forms, while at other places on the West Coast rubber is prepared by treating the latex with salt-water, lime juice or boiling effusions of certain plants, notably *Bauhinia reticulata*. As may be inferred much of such rubber is very poor grade and only obtains a low price. Some of the best prepared Mozambique ball (probably—*Landolphia Kirkii*) reached $4/9\frac{1}{2}$ against $5/4$ for fine hard Para.

Funtumia elastica (Lagos silk rubber) was first reported from Lagos in 1894. It is widely distributed on the West Coast and is also abundant in Uganda. Unlike the climbing *Landolphias*—to which *Funtumia* is allied—this species forms a medium sized tree and admits of easy cul-

tivation. Its discovery has compensated the African output for the loss of *Landolphia* rubbers through excessive tapping. Some nice samples of clean *Funtumia* were exhibited from the Gold Coast and Uganda—and improved methods of preparation are being carried out in these possessions—but much of the trade rubber is prepared by boiling, a method open to many objections; and the market price of such rubber is about $2/8$ with fine hard Para at $4/6\frac{1}{2}$.

Carpodinus lanceolatus and *Clitandra Henriquesiana* are the so called root rubbers. These are semi-herbaceous plants found in the Congo and as far as Portuguese South West Africa and North West Rhodesia. These little plants grow from 1-2 foot high and contain some latex in the leaves and stems but principally in the creeping underground rhizome. To obtain the rubber the whole plant is removed, the roots are cut into lengths, dried, and afterwards macerated in water for some days when the caoutchouc can be beaten out, but as the resulting rubber is mixed with particles of the plant such impurities detract from its market value.

Its growth is probably too slow for remunerative cultivation, as it does not appear to be utilized in any of the many plantations now being formed in many parts of Africa.

Tabernamontana, crassa is a dwarf growing tree native of Seirra Leone and supplies of the rubber from that country and the Gold-Coast. This plant is grown in the Botanic Gardens of the Straits and at Kuala Kangsar, Perak, where it attains the dimensions of a moderate sized tree. The yield of latex is scanty and the percentage of caoutchouc low. Another species of *Tabernamontana* supplied much of the rubber exported from Madagascar after the *Landolphias* had been exhausted but this, too, in turn, soon largely diminished owing to excessive tapping. A third rubber producing species *T. Thurstoni*—a moderate sized tree—grows in Fiji and produces some rubber.

Mascarenhasia elastica (N'harašika or Mgoa Rubber tree) a native of British and Portuguese East Africa supplies an addition to the rubber exported from those countries. The annual value of the rubber (including *Landolphia Kirkii*) exported from British East-Africa averages £20,000. There are a few specimens of this species in the Singapore Botanic Gardens.

Hancornia speciosa (Mangabeira Rubber) is a slender growing tree fairly abundant over nearly all Brazil from Pernambuco to Peru. Unlike the Heveas it grows in poor soils, and up to an elevation of 5000 feet. In some parts of Brazil the latex is diluted with water and as the particles of caoutchouc coagulate it is skimmed and dried. At Pernambuco coagulation is obtained by the addition of alum, and in Peru—soap-suds. In other parts common salt is used for clotting the latex, but with any of these methods Mangabeira is imperfectly, and in fact, only partially coagulated and frequently ferments giving off an offensive odour, and there is also a heavy loss of weight (from 40-50%) in washing. There appears to be a fair supply of this rubber, valued at $3/1\frac{1}{2}$ against $5/4$ for standard market price, no doubt it would be much improved if coagulated by centrifugalising as is done with *Castilloa*.

Forsteronia gracilis is a climbing plant native of British Guiana, North Brazil, and Venezuela. The rubber reported has been fine grade and the cultivation of the plant in the West Indies is expected. I would however again remark that the cultivation of climbing rubbers has not so far met with success. Another species *F. floribunda*, is found in Jamaica and is also said to produce fine grade rubber.

The Indo-Malayan *Apocynaceae* are well represented by the genus *Willughbeia** (getah gerip, singlarip, getah susu, and many other names according to locality). The best rubber is obtained from *W. firma*, formerly common in British Malaya, Sumatra, and Borneo. The rubber is obtained by ringing the liane and the latex drops into folded palm leaves, or native cups, and is coagulated with alum or salt when slightly heated. In this form the rubber is of poor quality—very wet, and loses from 40-50% in washing and at the present time is worth about $2/9$. What is now supplied comes principally from Borneo but the output has largely diminished from all sources. A few years ago, in Malacca and in the F. M. S. getah gerip or *Willughbeia* (of sorts) was used by natives for adulterating getah percha and getah taban.

Other species are:—*W. coriacea*, *W. tenuiflora*, and *W. flavescens*, and the Bornean rubber is a mixture of any or all of these, and probably other rubber vines too. None of these rubber vines have been successfully cultivated in

* In Malaya, the Peninsula, Java, Sumatra, and Borneo the generic term of gutta or getah is applied to all elastic gums.

the wild state the lianes may reach 4-6 inches diameter but under cultivation no such dimensions can be obtained, and even if under cultivation satisfactory growth could be obtained, I am confident that, at the present time such cultivation could not be made remunerative, and the superior claim of arborescent trees over climbing plants—for economic working—will commend itself to all parties.

Urceola elastica (getah gerip tembaga and getah gerip merah) is also a climbing plant. It does not grow in Borneo and is now rare in the Malay Peninsula. This was the first rubber plant brought to notice from any part of Asia by Mr. J. Howson—a surgeon of Penang—in 1798.

The rubber is fair grade—of the quality of *Willughbeia firma*.

Leuconotis eugeniaefolius (akar Getah sundi*) another climbing plant occurs in the Malay Peninsula, Sumatra and Borneo. A fair grade rubber but now rare. There are 2 or 3 species.

Melodinus orientalis is also a Peninsula climbing plant of only little value. It was formerly used for adulterating the latices of *Willughbeia* and *Leuconotis*.

Parameria glandulifera (akar gerip puteh) and another apocynaceous climber—*Chonemorphs macrophylla*—have a wide Eastern distribution and some repute as rubber plants. A sample of rubber prepared from *Chilocarpus costatus* was exhibited in the Netherlands section from Sumatra.

Dyera costulata (getah jelutong) is a well known tree in all parts of Malaya but has only received attention for its commercial value during the last few years. It is a gigantic tree—much larger than *Castilloa* (the writer remembers a tree in Malacca nearly 200 feet high, and at a man's height from the ground it requires 5 men with outstretched arms to span its circumference§). Locally, the wood—although light, is less brittle than *Hevea* or *Castilloa* and is used for several bazaar purposes, and by Chinese for wooden sandals. Hitherto, native collectors obtained small supplies for adulterating better grade rubbers and for making a local bird lime. Although the latex only contains a small percentage of caoutchouc (about 5%) a large tree is capable of yielding a considerable volume of such latex, reports place the weight at 2 or 3 pikuls,† and as previously stated, about 10,000 tons of this rubber is

* Getah Sundeh (true)=*Payena Leerii*, a true gutta not rubber.

§ About 30 feet circumference.

† One pikul=133 lbs.

annually exported—principally from Borneo and Sumatra.‡ The bark is medium thick, soft, and very easy to excise, and new bark is formed much quicker than with any other rubber tree, and with ordinary skill and discretion there is not any reason why a single tree should be lost through over tapping.

The latex is coagulated by natural heat and evaporation, pressed into balls and cakes and preserved with the addition of formalin. In this form it has the appearance of a white spongy cheese and a smell that is pungent.

It is a huge mistake to suppose that these low grade rubbers are only used for cheap varnishes or pasting wall papers. I quote from Dr. Wermer Eschs' notes on manufactured india rubber at the recent exhibition. "To-day Para rubber has had to be abandoned "as far as the manufacture of considerable part of our India rubber goods is concerned, and its place has been taken by cheaper rubbers. We have had to learn to renounce to a great extent "the easy workable Para rubber, and to condescend to take "up the wearisome study of the methods of treatment of " "Guayule" many have been unsuccessful herein on account of inability to fit themselves into the new conditions and surroundings."

This *Dyera* (*Jelutong*) rubber is similarly used—so I was informed—in Germany, i.e. for compoundings and fillings as with low priced goods the best rubber are prohibitive and with some other goods it is claimed that the article is improved by such addition or (qualified) adulteration.*

Owing to the poor grade and low price obtained for Jelutong rubber its cultivation would not attack private enterprise, but considering the demands; the simplicity of conserving or fostering the present forest trees in the Peninsula; the importance of this rubber is worthy of attention.

In Malaya jelutong grows readily everywhere from naturally sown seeds. It may be profitable for reafforesting certain areas if seeds could be obtained. These are produced on old, tall, trees and are difficult to collect as when the capsule bursts, the seeds which are flat and thin and apt to be blown away.‡

‡ The *Jelutong* of Borneo is produced by *Dyera Lowian*. It is very doubtful whether this is distinct from the Malaya Peninsula *D. costulata*.

* It will be understood that for compoundings and fillings other ingredients than low grade rubbers are used.

† Another species grows in Fiji and is described as *D. Plumosa* and the rubber is stated to be of some value.

Alstonia scholaris (getah Pulai) has a wide distribution, from India, throughout the tropics of the East. The rubber is not so easily prepared as that of jelutong but considering the abundance of this tree—particularly in Sumatra—it will most probably be soon in demand. It is fairly common in the Malay Peninsula—a much smaller tree than *Dyera costulata* but grows from self sown seeds almost everywhere.

ASCLEPIADACEAE.

Cryptostegia prandiflora is a well known plant from Madagascar and is grown in nearly all Botanic gardens for its handsome flowers. The rubber is reported as being of fair grade but the cost of collecting it is prohibitive, as the plant is of small dimensions—a bush or low limber.

Raphionacme utilis (Encanda rubber) is a recent discovery from Angola. It differs from all other known rubber plants, "it is a herbaceous stemless plant with a tuberous shaped root" a tuber like a small garden turnip with a few stemless leaves. As far as is known at the present time the rubber is difficult to separate and prepare. Some laboratory samples show a very high return of caoutchouc but the time and expense eliminating resins and other matter is considerable. Nearly all the African tubers imply a group of plants peculiar to arid regions. The tuber contains a viscid fluid or storage of sap enabling the plant to survive long periods (2 or 3 years) of drought, and I surmise that it is the difficulty of separating the latex from the contaminating sap of the tuber which detracts from its successful preparation. It is a fascinating plant and furnishes a high grade rubber, but considering the probable expense of preparation, the uncertainty of a mature crop, and its desert origin, there is little likelihood of it ever reaching the market as plantation rubber.

COMPOSITAE.

Parthenium argentatum (Gayule rubber) is a recent introduction from Mexico and Central America. A low herbaceous bush of slow growth but found wild over large areas of Central America. Although a low grade rubber it has excited considerable interest in the rubber trade as a cheap adulterant and substitute of better rubbers—thanks to the advance made in the better treatment of all rubbers by chemists and manufacturers—and brought into use many lines of cheap rubber goods which would not have been otherwise saleable, owing to the high cost of raw rubber. The rubber is obtained from all parts of the plant, the bush

is cut down, dried, then soaked, and subsequently the caoutchouc is beaten out. As however the whole plant is used, and a plant 2-3 feet high takes about 12 years to grow, it is not feasible that its cultivation could be made remunerative.

It has been suggested to grow the plants from cuttings or layers if this could be done (very doubtful) there would be a saving of time, but even so, the cost of production would be very high for so low grade a rubber, and failing some means of quick and successful reproduction the present wild supply is reported to be approaching exhaustion.

Actinella Richardsonii (Colorado rubber) is also a Composite resembling the "Guayule" plant and rubber, but not so abundant.

EUPHORBIACEAE.

Of the genus *Hevea* (Para rubber) there are said to be 14 lactiferous species, the most valuable being, *H. brasiliensis*. This genus has its headquarters in Brazil but extends to the adjoining territories of Bolivia, Peru, Venezuela, and Guiana. It is the most abundant and best known of all rubber yielding plants and its best prepared rubber (fine hard Para) is the standard rubber on the market to-day.

With the development of manufactured rubber fears were expressed of the probable exhaustion of wild sources of supply, and the desirability of introducing the Brazillian Para tree to British territory in the tropics—where the natural conditions of climate followed that which obtained in Brazil—was first given effect in 1872 when Sir Clements-Markham obtained seeds for the Royal Gardens at Kew. These were taken out in India, and in 1875 Mr. Wickham was commissioned to obtain more seeds for the British Indian government. Wickham brought to Kew Gardens 70,000 seeds and as the climate of India was not considered satisfactory, about 1,900 seedling plants were sent to Ceylon. About the same time Mr. Cross was sent to S. America for Para plants in case Wickham's seeds failed. Cross brought to Kew living plants, and also seeds of Ceara rubber (*Manihot Glaziovii*) and *Castilloa elastica*. Cross' Para plants were distributed to Ceylon, Singapore, and the West Indies. Under experimental cultivation—at the Botanic Gardens of Ceylon and Singapore—the trees thrived, but very little progress had been made by planters until the year 1899, when, owing to the collapse of coffee cul-

tivation, and the increased price for raw rubber, the prospect of plantation rubber received serious general attention, and at the present time it is estimated that—in these two countries alone—there is an area approaching 360,000 acres under cultivation, or approximately 60,000,000 plants raised from the original stock brought by Wickham and Cross, and indeed all plantations of Para rubber in the Netherlands, Borneo, Samoa, Burmah, Africa and the West Indies, are the progeny of plants supplied from the Botanic gardens of Ceylon and Singapore.

The price of the best Para rubber had advanced from 2/ in 1861 to 4/10 in the year of 1882, and fell again to 2/2 three years later. Since then, although there have been fluctuations, the price has gradually advanced, and in 1899 had reached 4/8. About this time—1880-1890—Brazilian collectors discovered that their country was richer in indigenous trees than had been anticipated, all the main tributaries of the Amazon, as far as Bolivia and Peru, offered better collecting ground than the mouths of the Amazon (Island rubber) and the port of Para was superseded by the port of Manaos, the capital town of the state of the Amazonas—about 1000 miles up the Amazon and navigable for Ocean going steamers—which became, and is still, the largest port for rubber in the world. From Manaos 374 tons of raw rubbers were exported in 1880, and 19,924 tons in 1907. Despite this large increase of output the demand for raw rubber has steadily advanced.

This increased demand is entirely due to the development by manufacturers and chemists during the last few years in the treatment of raw material, and a more extended knowledge of compounding, which has brought on the market many cheap goods. Writing on the "Treatment of Rubber" Dr. Torrey says of fillers and compounding, "Substances which made vulcanisation take place more promptly and definitely. Some of them increase the strength and resilience very notably," and again, "Compounding is not only defensible, but essential to an intelligent and legitimate application of rubber in the arts."

The rubber produced by the different species of *Hevea* in Brazil is classified—according to the districts where prepared—as Fina, Extra-fina, Grossa, and Sernamby, and all of this is coagulated with the aid of smoke. The latex of *Hevea* is alkaline to litmus and the smoke contains the necessary acid re-action, and it is by this process that the best rubber on the market is obtained. It is frequently insisted that the superior quality of "fine hard Para" is due

to the particular smoke used, viz. that obtained from the fruits of the Urucuri palm (*Attalea excelsa*) but this does not appear to be extensively used, and it is quite possible that the smoke of many other palm-nuts, e.g. (coco-nuts) would answer equally well. The real advantage of smoking most probably lies in the method of coagulation. This was described by Dr. P. Schidrowitz.* “The method of smoking “and drying one thin layer upon another in endless succession may, in my opinion, be compared to the manufacture of wirewound artillery. It is well known that the “strength of a gun which is built up by tightly winding “wire round a core is much greater than that of a solid “cast or forged mass. A great part of the physical “strength, if I may so put it, of fine Para is due, in my “opinion, to this method of coagulation by concentric “layers.”

No doubt there are other factors than the method of coagulation which enables Brazil to market the finest grade of rubber, and I suggest that the dominant one lies in the short tapping period during the dry season, i.e., at a time when the latex contains the minimum percentage of water per se.

It is not claimed by manufacturers that “fine hard Para” always reaches the market in perfect condition. It is well known that the latices of several plants are used for mixing with that of *Hevea brasiliensis*—I was also informed that none of the latex whether from young or old trees is kept separate—but it is asserted that any of these difficulties are more easily disposed of with Brazillian than with plantation rubber, where the latex of trees of different ages have been mixed.

PLANTATION RUBBER.

Plantation rubber is still in its infancy and the output compares with Brazilian rubber as follows:—

Country	1905	1906	1907
	Tons.	Tons.	Tons.
Ceylon	75	147	248
Malaya	130	385	936
Brazil	34,490	38,000	36,470

It has taken Brazil 50 years to raise its output from 1,800 tons to 36,470 tons* and this much may be accomplished by plantation rubber from the East within the next ten years. How far a large influx of cultivated rubber may effect the market it is difficult to forecast. At the present time there is strong demand for raw material and an annual output of about 100,000 tons during the next decade may not do more than meet market requirements, but there are many other plantations in other parts of the world and when all comes into bearing this output would be largely augmented.

But during the next decade there must be a large fall off with several wild rubbers. The African *Landolphia*s like the Malayan *Willughbeias* will gradually drop out. "Guayule" is reported to be shortening, and Jelutong, in native hands will most probably share the fate of all the other Malayan indigenous rubbers, and Pulai too. Whether Brazil can maintain its present output is very doubtful, there are already signs of a decrease in exports and Brazil is living on its capital. Undoubtedly *Hevea braziliensis* is a marvellous reproductive plant but there is no record of any plant, or crop, which does not become exhausted when no assistance—in any form—is given, (the well known Mangrove swamp plant reproduces itself provided seed-bearing trees are ear-marked and the period of recuperation is a long one) but such a system could not be adopted with wild rubber—in competition with plantation—and the lower grade rubbers are almost sure to suffer when plantation rubbers make good the shortage, but I am not at all sure that fine grade Para would suffer by such competition.

RUBBER PROSPECTS.

The greatest disservice that could be done to a prospective industry would be to overrate its possibilities and although cheap production is an important and necessary factor in Plantation Rubber, I suggest it is a gigantic error to build on it as the only, or most, important one.

It has yet to be proved that the present method of treating latex from plantation Para trees in British Malaya is the best or only, method. It will be remembered that the process is borrowed. When Professor Biffen demonstrated the advantage of curing *Castilloa* latex by centrifugalising, he also tried *Hevea* by the same method, but the latex failed to respond to such treatment. The rotating machine

* Vide Mr. Herbert bright's lecture at the Exhibition Conference.

was dropped, but the treatment of the latex by diluting with water still remains. There is abundant evidence that water, in any form, added to the latex of *Hevea* is a mistake. *Castilloa* and *Hevea* are two totally different rubbers, and I suggest that the addition of any water to *Hevea* latex, (sooner or later) polymerises the molecule, and the effect is, limp rubber. I pause to mention that I was assured by the Principal of one of the largest firms of Continental manufacturers that different results were obtained from a ball of 'fine grade Para' when treated in Hamburgh, Harburg, and Vienna. I wonder on how many estates in the colony or F. M. S. the water is alike. Rubber, Para Rubber, is a highly complex compound and its best method of preparation—in view of obtaining a uniform standard—must of necessity be a common one. It is an immense subject, but I believe—and Mr. Ridley takes that view—there is a solution of many of the problems of the treatment of rubber by the process of coagulating by smoke. I carefully inquired from leading manufactures what they expected or required in plantation rubber—and the manufacturer is the master of the rubber market—their formula was:—latex as you get it from the tree without any chemicals cured by smoking as is done in Brazil.

Hitherto—owing to the omission of what might appear a trifling detail—we have failed to cure cultivated Para by smoking—we can do it now, and are doing so, experimentally, at the Singapore Botanic Gardens, and when the novelty of a new process—in this country—has worn off, we hope to be able to prepare good marketable samples. Coagulation of latex, can be done on films of smoke, but it is necessary to start on films of smoke. It must be remembered that rubber is a crop, and few plants if any crop similarly all through the year. The latex at any given time may be immature as a rubber producer and it by no means follows that the method of coagulating by smoke can be carried on with equal success on trees of all ages and at all times of the year. The effect too of continuous tapping of a tree will have to be taken into account. However, investigations on these lines are being now carried on and we shall hope to publish the result of these at a later date.

Part II.

Under the Presidentship of Sir Henry A. Blake, G.C.M.G., and careful organization, the exhibition at Olympia proved as successful as it was instructive. In the raw rubber section the countries represented—following the catalogue were:—Ceylon, British Malaya, Netherlands, Brazil, Mexico, West Indies, Gold Coast, Southern India, Uganda, British East Africa, and Mosambique.

RAW RUBBER.

Ceylon plantations were well represented in their section and the exhibits was nicely displayed around a tastefully designed pavilion. All the rubber was arranged in groups according to the form of preparation without reference to districts e.g. biscuits, sheet, crepe, block, scrap and worms. Biscuits and sheet were largely exhibited and were mostly good samples. The Culloden "block" being the most favoured exhibit. Ceara Rubber—although well prepared—was only sparingly shown, and in fact, the Ceylon section consisted almost entirely of Para rubber. The section was well decorated and completed with a fine series of photographs, maps, showing the rubber districts. literature, models of factories, samples of rubber soils, and oil, tapping tools and rubber plants, etc.

The Malayan faced the Ceylon section, both being placed at the main entrance to Olympia. The arrangement took the form of four groups representing the Colony, Perak, Selangor, and Negri Sembilan (a suitable place was found for the Johore and Muar exhibits) arranged at four corners of a rectangle with a characteristic Malay house in the centre, and decorated with representative flags of the Colony and F. M. S. Of the exhibits I quote from my own notes:—About fifty estates were represented nearly all of which exhibited Para rubber only. Kamuning estate, Perak, exhibited a block of *Castilloa*, and a few estates Rambong scrap and crepe. Evidently, as judged from the exhibits, crepe is the most favoured form in Malaya of sending Para rubber to the London market. In this form it certainly possesses an important advantage over sheet or biscuits, i.e., (a) better colour, (b) it does not mould. Some very fine specimens of crepe were staged from Jebong, Golden hope, Vallambrosa, Pataling, Cicely, Linggi plantations, Damansara, Sungei Krudda, Highlands, and Consolidated Malay Rubber, Estates. The difference in

colour from pale crepe to golden yellow, and from pale to dark crepe, received a good deal of attention by interested visitors. This variation in colour, however,—probably due to the water—is not so remarkable as the strength of rubber from trees of the same age from different localities, although this is not so easily detected by physical tests as is the case with sheet or biscuits.

Blanket seemed to have a tendency to slightly mould, but the Kamuning exhibit was an excellent specimen, and a very fine piece also came from Linggi Plantations.

Sheet rubber included some interesting exhibits, and when compared with other forms of preparing rubber, one wonders if crepe has come to stay. The Botanic Gardens, Singapore, showed some sheets obtained from old trees, which were not surpassed by any plantation Para. From younger trees a sample of Bukit Rajah sheet, was, I believe, the finest sample of prepared Para in the Malayan Court. This sample was dark colour, moist texture, but quite free from mould (and the only sample of sheet free from mould—except Caladonia), strong, resilient, and received some careful security. Unlike any other examples, of sheet, the Bukit Rajah exhibit was rolled; the absence of mould, however, was most probably due to careful treatment rather than the method of packing. The Kamuning sheets were bold, but rather wet. Very fair sheet also came from Highlands Cicely, Golden Hope, Vallambrosa, Klanang, and Chang Koon Chang. Good pale coloured sheets came from Caledonia, but not dry enough; and also from Sungei Choh and Trafalgar, the latter sample being good strong rubber for young trees. Biscuits in comparison with Ceylon, were only scantily staged.

Singapore Botanic Gardens presented some fine instances of strong biscuits, and a very nice clean dry parcel was put up for Mr. Tan Chay Yan of Malacca.

Block finds favour on a few estates, but of those represented all were dwarfed by the Lanadron exhibit, and possibly no plantation Para at Olympia obtained so much comment and eulogy as this rubber. Unlike Lanadron, all the other block was too dark, and did not commend itself as good commercial samples of Para.

Rambong, like Para crepe, travelled well, being free from mould, and although not largely exhibited, the clean, dry, nice looking samples from Bukit Rajah, Consolidated Malay Rubber Estates, Tan Chay Yan, Malacca, and others, compared most favourably with the huge lots exhibited by

the Netherlands in the form of scrap balls, and tied with Rambong ribbons.

The section was completed by a nice series of photographs sent by Mr. Carruthers, and also from Cicely, Sungei Krudda, Chenderiang, Kamuning, Vallambrosa, Batu Caves, and an interesting photo of the Penang Garden Para tree from Mr. Fox. From the Singapore Garden Mr. Ridley sent mounted specimens of *Hevea braziliensis* in flower and fruit, (for which there were several applicants—these were delivered to Kew) as well as specimens of living plants and several tree stems. In literature Mr. Carruthers prepared an account of the industry in Malaya, and Mr. R. G. Walson a pamphlet on the Land Laws and Land Administration of the F. M. S., including an appendix shewing the cost of rubber cultivation, and this pamphlet was much in demand. By request I contributed a sketch on Rubber in Malaya for the official catalogue. An interesting exhibit came from Batu Caves Rubber Co.—a rubber-covered board-room table. Mr. Burn-Murdoch sent nice samples of gutta taban—biscuits and sheets,—from the forest department which were novel, and Mr. MacDougal of Singapore loaned some old Chinese figures made of gutta percha.

The Netherlands section was the most varied of all and although it did not exhibit Para rubber it surpassed all other sections in Rambong, and contained samples of many other Eastern rubbers. Its largest display in raw material occurred with guttas. These were exhibited in many grades and processes shewing the advanced stage of the industry. Balata from Dutch Guiana was well represented and also gums and damars from all parts of the Netherlands. The arrangement was tastefully carried out in large pavilions and completed with plans, maps, charts, statistics, instruments, and by far the finest series of photographs, and well printed literature.

Brazilian rubber is not attractive. It was well represented in all the different grades, and the enormous black smoked balls might convey the idea of primitive treatment, but the preparation is a traditional art handed down from the Red Indians to the present day Seringuieros and requires a great deal more skill in preparation than is apparent.

The Mexican exhibits were very limited. Some fair sized living stems of *Castilloa* were shown, and a large lot of 'Guayule.'

From the West Indies—principally Trinidad—various rubbers were exhibited but small samples only, these included *Sapium Jenmani*, *Ficus elastica*, *F. Vogelii*, *Castilloa*, *Ceara*, and *Hevea*. In these Islands much interest and enterprise in rubber cultivation is now taking place.

The Gold Coast, Uganda, British East Africa, Congo, and Mozambique gave a moderate representation of African rubbers. *Funtumia* and *Landolphias* were on view in the form of "lump" "niggers" "sausage" "ball" "tail" etc., but such preparation will scarcely find a market when plantation rubber is more abundant. From Uganda and the Gold Coast an effort had been made in better samples and both countries were represented with tastefully arranged sections.

Reclaimed rubber found a place in the exhibition and its use enters very largely into the trade of manufactured goods.

MANUFACTURED RUBBER.

This part of the exhibition was only moderately represented, manufacturers apparently fearing the possibility of losing or imparting trade secrets, and consequently the extent to which rubber is applied in the arts and manufactures became a matter of conjecture. From the Silver-town Rubber Works—the largest in Great Britain—a varied and interesting series of articles were on view, including the history of the tyre trade; cycles, carriages, and motor tyres; from the first solid tyre to the latest type of the present day. The floor of this section was paved with India Rubber tiling of Mosaic design; other exhibits were samples of rubber mats and sheets 50-60 years old; ebonite; athletic goods; and gutta percha cables.

In other sections Balata belting; Rubber hose; rubber toys; surgical goods; electrical and engineering goods; were moderately exhibited. Only one exhibit was noticed in the direction of a new use for rubber—as a substitute for tanning—a hide is treated with rubber solution which seals the interstices and renders the hide waterproof and more elastic. It is claimed that all hides so treated are improved in toughness and wear, and rubber tanned leather would appear to have a future.

MACHINERY.

This section was representative of all rubber curing or preparing machines, including washing machines, block-

ing presses, vacuum drying presses; tools and estate requisites; a model of the Kearney High Speed Railway; and general estate machinery.

SCIENTIFIC SECTION.

The Scientific section included laboratory apparatus and appliances for testing and analysing rubber and rubber goods, and scientific instruments.

Literature was adequately represented by the technical journals of England, America, France, Holland, and Germany, and books dealing with every branch of the industry were abundant.

CONFERENCES.

During the exhibition conferences were held by the delegates from nearly all European countries, and America, and a very full and complete programme of the industry in all its phases was got through, but as the proceedings will shortly be published I will only refer to one result—by general consent—here, viz:—the impossibility of synthetic rubber under existing conditions.

SCIENTIFIC SECTION.

From the Royal gardens at Kew an interesting group of rare and new rubber specimens, and samples, was shown, as well as two Wardian cases of Para seedlings, packed in the same way as in 1876, when the first plants of *Hevea brasiliensis* were sent to the East.

CONCLUSION.

It is proposed to hold another exhibition in London two years hence, or in 1910, which speaks well for the success of the first International Exhibition, that success was largely, if not entirely due, to the development of cultivated rubber, and this—it was acknowledged by the American and Continental delegates—owes its position to British enterprise.

R. DERRY,

Co-Commissioner for Malaya.

18th January, 1909.

MALAYA PLANTERS' ASSOCIATION.

Minutes of Meeting of the Planters' Association of Malaya, held at the Mess-House, Seremban, at 10 a.m., on December 6th, 1908.

PRESENT:—For the Perak Planters' Association: C. L. Gibson, C. Alma Baker, E. Lauder Watson, B. C. Knight; for the Kuala Lumpur Planters' Association: F. G. Hervey, E. B. Skinner, A. J. Fox, C. Burn-Murdoch, H. C. E. Zacharias; for the Batu Tiga Planters' Association: H. F. Browell, P. W. Parkinson, H. L. Jarvis; for the Klang Planters' Association: J. Gibson, A. B. Lake; for the Kuala Langat Planters' Association: H. Valpy, E. Macfadyen; for the Negri Sembilan Planters' Association: J. le P. Power, N. S. Mansergh, J. B. Douglas (by his proxy W. E. Vowler), G. W. Hingston. Visitors: Messrs. A. D. Davidson, H. M. Watson, C. F. Lushington, G. W. Templer, E. N. T. Cummins and F. M. Price.

1. Mr. Parkinson proposes, Mr. Browell seconds, and it is carried by acclamation, that Mr. C. L. Gibson take the Chair. Mr. C. L. Gibson having suitably replied, the Secretary reads the Notice convening the Meeting.

2. The Minutes of the Meetings, held on Oct. 5th and 8th, are taken as read, confirmed and signed.

3. LIQUOR SALE REGISTRATIONS. The Secretary reports, having received the following letter from Government:

Kuala Lumpur, October 15th, 1908.

No. 3995/1898.

SIR,—I am directed by the Resident-General to acknowledge the receipt of your letter of the 9th inst., and to inform you with reference to your letter of the 31st July last that the question of the sale of alcoholic liquor to Tamil Laborers is under consideration.

I have etc.,

(Sd.) S. McARTHUR.

Ag. Federal Secretary.

which the Meeting receives with satisfaction.

4. PREVENTION OF DISEASES ENACTMENT. The Secretary reports the receipt of the following letter from Government:—

No. 3995/1908.

Kuala Lumpur, 15th October, 1908.

SIR,—I am directed by the Resident-General to inform you with reference to your letter of the 31st July last, that

the Government is unable to agree to the issue of a Rule making obligatory the grant of compensation for any private property the destruction of which may have been ordered by a Medical Officer under the prevention of Diseases Enactment.

I have etc.,
(Sd.) S. McARTHUR,
Ag. Federal Secretary.

Noted with regret.

5. LOANS TO PLANTERS. The Secretary reports the receipt of the following letter:—

3995/1908.

Kuala Lumpur, 15th October, 1908.

SIR,—I am directed by the Resident-General to inform you with reference to your letter of the 31st July last, that the Government is unable to agree to the suggestions made by your Association on the subject of Loan to Planters.

I have etc.,
(Sd.) S. McARTHUR,
Ag. Federal Secretary.

and reads the following correspondence:

9th October, 1908.

The Federal Secretary, F. M. S.

Kuala Lumpur.

SIR,—I have the honour to draw your attention to a certain amount of hardship that has been entailed in certain recent cases, where planters applying for a loan from your Government had their Estates inspected by amateurs.

This question has been considered by the last Meeting of his Association, held on the 5th inst., when I was instructed to forward to you the following Resolution, as then passed:

“That it be submitted, that the Government for the purpose of Estate valuations do not go outside their own scientific staff of officers, as composing the Department of Agriculture.”

I have etc.,
(Sd.) H. C. E. ZACHARIAS,
Secretary.

5170/1908.

Kuala Lumpur, 15th October, 1908.

SIR,—With reference to your letter dated the 9th October, 1908, forwarding a copy of a resolution passed at a recent meeting of the Planters' Association of Malaya, I am directed to inform you that the Resident-General is unable to give such a promise as is suggested, or in any way to limit the exercise of its discretion in the selection of persons to inspect estates in respect of which applications are received for assistance from public funds.

I have etc.,
(Sd.) S. McARTHUR,
Ag. Federal Secretary.

To The Secretary,
The Planters' Association of Malaya,
Kuala Lumpur.

5818/1908.

Kuala Lumpur, 24th November, 1908.

SIR,—I am directed to request you to notify the Members of your Association that further applications for loans under the authorized scheme for Loans to Planters will if received in this office, in time to enable them to be examined and reported on by the Inspecting Officer before the end of the current year, be considered by Government.

2. The amount available for distribution throughout the Federated Malay States is however strictly limited and probably will not exceed \$40,000.

3. The allotment of whatever amount is available, will if possible, be made and announced to applicants before the 1st February, 1909.

I have etc.,
(Sd.) R. C. GREY,
Secretary to Resident, Selangor.

To The Secretary,
The Planters' Association,
Kuala Lumpur.

Mr. C. L. Gibson states that he did not understand, how the \$40,000 were arrived at. The capital lent out was \$1,500,000 and 6% on this alone can be \$90,000. Moreover

taking the 5%, that had to be paid by those receiving the loan, by way of stamp duty, this amount was thereby increased to \$165,000, without taking into consideration any sums that became repayable during 1909. Of course the whole \$1,500,000 had not been lent out all at once and at the same time, but for all that, even on their own showing, it must be clear, that at least \$100,000 were now available.

Mr. Parkinson hardly thinks that the stamp duty can be included in this calculation.

Mr. Macfadyen says that he had been privately informed, that the \$1,500,000 have been allocated as a permanent fund, on the lines of an Agricultural Bank, but regrets that no authoritative publication of the scheme has ever been made. The least Government could do, was to publish, say half-year, accounts, so that they might know exactly, what sums were maturing for re-lending.

Mr. J. Gibson reminds the Meeting that it is a gracious act on the part of Government to grant them any loan at all, and he fails to see how they can dictate to Government, whether the sum now available is to be \$100,000 or \$40,000, in any case the amount was so trifling, that it did not matter very much, whether it was the one or the other. As for the accounts, they were sure to be made accessible sooner or later without any request on their part.

Mr. Baker, would accept the \$40,000 with thanks, expressing regret at the same time, that the amount was not larger.

Mr. Skinner considers that a reply to Government, on the lines of Mr. C. L. Gibson's arguments, simply meant querying the accuracy of Government book-keeping.

Mr. Baker thinks that the whole scheme was really a very generous one and surely it was rather early in the history of these loans, to demand a statement of accounts. He would formally propose, that "the Association thank Government for its letter and express regret that the amount available was not larger."

This is seconded by Mr. J. Gibson.

Mr. Macfadyen then proposes as an amendment, that Government be asked to publish in the Gazette an authoritative statement of the financial position with reference to the loans, to be repeated every half year.

This is seconded by Mr. Valpy, but after some discussion Mr. Macfadyen agrees to withdraw his motion until the one, standing in Mr. Baker's name, is disposed of.

Mr. Baker's motion is then put to the Meeting and carried unanimously.

Mr. Macfadyen then proposes: "That with the view of clearing up the position of these loans, Government be asked, as soon as may conveniently be done, to publish in the Gazette an authoritative statement, to be repeated periodically, of the financial position of these loans."

This is seconded by Mr. Valpy, put to the meeting, and, after two re-counts declared lost by 9—8.

VI. REPRESENTATION ON COUNCIL. The Secretary reads the following correspondence:

21st October, 1908.

Sir John Anderson, K.C.M.G.,

Governor of the Straits Settlements and

High Commissioner of the Federated Malay States,

Singapore.

Your Excellency, •

At the last Meeting of this Association, held on the 5th instant a Resolution was considered and passed unanimously, directing me to lay before Your Excellency a petition for granting to the Planting Interests of the Peninsula a greater amount of representation, than is at present accorded to them, on the Legislative Council of the Straits Settlements, which body at present seems to initiate all legislation affecting our interests, both in the Colony and in the Federated Malay States.

Restricting my arguments by way of illustration to the interests involved in the cultivation of rubber alone (although of course quite as many acres again are planted up in coconuts, tapioca &c. &c.) I would point out:

1. That the capital value thereof is not far short of three million sterling for the F. M. S. alone;
2. That the area planted up in Rubber in the F. M. S. by the end of last year exceeded 125,000 Acres;
3. That the total exports came to 885 tons (of an approximate value of 4 million dollars and yielding in export duty alone nearly \$100,000);
4. That the total labour force employed was no less than 58,000.

These figures, I submit, speak for themselves, although they cannot and never will adequately express the value to a tropical country with a large native and alien population of Asiatics, of a steadily growing community of European Planters.

If the Chinese traders of the Straits Settlements deserve to have a representative on the Legislative Council of the Colony, it seems surely more than anomalous, that the British Planters of the hinterland should be without any official voice in legislation, that vitally concerns them and the large Industry they represent.

The agricultural interests of the Colony have for some time had the great advantage of being represented by the Hon. John Turner, but nobody recognizes more readily than this gentleman himself the inadequacy of one member having to represent so widely divergent interests as the planting Industry of the *whole* Peninsula involves. Of the 365 Estates in the Peninsula, with an acreage of 188,000 acres of rubber planted up, only 60 odd with an acreage of 40,000 acres are situated in the Colony. But apart even from merely quantitative consideration, it is well known that conditions and methods in the North are quite different from those prevailing in the South, a difference that is strikingly illustrated by the respective employment of indentured and kangany recruited laborers.

Under these conditions it would seem a great economical and political loss to the country at large that objections should exist against the creation of a Federal Council, even if such council were purely deliberative and merely an Advisory Board, assisting the Resident General of the F. M. S. in initiating legislation.

If however such objections are really quite unsurmountable, I would respectfully submit that the vastly increased interests of the Industry, which this Association represents, demand some other means of providing more adequate representation, and would in that case pray,

“That it may please Your Excellency to appoint an “additional planting representative on the Legislative Council of the Colony.”

I have the honour to be,
Your Excellency's
Humble and Obedient Servant,
(Sd.) R. W. HARRISON,
Chairman, Planters' Association of Malaya.

Kuala Lumpur, F. M. S.

3rd November, 1908.

No. 5456/1908.

SIR,—With reference to your letter of the 21st October, 1908, addressed to his Excellency the High Commissioner

on the subject of the creation of the Federal Council or the appointment of an additional planting representative on the Legislative Council, I am directed to inform you that the question of the Legislative Machinery of the Federated Malay States has engaged His Excellency's attention for some time. His Excellency is in communication with the Secretary of States on the subject, but is not yet in a position to make any statement in regard to it.

2. A copy of your letter is being forwarded to the Secretary of State.

I have etc.,
(Sgd.) S. McARTHUR,
Ag. Federal Secretary.

R. W. HARRISON, ESQ.,
Chairman,

The Planters' Association of Malaya,
Kuala Lumpur.

Mr. C. L. Gibson considered this reply very satisfactory and that H. E. should be thanked for same.

This is seconded by Mr. J. Gibson by and carried by acclamation.

VII. *ABSCONDING COOLIES.* The Secretary reads the following correspondence:

October, 9th 1908.

The Resident-General, F. M. S., Kuala Lumpur.

SIR,—I have the honour to inform you, that at the last Meeting of this Association held on the 5th instant, the question of the loss of labor through absconding was again thoroughly discussed.

Excellent as the results of the recently introduced Immigration Fund no doubt will eventually be, this Association yet feel that many years must elapse, before the evil of absconding will cease to an appreciable extent, and that in the meantime, surely, Planters, who heavily contribute towards the cost of importing fresh laborers are entitled to be assisted by your Government to retain the coolies thus recruited.

In order to achieve this end, the Members of this Association are unanimous, that a system of registration has become necessary and they suggest, that this be worked on the following lines.

1. That an officer of the Indian Immigration Department be attached to every District Officer.

2. That amongst others, it be the duty of that Officer to keep a Register of all laborers in his District, as defined by the Indian Immigration Enactment.

3. That it be compulsory for all employers of Tamil Labor to give a discharge ticket on the completion of the usual month's notice. The Ticket should show the following particulars.

1. Name
2. Parents' name and village
3. Places of discharge
4. Length of service
5. Reason of discharge
6. Rate of wages paid
7. Distinguishing marks

4. That all employers of Tamil labor be forbidden to take on any Tamil Laborers, unless they come direct from India, or can produce from their last employer a discharge ticket, which has been registered at the respective District Office, in accordance with Para 3.

5. That every employer taking on a discharged cooly shall pay a nominal Registration Fee for each such cooly, and that all fees so collected shall be paid into the Indian Immigration Fund, which in a measure will defray the expense of the proposed scheme.

6. That in Sec. 2 of the Indian Immigration Amended Enactment, (No. 1 of 1907) the word "knowingly" be omitted, and the whole of the scheme be worked in with that Enactment.

7. That in conjunction with this scheme, a system of finger prints be universally adopted.

8. That free return tickets be granted to all coolies able to prove a stated term of uninterrupted service with one employer.

In further explanation I may say, that the whole of these proposals have been framed in order to fix more definitely the responsibility on the employer who takes on absconding coolies rather than on the laborer, who bolts from an Estate, thus ensuring a strict observance of the Indian Immigration, 1904, Amendment Enactment 1907, with which, we respectfully submit, the foregoing provisions might advantageously be amalgamated.

I have etc.,

(Sd.) H. C. E. ZACHARIAS,

Secretary.

Kuala Lumpur, F. M. S.

23rd October, 1908.

No. 5172/1908.

SIR,—I am directed by the Resident-General to acknowledge the receipt of your letter of the 9th instant, communicating the views of the Planters' Association of Malaya on the subject of the procedure which should be adopted to prevent coolies from absconding.

2. I am to convey to you an expression of the Resident-General's regret that it does not seem possible to adopt the resolutions put forward at the Meeting of the Association on the 5th instant.

3. I am to remind you that the passing of the Tamil Immigration Fund Enactment has already had the desirable effect of charging those for whom the Immigrants work with the cost of importing them in proportion to the amount of work done and that amendments are in course of preparation which will effect the same result with regard to recruiting, and thus lessen the evil to which you allude.

4. I am to point out that this country is dependent for its labor on the attractions offered to immigrants and that a system of registration such as that suggested would greatly hamper the movements of labour and would be likely to defeat its own ends by acting prejudicially on the supply of immigrants, to whom it would no doubt be obnoxious.

I have etc.,

(Sgd.) S. McARTHUR,
Ag. Federal Secretary.

Mr. Parkinson considers that the Enactment, dealing with the prevention of this offence, has become a dead letter owing to lack of supervision on the part of the Department charged with carrying out its provisions. If Government would not help in any other way, they should make at least a closer inspection possible by considerably increasing their staff.

Mr. Skinner understands that a new travelling inspector had recently been appointed, and recommends giving the Department a fair chance.

Mr. Jarvis narrates a recent experience of his, when he had to go to the Klang Office to look for some bolters, and found that no entries had been made in the Register for four months. Nobody could give him any information at all and it was clear, that the Enactment was a dead letter.

Mr. Hervey tells the Meeting that a man having improperly taken on three of his bolters, had recently been fined \$75/- for each cooly, so taken on.

Mr. Lake would restrict the work of the Immigration Department to inspecting Mining Kongsis; surely planters could look after their own coolies.

Mr. Parkinson only wishes to see the provisions of the Enactment carried out.

The Secretary is then instructed to point out to Government that the Enactment is not being carried out at present by its Executive, to quote Mr. Jarvis' case; and to ask that steps be taken to see that that portion of the Enactment be strictly enforced.

VIII. RETURN OF CONVICTED ABSCONDERS. The Secretary reads the following correspondence:—

October 9th, 1908.

The Resident-General, F. M. S.,

Kuala Lumpur.

SIR,—I have the honour to inform you that I have been in correspondence with the Residents of the Federation regarding the return to the Estate of origin of convicted absconders on their release from Goal. (Vide Letters No. 4461, Perak; No. 3891, Selangor; No. 2514 Negeri Sembilan; No. 1289, Pahang).

As it would seem highly desirable, that a uniform practice be established, I am instructed respectfully to submit that the Police Authorities be instructed to see, that on release of such coolies from goal they be escorted back to the Estate of origin or to the nearest Police Station thereto (at the option of the employer); always provided of course that an application to that effect is made by the employer at the time of conviction.

I have etc.,

(Sd.) H. C. E. ZACHARIAS;

Secretary.

Kuala Lumpur, F. M. S.,

21st October, 1908.

No. 5171/1908.

SIR,—I am directed to acknowledge the receipt of your letter, dated the 9th October, 1908, on the subject of the return to the Estates on which they are employed of coolies who have been convicted of absconding and have served a term of imprisonment.

2. I am to refer to Section 33 (iii) of the Labour Enactment (General) 1904 and Section 91 of the Indian Immigration Enactment 1904, and to inquire if it is to be understood that applications made in accordance with those sections have been disregarded.

I have etc.,
(Sd.) S. McARTHUR,
Ag. Federal Secretary.

The Secretary,

The Planters' Association of Malaya,

Kuala Lumpur.

Mr. Lake feels that timely notice should be given to the employer.

Mr. Parkinson quotes his recent experience, in which he was notified that a cooly of his was going to be released on December 2nd. As a matter of fact, he was discharged on November 28th.

Mr. Macfadyen proposes, that a letter be written to the Federal Secretary, stating that the replies received from the four Residents indicate that the law is not observed, but that, as far as this Association is concerned, the Members are quite satisfied with the law, as it stands, provided it is carried into effect: and to submit, that a rule be issued, to give timely notice direct to the employer regarding the exact date of release.

This is seconded by Mr. Lake and carried unanimously.

IX. WHITE ANTS REWARD. The Secretary reads the following correspondence:

October 9th, 1908.

The Federal Secretary, F. M. S.,

Kuala Lumpur.

SIR,—In further reply to your letter No. 3995 of the 19th ultimo I am instructed to inform you that this Association is prepared to guarantee £2,000 as their share of a £5,000 reward to be offered to any person discovering a cheap and effective method of exterminating white ants.

I have etc.,
(Sd.) H. C. E. ZACHARIAS,
Secretary.

No. 3995/1908.

Kuala Lumpur, F. M. S.,

30th October, 1908.

SIR,—With reference to your letter dated the 9th October, 1908, I am directed to inform you that the Govern-

ments of the Straits Settlements and the Federated Malay States will contribute the sums of £1,000 and £2,000 respectively, the Planters' Association contributing a sum of £2,000, towards the sum of £5,000 to be given as a reward for the discovery of a cheap and effective method of exterminating white ants.

2. I am to add that His Excellency the High Commissioner desires it to be understood that the Government shall be the judge as to whether the method is cheap and effective.

I have etc.,

(Sd.) S. McARTHUR,

Ag. Federal Secretary.

The Secretary,

The Planters' Association of Malaya,

•Kuala Lumpur.

Mr. Lake enquires whether anybody has ever thought of where their £2,000 were to come from.

Mr. Gibson favours the appointment of a committee, whose duty it would be to devise a scheme for raising the funds required, on an equitable basis.

Mr. Skinner feels very strongly, that this Association could not possibly agree to the terms of the second paragraph of the Federal Secretary's letter, unless they had a voice in awarding the Reward.

Mr. Macfadyen formally proposes "that inasmuch as it does not appear how the planters' interests will be safeguarded, this Association ask for information as to the lines on which Government proposes to decide the award."

Mr. Baker having seconded this motion, same is put to the Meeting and carried unanimously.

The Secretary reports that he has received a number of applications, putting forward a claim to this Award, and asks for directions, as to which is to be the central office for receiving same.

Mr. Parkinson then proposes, Mr. J. Gibson seconds and it is carried unanimously, that it be suggested to Government that all letters, setting forth a claim to the White Ant Rewards, be addressed to the Director of Agriculture.

Mr. C. L. Gibson proposes that a circular be sent out asking for full returns of the expenditure sub "White Ants," actually incurred by the various estates in the past.

Mr. Browell does not consider it politic to publish any such returns and questions the propriety of calling for them.

Resolved to let the matter remain in abeyance until the next meeting.

X. The Secretary reports that the motion standing in the name of the K. District Planters' Association has since been withdrawn.

XI. LONDON RUBBER EXHIBITION. The Secretary reports progress of this fund and exhibits a photo taken of the British Malaya stand and leaflets, prepared by Mr. Carruthers and distributed at the Exhibition.

Mr. G. L. Gibson proposes that a formal vote of thanks be accorded to Messrs. L. Wray, Derry and J. B. Carruthers for the excellent work done by them in connection with this Exhibition.

Mr. Lake in seconding this proposal, suggests that mementoes be also given to these three gentlemen, of a value aggregating \$150.00.

XII. The Secretary read out the following letter from the Kapar District Planters' Association.

Golconda, 27-11-08.

Kapar District Planters' Association.

The Secretary P. A. M.,

Kuala Lumpur.

DEAR SIR,—At a Meeting of my Association it was proposed and passed unanimously "That at the General Meeting of the P. A. M. every member of any affiliated association should be allowed to attend and vote."

I should be much obliged if you could kindly bring this up at your next Meeting.

— Yours faithfully,

(Sgd.) W. S. BOSANQUET,

Hon. Secretary.

There being no proposer of this motion, the Meeting passes on to the next item.

XIII. Mr. Parkinson animadverts on the fact that a letter sent during 1907 by the Commander, M. S. V. R., to the Secretary of the United Planters' Association had never received any acknowledgement.

Mr. Zacharias regrets being unable from memory to give any information on the subject.

XIV. RECRUITING ALLOWANCE. Mr. Browell asks whether there is any limit at all to the powers of the Immigration Committee. He refers to the \$3.00 recruiting allowance, just sprung on them, to fix which without reference to anybody, he considered a rather high-handed action.

Mr. Fox thinks that such a matter ought to have been ventilated at a P. A. M. Meeting, before becoming law. \$3/- were not nearly sufficient to cover all expenses.

Mr. Power's opinion is that there is no reason why planters should not appeal to the Immigration Committee, if they disagree with any rule framed by same.

Mr. Lake says the point to decide is whether \$3 is sufficient or not.

Mr. Skinner explains that the object of the Immigration Committee had been to try and stop advances becoming too large. The tendency was, to pay ever increasing premia to recruiters in India and this it was intended to stop, by preventing anyone from recovering more than \$3 from any cooly. This rule of course had no retrospective effect. As for the sum of \$3 decided upon, he would like to say, that his Estates were all up-country and his expenses therefore probably quite \$1 per cooly higher than those of Estates, situated at the Coast, but even in his case he had calculated, that \$3 would cover all expenses.

Mr. Fox reminds the Meeting that that part of the advances are made, in order to keep the relatives going, until the emigrant can start making regular remittance Home.

Mr. Parkinson proposes "That the Immigration Committee be asked, not to make any drastic financial changes, affecting the interest of employers of labour, until this Association has had an opportunity of expressing its opinion."

Mr. J. Gibson thinks that the idea of the new Rule is quite good, but objects strongly to the principle of non-consultation.

Mr. C. L. Gibson quite concurs and recalls his request that the Immigration Committee fix their days of meeting beforehand, so that planters might have a chance of appearing before them, a request which had airily been waved aside with the remark, that "this was impossible." This showed that the Immigration Committee simply would broke no interference; leave alone ask them for suggestions. He would add, that the Planting Representatives on the Immigration Committee were appointed, not elected.

Mr. Macfadyen then seconds Mr. Parkinson's motion, which is put to the Meeting and carried unanimously.

Mr. Lake proposes that the Secretary write to the R. G. A., explaining the situation and asking them to bring pressure to bear at Home, so that further questions of finance be first referred to the P. A. M.

Mr. Macfadyen has the greatest pleasure in heartily and unreservedly opposing this proposition. He fails to see, why this Association should discredit itself by seeking outside assistance. The R. G. A. was a thing of the past and there was no point in their trying to revive it.

Mr. J. Gibson agrees completely with the last speaker.

Mr. Lake regrets being apparently quite a minority and states his willingness to let this matter stand over until their next Meeting.

Mr. Macfadyen cannot accept this and insists on a clear decision, as to whether any appeal to the R. G. A. is to be made by this Association or not.

Mr. Lake feels that surely those, who paid the piper, ought to be consulted as to the tune, and he would substitute "Boards of Directors" for "R. G. A." However, seeing the strong opposition he had met with, he withdraws his motion.

Mr. Skinner, referring back to the \$3 Rule would like to add, that this Rule was only made tentatively and, if after six months it was found to be unsound, it would of course be amended.

XV. The Secretary lays on the Table:

A. Correspondence with the Perak Chamber of Mines during November 1908.

B. Pahang Notification No. 7 (Vol. xii) re Estate Hospitals.

In reply to an enquiry, the Secretary states that bound copies of the minutes of the whole year will be procurable at the close of their financial year.

XVI. The Secretary reads a telegram from the Honorary Secretary, Johore Planters' Association, regretting inability of their delegates to attend the present Meeting and extending a hearty invitation to the P. A. M. to hold their next Meeting in Johore.

Resolved to accept their kind offer with thanks and to hold the next Meeting accordingly at Johore Bahru, on a day in February, to be arranged by the Secretary.

The Meeting terminates at 1 p.m.

H. C. E. ZACHARIAS,
Secretary.

SINGAPORE MARKET REPORT.

November, 1908.

Articles.	Quantity sold.		Highest price.	Lowest price.
		Tons.	\$	\$
Coffee Palembang
Bali	...	6	23.25	22.50
Liberian	...	52	24	23
Copra	...	2,983	8.15	7.15
Gambier Bale	...	1,097	9.75	7.85
Gambier Cube, Nos. 1 & 2	...	302	14	12.25
Gutta Percha, 1st quality	300	240
Medium	240	80
Lower	80	12
Borneo Rubber, 1, 2 & 3	130	57
Gutta Jelotong	8.25	6.17½
Nutmegs, 110's	19.50	19
80's	22	20
Mace, Banda	108.	86
Amboina	68	65
Black Pepper	...	1,495	11.55	10.12½
White Pepper (Sarawak)	...	463	18.50	15.50
Pearl Sago, Small	...	220	3.95	3.75
Medium	...	10	...	...
Large
Sago Flour, No. 1	...	5,619	3.04	2.85
No. 2	...	138	1.47½	1.45
Tapioca Flake, Small	...	968	5.05	4.85 fair
Medium	...	54	...	...
Pearl, Small	...	400	8.25	4.50
Medium	...	716	5.10	4.85 fair
Bullet	...	20	8.25	...
Tin	...	3,720	72	68

SINGAPORE MARKET REPORT.

December, 1908.

Articles.	Quantity sold.	Highest price.	Lowest price.
	Tons.	\$	\$
Coffee Palembang ...	2,050	...	...
Bali ...	...	...	...
Liberian ...	...	25.50	23.50
Copra ...	66	8.50	7.30
Gambier Bale ...	3,397	10.25	9.62½
Gambier Cube, Nos. 1 & 2 ...	1,553	14.25	12.75
Gutta Percha, 1st quality ...	215	300	240
Medium ...	...	240	80
Lower ...	...	80	12
Borneo Rubber, 1, 2 & 3 ...	...	125	65
Gutta Jelotong ...	...	8.50	7.50
Nutmegs, 110s ...	...	21.50	18
80s ...	...	26.50	22
Mace, Banda ...	...	107	102
Amboina ...	...	64	63
Black Pepper ...	...	12.40	11
White Pepper (Sarawak) ...	1,099	19	18.25
Pearl Sago, Small ...	279	3.95	3.90
Medium ...	161	...	...
Large ...	70	...	...
Sago Flour, No. 1 ...	...	3.08	2.90
No. 2 ...	3,585	1.65	1.50
Tapioca Flake, Small ...	61	5.60	5.00 fair.
Medium ...	913	...	...
Pearl, Small ...	19	8.37½	4.60 fair.
Medium ...	422	6.12½	5.15 „
Bullet ...	600	8	...
Tin ...	...	68.25	66.12½

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

Fortnight ending November, 15th & 30th.

Tons.

			15th.	30th.
Tin	Str. S'pore. & Penang to U. Kingdom &/or		2,091	1,525
do.	do.	U. S. A.	750	996
do.	do.	Continent	374	195
Gambier	do.	Glasgow	10	...
do.	do.	London	110	100
do.	do.	Liverpool	125	...
do.	do.	U.K. & or Continent	50	50
Cube Gambier	do.	United Kingdom	130	50
Black Pepper	do.	do.	...	...
do.	Penang	do.	40	10
White Pepper	do.	Singapore	200	80
do.	do.	Penang	...	...
Pearl Sago	do.	Singapore	25	70
Sago Flour	do.	do.	575	275
do.	do.	London	1,200	..
do.	do.	Liverpool	50	...
do.	do.	Glasgow	240	60
Tapioca Flake	do.	United Kingdom	350	50
T. Pearl & Bullet	do.	do.	210	170
Tapioca Flour	do.	Penang	...	...
Gutta Percha	do.	Singapore	125	...
Buffalo Hides	do.	do.	1,500	...
Pineapples	do.	do.	800	500
Gambier	do.	U. S. A.	10	120
Cube Gambier	do.	do.	290	100
Black Pepper	do.	do.	50	25
do.	Penang	do.	85	50
White Pepper	do.	Singapore	25	...
do.	do.	Penang	180	75
Tapioca Pearl	do.	Singapore	16	17
Nutmegs	do.	S'pore., Penang	420	275
Sago Flour	do.	Singapore	3,000	2,000
Pineapples	do.	do.	3,000	1,500
do.	do.	Continent	60	...
Gambier	do.	South Continent	310	70
do.	do.	North Continent	15	10
Cube Gambier	do.	Continent	180	90
Black Pepper	do.	South Continent	110	130
do.	do.	North do.	45	...
do.	Penang	South do.	10	...
do.	do.	North do.	40	5
White Pepper	do.	Singapore	65	15
do.	do.	do.	...	5
do.	Penang	South do.	15	35
do.	do.	North do.	360	760
Copra	do.	S'pore., Penang	150	200
do.	do.	do.	800	300
do.	do.	Marseilles	1,425	150
do.	do.	Odessa	1,560	290
Sago Flour	do.	Other S. Continent	320	110
Tapioca Flake	do.	North Continent	25	10
do. Pearl	do.	Continent	100	..
do. Flake	do.	do.	60	210
do. do.	Penang	U. S. A.	85	30
do. Pearl & Bullet	do.	U. K.	50	...
do. Flake	do.	do.	300	150
do. Pearl	do.	U. S. A.	30	35
do. Flake	do.	do.	230	110
do. Pearl	do.	Continent		
	do.	Continent		

			Tons.	
			15th.	30th.
Copra	Str. S'pore., Penang	England	300	200
Gambier	" do.	U. S. A.	..	..
Cube Gambier	" do.	do.	..	..
T. Flake & Pearl	" do.	do.	..	..
Sago Flour	" do.	do.	..	..
Gambier	" do.	South Continent	..	..
Copra	" do.	Marseilles	..	..
Black Pepper	" do.	South Continent	..	..
White Pepper	" do.	do.	..	..
do.	" do.	U. S. A.	..	..
Pineapples	" do.	do.	..	..
Nutmegs	" do.	do.	..	..
Black Pepper	" do.	do.	..	..
do.	" Penang	do.	..	..
White Pepper	" do.	do.	..	..
T. Flake & Pearl	" do.	do.	..	..
Nutmegs	" do.	do.	..	..
Tons Gambier			250	400
Tons Black Pepper			875	500

Wired on 16th November & 1st December.

EXPORTS TELEGRAM TO EUROPE & AMERICA.

Fortnight ending December, 1st & 31st.

			Tons.	
			1st.	31st
Tin	Str. S'pore. & Penang to U.	Kingdom &/or	1,480	1,671
do.	" do.	U. S. A.	714	630
do.	" do.	Continent	385	105
Gambier	" Singapore	Glasgow	..	..
do.	" do.	London	..	150
do.	" do.	Liverpool	50	..
do.	" do.	U.K. & or continent	50	330
Clube Gambier	" do.	United Kingdom	60	45
Black Pepper	" do.	do.	10	..
do.	" Penang	do.	..	25
White Pepper	" Singapore	do.	95	110
do.	" Penang	do.	10	..
Pearl Sago	" Singapore	do.	25	45
Sago Flour	" do.	London	75	470
do.	" do.	Liverpool	900	..
do.	" do.	Glasgow	50	100
Tapioca Flake	" do.	United Kingdom	125	250
T. Pearl & Bullet	" do.	do.	260	180
Tapioca Flour	" Penang	do.	250	550
Gutta Percha	" Singapore	do.	..	..
Buffalo Hides	" do.	do.	150	..
Pineapples	" do.	do.	..	..
Gambier	" do.	do. Cases	3,250	4,750
Cube Gambier	" do.	U. S. A.	500	600
Black Pepper	" do.	do.	20	100
do.	" do.	do.	175	190
White Pepper	" Penang	do.	20	..
do.	" Singapore	do.	45	55
do.	" Penang	do.	5	..
Tapioca Pearl	" Singapore	do.	100	160
Nutmegs	" S'pore., Penang	do.	3	9
Sago Flour	" Singapore	do.	230	420
Pineapples	" do.	do. Cases	2,500	1,500

				Tons.	
				1st.	30th.
Pineapples	Str.	Singapore	Continent	1,500	1,500
Gambier	"	do.	South Continent	210	...
do.	"	do.	North Continent	270	200
Cube Gambier	"	do.	Continent	20	55
Black Pepper	"	do.	South Continent	140	125
do.	"	do.	North do.	..	15
do.	"	Penang	South do.	10	25
do.	"	do.	North do.	...	10
White Pepper	"	Singapore	South do.	5	15
do.	"	do.	North do.	35	70
do.	"	Penang	South do.	...	..
do.	"	do.	North do.	...	15
Copra	"	S'pore., Penang	Marseilles	...	400
do.	"	do.	Odessa	...	280
do.	"	do.	Other S. Continent	500	..
do.	"	do.	North Continent	100	96
Sago Flour	"	Singapore	Continent	1,500	1,200
Tapioca Flake	"	do.	do.	190	80
do. Pearl	"	do.	do.	25	..
do. Flake	"	do.	U. S. A.	55	50
do. do.	"	Penang	U. K.	25	140
do. Pearl & Bullet	"	do.	do.	100	55
do. Flake	"	do.	U. S. A.	...	...
do. Pearl	"	do.	do.	50	25
do. Flake	"	do.	Continent	...	60
do. Pearl	"	do.	Continent	95	160
Copra	"	S'pore., Penang	England.	260	500
Gambier	"	do.	U. S. A.	...	...
Cube Gambier	"	do.	do.	...	...
T. Flake & Pearl	"	do.	do.	...	...
Sago Flour	"	do.	do.	...	...
Gambier	"	do.	South Continent	...	...
Copra	"	do.	Marseilles	...	...
Black Pepper	"	do.	South Continent	...	...
White Pepper	"	do.	do.	...	...
do.	"	do.	U. S. A.	...	...
Pineapples	"	do.	do.	...	...
Nutmegs	"	do.	do.	...	...
Black Pepper	"	do.	do.	...	...
do.	"	Penang	do.	...	...
White Pepper	"	do.	do.	...	...
T. Flake & Pearl	"	do.	do.	...	...
Nutmegs	"	do.	do.	...	...
Tons Gambier				950	1,000
Tons Black Pepper				460	800

Wired on 16th December & 2nd January.

GOW, WILSON & STANTON, Limited— India Rubber Market Report.

13 & 23, RÔOD LANE, LONDON, E.C.

31st December, 1908.

The closing sale of the year passed off with a fairly good demand for all descriptions except Sheets and Biscuits for which, in some instances, competition was rather slow.

The market has been quiet since the holidays, but prices have been rather firmer, and quotations at to-day's auction marked an irregular advance of from 1d. to in some cases 2d. per lb. on last sale rates.

A large parcel of Lanadrop Block weighing about 6 tons was partly sold at from 5/10 to 5/10 $\frac{1}{4}$ per lb., this being the highest price of the sale. The next best figure was 5/7 $\frac{3}{4}$, which was realised for some Gikiyanakande Worm. The highest price for Crepe was 5/6 $\frac{3}{4}$ paid for a small parcel of C. M. R. E.

NUMBER OF PACKAGES ADVERTISED.	Quantity in Tons.			Average Price of Plantation Rubber.		Comparative Prices.			
	Ceylon.	Malaya.	Totals.	No. of Packages sold.	Price.	Hard Fine Para.	Plantation.		
							Fine	Scrap.	
To-day	1425	12 $\frac{3}{4}$	61 $\frac{1}{4}$	74	1151	5/2	5/1 $\frac{1}{2}$	5/4 to 5/10 $\frac{1}{4}$	4/3 $\frac{1}{4}$ to 4/4 $\frac{1}{4}$
Corresponding } Sale Last year }	570	5 $\frac{3}{4}$		27 $\frac{1}{2}$	208	3/2 $\frac{1}{2}$	3/5 $\frac{1}{2}$	3/10 to 3/11 $\frac{1}{4}$	2/4 to 2/11

TO-DAY'S QUOTATIONS.

SHEET AND BISCUITS.		CREPE.		UNWASHED SCRAP.	
Fine Pale Worm	5/7 $\frac{3}{4}$	Fine Block	5/10 to 5/10 $\frac{1}{4}$	Good to Fine	4/3 $\frac{1}{4}$ to 4/4 $\frac{1}{4}$
Good to Fine Biscuits	5/4 to 5/4 $\frac{1}{2}$	Very Pale Crepe	5/5 to 5/6 $\frac{3}{4}$	Medium and Low	3/6 $\frac{1}{2}$ to 4/1
Good to Fine Sheet	5/4 to 5/4 $\frac{1}{2}$	Medium and Palish	5/- to 5/4 $\frac{3}{4}$		
		Dark and Brown	4/- to 4/11		

PLANTATION EXPORTS.

CEYLON—1st January to 30th November.				MALAYA—1st January to 20th November.		
				Singapore.	Penang.	Total.
1908	...	...	314 $\frac{1}{4}$ tons	1908... 796 tons	512 tons	1308 tons
1907	...	...	205 $\frac{3}{4}$ tons	1907... 552 $\frac{1}{2}$ tons	190 $\frac{1}{2}$ tons	742 $\frac{3}{4}$ tons
1906	...	...	137 tons	1906... 263 tons	34 $\frac{1}{2}$ tons	297 $\frac{1}{2}$ tons
1905	...	...	58 $\frac{3}{4}$ tons			

U. S. A. STATISTICS.

IMPORTS FROM 1st JANUARY TO 31st OCTOBER.

	Tons. 1906.	Tons. 1907.	Tons 1908.
India Rubber	23,921	26,572	25,895
Gutta and Balata	5,782	12,837	6,332
Old Scrap for re-manufacture	8,154	11,441	3,448
	<u>37,857</u>	<u>50,850</u>	<u>35,675</u>

IMPORTS OF CRUDE RUBBER.

Imports.	Tons. 1907.	Tons. 1908.
Year ended 30th June	34,359	27,782
Month ended 31st July	1,879	2,497
" " 31st August	1,681	1,692
" " 30th September	1,443	2,420
" " 31st October	2,521	3,161
Ten Months ended 31st October	26,572	25,895

U. S. A. STOCKS.

	1907.	1908.
Value of Stocks in Warehouses as at 30th June	£81,598	£8,198
" " " " 31st July	£71,819	£6,366
" " " " 31st August	£62,698	£4,842
" " " " 30th September	£60,000	£4,307
" " " " 31st October	£51,519	£6,041

PARTICULARS AND PRICES OF TO-DAY'S SALE.

CEYLON.

MARK.	PKGS.	DESCRIPTION.	PRICE.
Gikiyanakande	7	Fine pale and palish worm	... 5/7 ³ / ₄
	10	Darkish and dark crepe	... 4/4 ¹ / ₄ to 4/11
G. & C., etc.	5	Fine crepe	... 5/5 ¹ / ₂
	3	Darker	... 4/8 ¹ / ₂ to 4/10 ¹ / ₄
	1	Biscuit	... 5/1 ¹ / ₂
	1	Pressed sheet	... 5/2
	1	Scrap	... bought in
N. A. N. A.	6	Fine pale crepe	... 5/5 ¹ / ₄
	9	Darkish to dark	... 4/4 ¹ / ₄ to 4/10 ³ / ₄
	2	Darkish worm	... 5/3 ³ / ₄
	1	Dark worm (dirty)	... 4/9 ¹ / ₄
Tudugalla	7	Brown crepe	... 5/2 to 5/3 ¹ / ₄
	7	Dark crepe	... 4/- to 4/9 ³ / ₄
Kumaradola	5	Biscuits	... 5/4 ¹ / ₄ to 5/4 ¹ / ₂
	1	Scrap	... 4/4
Elston	2	Biscuits	... bought in
	3	Brownish crepe	... 4/10 ¹ / ₂ to 5/2 ¹ / ₄
	1	Black crepe	... bought in
Yogama	1	Biscuits	... 5/4
Weoya	3	Brown crepe	... 5/0 ¹ / ₂
Polatagama	8	Brownish to dark crepe	... 5/0 ¹ / ₄ to 5/2 ¹ / ₄
Halwatura	8	Good crepe	... 5/2 ¹ / ₂ to 5/3 ¹ / ₄
	2	Dark "	... 4/9 ¹ / ₄
Katugastota	2	Fine pale biscuits	... bought in
	2	Darker	... bought in

MARK.	PKGS.	DESCRIPTION.	PRICE.
Katugastota	1	Scrap	... 3/6 $\frac{1}{2}$
Alupolla	3	Biscuits	... bought in
Wewelwatte	1	Biscuit	... bought in
Hapugastenne	4	Biscuits	... bought in
	4	Biscuits	... bought in
Halgolle	2	Scrap	... 4/3 $\frac{1}{4}$
Galphele	4	Good to dark crepe	... 4/7 to 5/2 $\frac{1}{2}$
Glanrhos	6	Fine pale crepe	... 5/5 $\frac{3}{4}$ to 5/6 $\frac{1}{2}$
	4	Darker	... 4/9 to 5/4
	1	Dark and block	... bought in
Verulapitiya	2	Sheets	... 5/4 $\frac{1}{4}$
Clontarf	2	Dark crepe	... pt. sold, 5/-
Weikandala	2	Good biscuits	... 5/4 $\frac{1}{4}$
	3	Dark crepe	... pt. sold, 4/7 $\frac{1}{2}$
Taldua	2	Worms	... 5/4 $\frac{1}{4}$ to 5/5 $\frac{1}{2}$
	4	Crepe	... 5/3 $\frac{1}{2}$ to 5/3 $\frac{1}{2}$
	4	Dark crepe	... 4/11 $\frac{3}{4}$
Densworth	6	Biscuits	... 5/4 $\frac{1}{4}$
Ambatenne	5	Biscuits	... 5/4 $\frac{1}{4}$
	2	Scrap	... 3/9 to 4/2 $\frac{1}{4}$
Sunnycroft	1	Biscuit	... 5/4
Glencorse	1	Biscuit	... 5/4
	3	Scrap	... 4/2 $\frac{3}{4}$ to 4/4
Waharaka	2	Rough biscuits	... 5/4 $\frac{1}{4}$
Doranakande	8	Biscuits and sheet	... pt. sold, 5/4
	10	Scrap	... 3/11 $\frac{1}{2}$ to 4/4
Warriapolla	1	Scrap	... bought in
Kumbukkan	2	Biscuits	... 5/4 $\frac{1}{4}$
	1	Scrap	... 4/3 $\frac{3}{4}$
Ingoya	12	Brown crepe	... 5/3 $\frac{1}{2}$ to 5/4
	3	Dark crepe	... 4/4 $\frac{1}{2}$
Arapolakande	7	Biscuits	... 5/4 $\frac{1}{4}$
	25	Fine pale to dark crepe	... 4/6 $\frac{1}{2}$ to 5/6 $\frac{1}{2}$
Hattangalla	3	Biscuits	... 5/4
	4	Darkish crepe	... 4/7 $\frac{3}{4}$ to 4/11 $\frac{1}{4}$
Ballacadua	1	Dark crepe	... 4/7 $\frac{1}{4}$
Langsland	5	Biscuits	... 5/4 $\frac{1}{4}$
Glendon	1	Biscuit	... 5/4 $\frac{1}{4}$
M. C.	1	Rough biscuits and sheet	... bought in

MALAYA.

MARK.	PKGS.	DESCRIPTION.	PRICE.
Linggi	43	Dark crepe	... 4/9 $\frac{1}{2}$ to 5/0 $\frac{1}{2}$
Lann	17	Good and dark crepe	... 4/9 to 5/2 $\frac{1}{2}$
Kamuning	1	Fine pale crepe	... 5/5 $\frac{1}{4}$
	4	Mottled	... 5/3 $\frac{1}{2}$
	3	Block	... bought in
G. C. L.	1	Sheet	... 5/3
	2	Scrap	... 4/4 $\frac{1}{4}$
Pataling	36	Good to fine pale crepe	... 5/4 $\frac{3}{4}$ to 5/5 $\frac{3}{4}$
	4	Black	... 4/4 $\frac{1}{4}$
Ayer Angat	11	Brownish and dark crepe	... 4/3 $\frac{1}{4}$ to 5/1 $\frac{1}{2}$
Bantang Kali	5	Good and dark crepe	... 4/10 to 5/1 $\frac{1}{2}$
Terentang	40	Fine pale crepe	... 5/5 to 5/6
	24	Darkish and dark crepe	... 4/3 to 5/1 $\frac{1}{2}$
Linsum	18	Fine pale crepe	... 5/5 $\frac{1}{2}$
	12	Brownish to dark crepe	... 4/2 to 5/1 $\frac{3}{4}$
S. M.	6	Dark pressed crepe	... bought in
Jebong	26	Fine pale crepe	... bought in
	11	Sheets	... bought in
S. S. B. R. Co., Ltd.	4	Darkish and dark crepe	... 4/10 $\frac{1}{4}$ to 5/0 $\frac{1}{2}$

MARK.	PKGS.	DESCRIPTION.	PRICE.
W. Figg	1	Dark pressed crepe	... 4/6 $\frac{3}{4}$
Goleonda	1	Rough biscuit	... 5/1
	6	Rough sheets	... bought in
	9	Dark crepe	... pt. sold 4/9 $\frac{1}{4}$
R.	1	Sheet	... 5/4
C. M. R. E. Ltd.	21	Fine pale and palish crepe	... 5/4 $\frac{1}{4}$ to 5/6 $\frac{3}{4}$
	3	Mottled & scrap crepe	... 5/2 to 5/3
	12	Dark crepe	... 4/8 $\frac{1}{4}$
P. S. E.	3	Sheets	... bought in
Salaba	1	Crepe	... 5/1 $\frac{3}{4}$
Linggi Plants.	18	Good palish crepe	... 5/5 $\frac{1}{2}$
	1	Good palish (damaged)	... 5/1 $\frac{1}{2}$
	8	Dark crepe	... 4/8 $\frac{1}{4}$ to 5/1 $\frac{1}{4}$
	3	Fine pale crepe	... 5/5 $\frac{1}{4}$
L. E. Muar Straits	125	Fine block	... pt. sold 5/10 to 5/10 $\frac{1}{4}$
M. B. E. Straits	53	Dark crepe	... 4/7 to 5/1 $\frac{1}{2}$
R. M. P. Ltd.	30	Good pale to dark crepe	... 4/11 $\frac{3}{4}$ to 5/5 $\frac{1}{2}$
Jugra Est.	4	Sheets	... 5/4 $\frac{1}{4}$
	6	Brown to black crepe	... 4/6 $\frac{1}{4}$ to 5/-
	13	Fine palish crepe	... 5/4 $\frac{1}{4}$ to 5/5 $\frac{1}{4}$
	4	Dark	... 5/-
B. & D.	22	Good & rough sheet & pieces	... 4/4 to 5/4 $\frac{1}{4}$
	9	Scrap, crepe, etc.	... 2/9 to 5/5 $\frac{1}{4}$
B. M. & Co., Ltd.	2	Sheets	... 5/4
	4	Scrap, etc.	... 4/1 to 4/4
Edinburgh	4	Sheets	... 5/4 to 5/4 $\frac{1}{4}$
E. K. K. P.	2	Brown and dark crepe	... 4/6 to 5/1
	3	Fine sheets	... 5/4 $\frac{1}{4}$
	2	Scrap	... 4/3 to 4/4 $\frac{3}{4}$
F. (S.) R. Co., Ltd.	5	Sheets	... 5/4
	20	Darkise crepe	... 4/10 $\frac{1}{4}$ to 5/2 $\frac{1}{4}$
B. R. R. Co., Ltd.	59	Good crepe	... 5/2 $\frac{1}{4}$
	1	Pressed crepe	... 5/1 $\frac{1}{2}$
	56	Dark crepe	... pt. sold 3/- to 4/10 $\frac{3}{4}$
	34	Sheet	... 5/4 $\frac{1}{4}$ to 5/4 $\frac{3}{4}$
	3	Rambong crepe	... 4/6
V. R. Co., Ltd.	27	Sheets	... 5/4 $\frac{1}{4}$ to 5/4 $\frac{1}{2}$
Klang	62	Fine palish to darkish crepe	... 5/- to 5/4 $\frac{1}{2}$
F. M. S.	13	Dark	... 4/10 $\frac{1}{2}$
K. P. Co., Ltd.	5	Good to fine sheets	... 5/4 $\frac{1}{4}$
	6	Dark crepe	... 4/11 $\frac{1}{2}$
S. R. Co., Ltd.	43	Good ,,	... pt. sold 5/2 to 5/4
	16	Dark ,,	... bought in
P. S. E.	10	Fine sheets	... 5/4
	7	Fine pale crepe	... 5/6 $\frac{1}{2}$
	6	Darkish to dark	... 4/6 to 5/-
S.	23	Sheets	... 5/4 to 5/4 $\frac{1}{4}$
	7	Scrap	... 4/2 $\frac{1}{4}$ to 4/3 $\frac{1}{2}$
K.	12	Sheets	... 5/4
	12	Crepe	... 4/11 $\frac{1}{4}$ to 5/4
B. B. B.	11	Crepe	... 5/- to 5/3 $\frac{1}{4}$
S. B.	4	Sheets	... 5/4
P. R.	2	Scrap	... 4/2 $\frac{1}{4}$ to 4/3 $\frac{3}{4}$
Highland Estate	36	Fine sheets	... 5/4 $\frac{1}{4}$ to 5/4 $\frac{1}{2}$
	40	Good brown and dark crepe	... 4/9 $\frac{3}{4}$ to 5/2 $\frac{1}{2}$
Pasir Octjing	10	Pressed Rambong sheets	... 4/1 $\frac{1}{4}$
	1	Scrap	... 4/3 $\frac{1}{4}$
	1	Rejections	... bought in

JOHN HADDON & CO. SPECIAL PRODUCE LETTER.

London, December 11th, 1908.

STRAITS REPORT.

- BEE SWAX** Yellow descriptions have met with a fair demand although it is not the bleaching season.
- CAPSICUMS** For a time supplies sold well, the best descriptions selling at 50/- to 60/- per cwt, but the market is now fully 5/- down.
- CAMPHOR** Market owing to Eastern manipulation dropped to 135/- to 140/- per cwt for Crude unsettling trade generally by causing a nervous feeling among buyers.
- CHILLIES** Market quiet and easier. Good to fine Nyassland value 45/- to 55/- per cwt and Japan 42/6 to 45/- per cwt.
- COPRA** For a time business was quiet and only moderate transaction took place, but with a big failure in Marseilles, covering, caused a decided improvement, and a good business followed at advancing rates. To-day F. M. Strait £17.12.6. to £17.17.6 and Java £19.5.0 per ton.
- GUM COPAL** Heavy supplies were brought forward, which were mostly firmly held. Scraped kinds however, were neglected, but a moderate quantity of Macassar descriptions found buyers at about previous prices.
1447 Cases 3470 baskets and 442 bags offered and about 900 packages sold.
Manila and Macassar: Sorts, yellow pipey at 27/6 to 30/- ditto part small and dusty at 23/- to 26/-, ditto part blocky at 20/6 to 24/-, good pale block at 21/- to 22/-, blocky pickings at 14/-. Nubbles, good pale hard at 36/6, fair ditto at 31/- to 34/6, Chips, palish small at 26/-, darker at 24/-.
Pontianac: Bold amber scraped at 65/-, dark brown at 60/-, hard nubbles at 36/-.
Amboyna: Rough dark blocky sorts at 19/-, good yellow nubbles at 27/6.
- GUM DAMAR** Quiet and easier. 315 packages Singapore offered and 120 sold. Penang character: Siftings, small specky at 32/6, blocky ditto at 27/-, small dusty at 26/- blocky ditto at 20/- to 21/-, gray pickings at 40/-. Borneo: Black coated, part dusty at 6/-. Batavian: 48 cases were bought in.

ISINGLASS

In the last sales of the year the offerings consisted chiefly of the previous bought in lots. There was a fair demand, prices were irregular; Saigon was in rather larger supply but sold well.

Penang—92 packages offered about 22,000 lb., and 36 sold. Round leaf, fair to good heavy, pale at 3/10d to 4- per lb., middling to fair palish at 3/2d to 3/7d, ditto reddish part small at 2/4 to 2/10d, small part thin and rough, dark at 1/8 to 2/1d, pickings 10½d to 1/2d, Tongue, good heavy pale at 4/2, fair reddish at 3/5d, middling dark at 2/3d, ordinary mixed dark 1/11d, tails, small pale at 1/7d. Purse, fair heavy at 1/1d, middling at 10d to 11d, ordinary dark at 6d.

Saigon:—84 packages offered and 33 sold. Long leaf, good heavy pale at 5/5d to 5/7d, fair ditto at 5/1d to 5/4d, fair pale and reddish at 4/9 to 4/10d, middling reddish part small at 3/11d to 4/2d, dark rough small part and thin at 3/3d to 3/8d. Round leaf, fair to good heavy at 4d to 4/2d, middling to fair yellow and reddish at 3/7d to 3/10d, reddish part rough small and thin at 2/5 to 2/9d.

PEPPER

Black Singapore—A fair business done at advancing prices commencing at 2¾d for all positions until 3d was paid, and a small business done thereat, but a decline has set in and we close easier with Sellers at 2¼d January, March and 2¾½d for March, May.

White Pepper:—also improved in sympathy, and a large business was done from 4½d to 4¾d per lb.

RUBBER

A strong market, values advancing considerably, but recently received a check and declined about 5d per lb., for Plantation kinds.

The values in last sales realised were as follows:—Malay—Sheet, fair and good 5/3d to 5/3¼d. A few lots Fine 5/4d to 5/5d. Dark mixed 5/- to 5/2¼d. Crepe, good to very Fine pale 5/4½ to 5/6¾d, fair to good palish 5/2½d to 5/4d. Light brown and grey 4/11½d to 5/3d. Clean and dark brown 4/9½d to 4/11½d. Dark, black, and specky 4/2d to 4/9. Scrap, fair to fine 4/2¼d to 4/4¾d. Mixed, part inferior 3/4d to 3/10¼d.

Ceylon:—Sheet and Biscuit, fair to fine 5/3d to 5/3½d. Very pale 5/4d. Worms, Fine pale 5/7. Crepe, fair to fine thick palish amber 5/2½d to 5/5¾d, clean brown 4/10d to 5/1¼d, dark brown 4/7½d to 4/9¼d, dark and black 4/3d to 4/6d. Scrap, mixed part inferior 3/8 to 4/-, fair to fine 4/3d to 4/5d. Rambong, fine Crepe 4/10¼d to 4/11½d.

The outlook is towards a firm market for the next six months.

SAGO

Quiet. The offerings in Public Auction have all been bought in, a small business only closing Sellers to arrive for small at 10/3d per cwt c.i.f.

TAPIOCA

Market has been quiet but steady. A small business has been done in flake from $1\frac{3}{4}$ d to $1\frac{1}{4}$ d according to position and fair Singapore, medium, from 12/9 to 13/3d per cwt.

VANILLOES

At these the last auctions of the year the larger supply of 1016 tins was offered, and with a good all-round demand about 920 tins sold at dearer rates. The principal advance was for common brown and foxy beans, which averaged an advance of about 2/- per lb. Black beans of good flavor in moderate supply were about 1/- dearer, crinkly and leanish "firsts" very irregular, but also show an average advance of 6d per lb.

Seychelles:—Of 926 tins about 136 sold: Fair, 7 to 9 inch at 11/- to 13/-, $7\frac{1}{2}$ to $8\frac{1}{2}$ inch at 9/- to 12/6, 7 to 8 inch at 8/3d to 12/-, 5 to 7 inch at 6/6 to 9/6 $2\frac{1}{2}$ to $6\frac{1}{2}$ inch at 6/2d to 9/-, common foxy and split 1/6 to 7/9.

Bourbon:—15 tins sold: Fair to good, $8\frac{1}{2}$ to 9 inch at 14/-, $8\frac{1}{2}$ inch at 13/-, $7\frac{1}{2}$ to 8 inch at 11/6 to 12/-, 5 to 7 inch at 7/9 to 10/6d.

Mauritius:—39 tins sold: Fair to good, $7\frac{1}{2}$ to $8\frac{1}{2}$ inch at 9/6 to 11/-, 5 to 7 inch at 7/3d to 8/9d.

Ceylon:—9 tins sold: 4/- to 7/3d, various 2/- to 2/3d

Fiji:—20 tins sold, fair at 5/3d to 7/6.

Madagascar:—1 tin sold: 8 to 9 inch at 11-.

Penang.

Abstract of Meteorological Readings in Criminal Prison Observatory for the month of December, 1908.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison	29.905	149.0	81.9	89.0	73.2	15.8	76.3	0.845	72.5	77.6	N. W.	4.79	2.65
Fort Cornwallis	6.74	...
Government Hill	4.90	...
Balik Pulau	3.72	...
Pulo Jerajah	3.04	...
Pangkua	3.76	...
Bruas	2.00	...
Lamut	3.48	...

CRIMINAL PRISON PENANG,
Penang, 14th December, 1908.

W. H. FRY,
Senior Medical Officer Penang.

Perak.

Abstract of Meteorological Readings in Perak for the month of December, 1908.

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DISTRICT	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taipeng	...	148	81°16	92	68	24	76°68	859	...	80	...	7.85	1'80
Kuala Kangsar	80°24	91	69	22	73°70	961	...	93	...	7.36	3'72
Batu Gajah	...	156	78°59	90	73	17	76°54	887	...	91	...	11'85	3'10
Gopeng	80°20	90	63	27	76°27	854	...	82	...	6'34	1'96
Ipoh	80°77	91	70	21	76°25	847	...	80	...	15'03	4'60
Kampar	79°84	91	69	22	75°79	840	...	82	...	14'07	3'00
Teluk Anson	81°07	92	69	23	76°24	841	...	79	...	9'83	2'55
Tapah	80°63	91	68	23	76°01	837	...	80	...	7'45	2'28
Parit Buntar	81°05	88	68	20	76°62	856	...	80	...	5'26	1'47
Bagan Serai	81°46	91	71	20	76°95	865	...	80	...	6'93	2'52
Selama	82°09	92	71	21	76°39	835	...	76	...	5'19	1'00

STATE SURGEON'S OFFICE,

Taipeng, 14th January, 1909.

M. J. WRIGHT,

State Surgeon, Perak.

Selangor.
Abstract of Meteorological Readings in the various Districts of the State for the month of December, 1908.

DISTRICT.	Mean Barometrical Pressure at 32 Fah.	Maximum in Sun.	TEMPERATURE				HYGROMETER.				
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.	
General Hospital, K. Lumpur	29.876	140.5	79.7	88.9	72.2	16.7	75.9	0.823	73.3	S. E.	7.71
District Hospital "	"	"	"	"	"	"	"	"	"	"	10.36
District Hospital "	"	"	"	"	"	"	"	"	"	"	9.25
Klang "	"	"	"	"	"	"	"	"	"	"	13.55
Kuala Langat "	"	"	"	"	"	"	"	"	"	"	13.01
Kajang "	"	"	"	"	"	"	"	"	"	"	15.79
Kuala Selangor "	"	"	"	"	"	"	"	"	"	"	2.53
Kuala Kubu "	"	"	"	"	"	"	"	"	"	"	15.78
Serendah "	"	"	"	"	"	"	"	"	"	"	12.95
Rawang "	"	"	"	"	"	"	"	"	"	"	13.69
Beri-beri Hospital, Jeram	"	"	"	"	"	"	"	"	"	"	2.70
Sabak Bernam	"	"	"	"	"	"	"	"	"	"	3.10

STATE SURGEON'S OFFICE,
 Kuala Lumpur, 18th December, 1908.
 E. A. O. TRAVERS,
 State Surgeon, Selangor.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of November, 1908.

93

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Mean Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis	78.8	90	88	17.4	75.0	...	...	...	...	12.56	2.32
Raub	78.2	89	67	20.0	73.1	...	...	...	...	10.21	1.59
Bukit Fraser	13.16	3.25
Bentong	79.9	92	66	16.4	75.3	...	...	...	...	11.58	2.35
Temerloh	92	72	16.0	...	...	...	...	...	11.36	4.20
Pekan	80	89	70	13.4	76	...	...	...	...	14.92	5.20
Kuantan	81.8	91	70	...	76.7	...	...	...	...	8.77	1.86
Sungei Lembing	82.2	69.1	...	...	...	...	...	...	17.92	2.28

OFFICE OF THE MEDICAL OFFICER,

Kuala Lipis, 23rd December, 1908.

W. FLETCHER,

Medical Officer, Pahang.

10/5

Kelantan.

Abstract of Meteorological Readings in Kelantan for the month of December, 1908.

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DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
				Mean F°	Mean F°	Mean F°						Inches	Inches
Kuala Lebir	84.53	72.32	12.21	...	...	...	...	...	6.54	2.95
Kuala Pergau	8.25	2.47
Kuala Kelantan	81.26	73.22	8.03	...	...	...	...	...	19.52	9.42
Taku Plantation	6.80	3.61

STATE SURGEON'S OFFICE,
Kelantan, 7th January, 1909.

A. G. H. SMART,
State Surgeon, Kelantan.

Negri Sembilan.

Abstract of Meteorological Readings in Negri Sembilan Hospitals for the month of December, 1908.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Seremban	...	142	85.	86.	70.	16.5	80.	876	79.8	80.5	W.	3.23	.70
Port Dickson town	8.32	2.16
Port Dickson Beri-Beri Hospital	5.76	1.23
Tampin	7.28	1.60
Kuala Pilah	9.17	2.36
Mantin	8.54	2.15
Jelebu	6.40	2.00
Ayer Kuning	11.76	2.70

STATE SURGEON'S OFFICE,
Seremban, 12th January, 1909.

S. LUCY,
State Surgeon, Seremban.

Seremban.

Table Showing the Daily Results of the Reading of Meteorological Observation taken at the General Hospital, Seremban, for November, 1908.

DATE.	TEMPERATURE OF RADIATION.						TEMP RA- DIATION.		WIND. DIRECTION.			TEMP OF EVAPORATION.			COMPUTED VAPOUR TEN- SION.			RELATIVE HUMIDITY.			CLOUDS 0 TO 10			WEATHER INITIALS.			RAIN Inch				
	9 H.	15 H.	Mean.	Maxi- mum.	Mini- mum.	Range.	Sun.	Differ- ence Sun & Shade.	9	15	Mean.	9	15	Mean.	9	15	Mean.	9	15	21	9	15	21	inch							
	H.	H.							H.	H.	H.	H.	H.	H.	H.	H.	H.	H.	H.	H.	H.	H.	H.								
1	78	84	81	85	70	15	134	49	N	W	N	W	72.9	77.4	75.6	810	938	874	84	80	82.0	3	8		4	S	S	N	C	C	C
2	76	86	81	87	70	17	140	53	N	W	N	W	74.3	82.7	78.5	848	1.121	934.5	94	90	92.0	3	2	4	S	S	N	C	C	C	5.4
3	75	85	80	90	71	19	141	51	N	W	N	W	73.3	80	76.3	820	1.026	920	94	85	89.5	3	3	2	S	S	N	C	C	C	20
4	75	86	80.5	89	70	19	136	47	N	W	N	W	69.8	78.1	73.9	731	1.064	897	84	85	84.5	2	3	2	S	S	N	C	C	C	
5	73	85	81.5	88	70	18	142	54	N	W	N	W	72.9	80	76.4	810	1.026	918	84	85	84.5	3	3	2	S	S	N	C	C	C	
6	79	86	82.5	89	71	18	140	49	N	W	N	W	73.9	80.1	77	839	1.064	951.5	85	85	85.0	3	3	2	S	S	N	C	C	C	
7	78	87	82.5	87	72	15	139	52	N	W	N	W	74.6	73.9	74.5	857	837	842	89	65	77.0	2	5	2	S	S	N	C	C	C	
8	79	82	80.5	85	72	13	139	54	N	W	S	W	75.6	78.7	78.5	888	878	933	90	90	90.0	1	7	2	S	S	N	C	C	C	45
9	78	86	82	87	72	15	129	42	N	N	N	W	72.9	79.1	75.5	810	1.008	909	84	80	82.0	3	3	5	S	S	N	C	C	C	
10	79	86	82.5	88	72	16	140	52	N	N	N	W	73.9	80.1	76.5	839	1.064	951.5	85	85	85.0	3	3	5	S	S	N	C	C	C	12
11	80	88	84	88	72	16	148	60	N	N	S	E	72.6	74.9	73.7	802	865	833.5	76	65	70.5	0	5	6	S	S	N	C	C	C	
12	80	86	83	88	72	16	140	52	N	N	S	E	76.7	82.3	79.5	897	1.103	1000	85	95	90.0	2	4	6	S	S	N	C	C	C	25
13	75	84	79.5	86	71	15	146	60	N	N	S	S	74.6	76.7	75.6	857	922	980	89	76	82.5	1	2	2	S	S	N	C	C	C	
14	77	85	81	86	69	17	142	58	N	N	S	W	73.6	76.4	74	829	904	806.5	89	72	80.5	2	4	2	S	S	N	C	C	C	
15	78	86	82	87	70	17	151	64	N	N	W	W	75.3	75.5	75.4	877	884	880.5	94	69	81.5	2	2	2	S	S	N	C	C	C	
16	77	87	82	88	72	16	146	61	N	N	W	W	72.9	65.1	69	810	619	714.5	84	46	65.0	2	2	2	S	S	N	C	C	C	
17	77	88	82.5	88	73	15	148	60	N	N	W	W	75.3	77.4	76.3	877	938	907.5	94	80	87.0	3	3	3	S	S	N	C	C	C	10
18	78	84	81	88	70	18	147	59	N	N	W	W	73.6	78	75.3	829	956	802.5	89	85	87.0	3	3	3	S	S	N	C	C	C	10
19	76	83	80	84	70	14	144	60	N	N	S	W	74.6	77.4	76	857	938	897.5	89	80	84.0	3	3	3	S	S	N	C	C	C	10
20	76	84	81	86	71	15	146	60	N	N	S	W	73.6	78.3	76	829	903	806	89	80	82.5	10	6	4	S	S	N	C	C	C	10
21	75	80	77.5	85	71	14	146	61	N	S	W	W	72.6	74.4	73.5	801	938	869.5	89	80	84.5	8	8	7	S	S	N	C	C	C	70
22	76	84	80	86	72	13	138	53	N	N	S	W	69.8	74.4	72	731	855	793	84	68	76.0	2	3	5	S	S	N	C	C	C	20
23	75	86	80.5	86	70	16	140	54	N	N	W	W	72.6	76.7	74.5	801	922	867.5	89	76	82.5	2	2	4	S	S	N	C	C	C	10
24	75	85	80	85	72	13	150	65	N	N	W	W	71.6	76.3	74	774	905	869.5	89	80	84.5	9	0	0	S	S	N	C	C	C	13
25	75	83	79	84	70	14	148	64	N	N	S	W	71.6	75.5	73.5	774	824	833	89	60	79.0	3	3	2	S	S	N	C	C	C	
26	79	87	83	88	70	18	140	52	N	N	S	W	69.8	77.4	73.5	774	538	834	84	80	82.0	2	6	4	S	S	N	C	C	C	
27	78	84	81	86	71	15	142	56	N	N	W	W	74.6	76.3	76.5	857	905	881	89	88	84.5	3	4	2	S	S	N	C	C	C	11
28	79	83	81	86	70	16	146	60	N	N	W	W	73.9	75.5	74.3	939	873	850	85	72	78.5	3	2	3	S	S	N	C	C	C	
29	76	85	80.5	86	72	14	140	54	N	N	E	W	72.6	71.5	71.4	801	766	783.5	89	68	78.5	2	5	3	S	S	N	C	C	C	
30	80	85	82.5	86	69	17	142	59	N	N	W	W	75.3	76.7	76	877	922	899.5	94	76	85.0	2	7	7	S	S	N	C	C	C	
31	78	84	81	85	69	17	144	58	N	W	S	W	73.6	75.5	74.6	829	888	858.5	89	76	82.5	0	7	7	S	S	N	C	C	C	23
Total.	77.11	84.24	81.3	86.3	70.26	16.5	142.12	56.9					73.3	76.4	79.8	823	929	87.6	88	73	89.5	3	4	4							3-23

Seremban, 12-10-1908.

S. LUCY,
State Surgeon.

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

No. 3.]

MARCH, 1909.

[Vol. VIII.

TERMES GESTROI.

In the whole of the past history of tropical agriculture in tea, coffee, cocoa, cinchona and spices; there have been four causes for disappointment and an awakening from the golden dreams with which various enterprizes were originally commenced; i.e.

1. Substitutes.
2. Synthetic production at a low cost.
3. Over-production.
4. Pests and Blights.

The first three are beyond the control of the individual and if any reliance is to be placed on expert opinion the rubber planter in the East has nothing to fear from them in his comparatively new venture, but the fourth, i.e., Pests and Blights, come well within his scope and it is his duty to leave nothing to chance and do everything within his power to assure the success of the enterprize.

So far we have one blight and one pest which may be considered as serious, i.e., *Fomes semitostus* and *Termes Gestroi*.

Fomes semitostus is a blight which if taken in hand at once and treated according to the advice of the Government mycologist Mr. W. J. Gallagher, will I am sure be easily overcome as we have successfully dealt with the same class of blight in tea, coffee, etc. by drainage and application of lime.

Termes Gestroi, however, is a very serious pest and it was in recognition of this fact, that, in my various endeavours to exterminate it, I collected a large number of queen termites; these I showed to Messrs. Caruthers and Pratt, who were much interested, as the queens evidently belonged to two or more species and it was quite possible the Queen *Gestroi*, which had hitherto never been found, was amongst the collection. This resulted in the investigation by Mr. Pratt and I have been fortunate in being in possession of the valuable discoveries made by him, for a considerable time before they were published. Previous to Mr. Pratt's discoveries with regard to the habits of *T. Gestroi* I was much afraid that the pest would prove to be a heavy handicap to the Malay Peninsula in its competition with other rubber producing countries in the future and a serious though unseen and therefore unrecognized loss, in the present. I am now quite satisfied, however, that it can be altogether eradicated. In my endeavours to exterminate the pest as expeditiously and as cheaply as possible I have arrived at some conclusions and methods which may be of use to my brother planters.

The following notes refer to flat alluvial land:—

TIMBERS CONTAINING TERMITARIA OF TERMES GESTROI.

The determination of these is of the utmost importance and rests largely with planters themselves. In different localities the trees affected may vary and if planters were to publish either in the Agricultural Bulletin or in the local papers the names of trees and their localities in which the termitaria of *T. Gestroi* have been found, they will be performing a great service to the rubber industry in Malaya. So far, in this particular locality, i.e., North Bank of the Selangor River, I have found the termitaria exclusively in Kumpas and Meranti logs and roots but chiefly in Kumpas, this, I think, is due to the fact that about two thirds of the planted area, consists of reclaimed land in which Kumpas, owing to its great hardness and durability, is practically the only timber left to deal with.

Both Kumpas and Meranti appear to grow in greater abundance in land at all inclined to be peaty and this no doubt is the reason for the opinion of some planters that peaty soils encourage *T. Gestroi*, as mentioned in Mr. Pratt's note.

NATURE OF SOILS AS AFFECTING THE ABUNDANCE OF *T. Gestroi*.

In view of the fact that the termitaria are contained invariably if not exclusively in timber, it may be concluded that soils only indirectly effect the abundance of *T. Gestroi*, i.e. certain soils are favourable to the growth of trees affected by *T. Gestroi*.

The soils may affect the extent of the attack on rubber trees by being more or less easy of penetration when the termites go abroad in search of food.

METHODS OF EXTERMINATION.

On old rubber trees. It has to be determined whether *T. Gestroi* establish their termitaria in the rubber trees themselves and on this point I have no data. If it should prove to be the case, fortunate is he who discovers an insecticide, or other means, by which the Queen cells may be reached, at a low cost and without destroying the tree, and thereby obtain the reward now being offered. On the other hand, our success in exterminating the pest depends upon the skill with which the runs are traced up to their base. If all timber is collected and destroyed I feel convinced that if the attack does not entirely cease it will be very much diminished.

On young Rubber Estates. I have found it cheapest and best to make a systematic search field by field and line by line for all timber which is known to be favoured by *T. Gestroi*, cut them open with an axe or cross-cut saw and if they contain the slightest trace of the enemy destroy them by burning.

The danger of scorching the surrounding plants may be entirely done away with or at least greatly minimized by burning in a trench, keeping the fire covered with green stuff, and shielding the surrounding trees with sheets of corrugated iron.

These should not lean against the rubber trees but be supported by sticks a short distance from them; even if two or three rubber trees are destroyed by fire in this way, the damage done is more than compensated for, by the fact that one *T. Gestroi* termitarium is capable of destroying a score or more of trees to a distance of two or three hundred feet.

Where there is a sale for timber or charcoal, sound Meranti trees may be sawn up with advantage and Kumpas can be converted into first class charcoal.

A close watch should always be kept on land that has been cleared of timber and if a tree is seen to be attacked, every endeavour should be made to discover the source of infection, which will invariably be found to be a buried root or stump, from which the termites make their way in search of food by means of tunnels. These may be found at a depth of 6" to 3' below the surface of the ground. In flat land, I have never found them below the sub soil water level, which of course is regulated by the efficiency of the drainage system.

These tunnels are as a rule, (as Mr. Pratt says) sufficiently large to admit the introduction of an ordinary microscope slide though sometimes smaller, they are perfectly smooth and are lined with a red substance, probably the excreta of the termites which takes its colour from the timber on which they have been feeding. This colouring greatly facilitates the following up of the tunnels but it is by no means an easy matter until the coolies become practiced at it and see for themselves that they are doing real good and not merely following out some mad scheme of their masters. When the direction of a tunnel is lost it is very difficult to pick it up again. I have found the surest means of not losing it, is to use a piece of thin flexible wire or strip of cane as a probe. Pass it into the tunnel as far as it will go, remove the top soil carefully with a chunkol, then break open the run to the end of the probe. Pass the probe in again and proceed as before until the termitarium is reached. To find the tunnel or to pick it up again should it be lost, I have found it a good plan to cut a trench round the tree attacked or the spot where the run was lost. This trench should be to the depth of the water level, say two feet, and should be examined the next day when it will often be found that the termites have made their way across by means of a mud casing, thus determining the direction of attack.

It is tedious matter at the best to follow up these tunnels and it is on this account that I have found it expedient to examine all timber which I know to be likely to contain termitaria before resorting to this means thereby saving much time and expense.

At first I gave rewards for the Queens and have collected in this way upwards of seventy undoubted specimens but I find that by this method the coolies waste much of their time in breaking up every smaller piece of the termitaria in order to find the Queen cells.

When a log or root containing the termitarium has been discovered and destroyed and the ground around it dug up it may safely be concluded that the Queen has perished with the rest of the individuals. Usually it is only necessary to trace up the runs in the case of a nest occurring in a buried stump or root.

The first field I systematically cleared of all timber five months ago has since shown no sign of the pest. This field was planted with Rambong about six years ago it was allowed to lapse into bluker and was interplanted with para in 1906. The only remaining timber was Kumpas of which there was a considerable quantity. The attack on both Para and Rambong trees was particularly virulent in this block but has now entirely ceased.

As Mr. Pratt very truly says owing to the cryptic habits of termites it is very difficult to determine when a tree is attacked until it falls down but during the wet seasons in October, November, December, and January the termites frequently make their appearance above ground and this fact I think should be taken advantage of, by marking in some way all the trees on which the termites make their appearance, for even if they cannot be attended to at once, one would at least know where to look for them in the future.

I am afraid that some planters are lulled into a sense of security by the fact that none of their young trees have been attacked, it would be well worth their while to make a search for *T. Gestroi* in the timber lying in clearings and if found, take steps to eradicate the pest, for although trees may not be attacked now, or perhaps for a year or two to come, they will be attacked sooner or later if *T. Gestroi* is present.

I have not found a single tree attacked so far in my forest clearings, but I know that *T. Gestroi* is present. On the other hand in reclaimed land, where owing to the decay of most of the timber, *T. Gestroi* has wandered forth in search of fresh fields and pasture new and has made its presence evident by attacking young rubber trees.

On Future Clearings. In these again the importance of discovering the forest trees most favoured by *T. Gestroi* is evident. I cannot speak from practical experience, but the obvious course to pursue would be to cut down all trees known to harbour *T. Gestroi* and allow them to dry for as long a period as possible, prior to the felling of the land. Many of these trees would be then destroyed in the burn

and those which remained could be burnt out by piling over them the surrounding timber. This would of course enhance the cost of clearing perhaps by \$10 or even \$20 per acre, a small consideration in comparison to the damage that may be effected by *T. Gestroi*.

Further advantages of more thorough clearing, would be less likelihood of vacancies caused by *Fomes semitostus* and a saving in the cost of weeding, in fact of every other work carried on in the clearing, together with easier and consequently more efficient a supervision.

COST OF ERADICATION BY DESTRUCTION OF TIMBER CONTAINING TERMITARIA.

It is obviously impossible to give even approximate figures with regard to cost; this depends entirely on the quantity of timber to be removed. One ten acre block may contain a dozen large Kumpas and Meranti trees and the adjoining fifty acres may contain only half a dozen. The cost may vary from \$2 to \$20 per acre and it will be necessary to estimate for each ten or twenty acre block separately.

In opening new clearings it is false economy to cut down expenditure on clearing and it will obviously be far cheaper to eradicate *T. Gestroi* in clearings before they are planted than afterwards to say nothing of the saving in the cost of other works and the satisfaction of knowing that the only two pests which we have to fear have been eradicated.

T. Gestroi is frequently found in nibong palms but owing to the facility with which these can be split up and the many uses they can be put to they do not cause any serious trouble or expense.

Drains as affecting Terms Gestroi. I have not in a single instance found the runs of termites crossing a sub-soil drain, excepting by means of a fallen log or wooden bridge, it follows therefore, that the more frequent the drains, the more circumscribed will be the attack of the termites, provided that iron or concrete bridges are used instead of wooden ones and that all timber lying across drains be removed.

The mound termites, *T. Malayanus*, and *T. carbonarius* seem to prefer the edge of a drain for the construction of their termitaria but *Gestroi* apparently considers the suitability of timber only and not that of soil in choosing its home.

When nearing a drain the *T. Gestroi* runs are usually found at a greater depth than elsewhere this is no doubt due to the facility with which the termites are able to penetrate the soil which has become freer owing to good drainage.

IMPORTANCE OF DISTINGUISHING THE VARIOUS TERMITES.

Mr. Pratt mentions that *T. pallidus* occupies the disused termitaria of *T. Malayanus* and *T. carbonarius*, I have since found that they also occupy the termitaria of *T. Gestroi* and have had several queens brought to me for reward, these were contained in timber and surrounded by unmistakable individuals of *T. pallidus*.

On one occasion the coolies were following up *T. Gestroi* under my personal supervision when they came on a small piece of timber, two feet below the surface of the ground, it was about one foot in length and four inches in diameter and contained the Queen and myriads of individuals of *T. pallidus* as well as many soldiers and workers of *T. Gestroi*.

I have found *T. Gestroi* in close association with *T. Malayanus* and *T. carbonarius* as well as *T. pallidus* but there is no difficulty in distinguishing one from the other by their soldiers, there is also a wide difference in the general appearance of the Queens though a great similarity in the workers.

Mr. Pratt gives us the difference of the various termites as far as possible on page 3 of his notes, but I think it would be of more practical value to planters if specimen cases of the termites, showing the individuals separately, were exhibited in some convenient and central spot.

INSECTICIDES FOR THE ERADICATION OF TERMES GESTROI.

To anyone who has followed up a *T. Gestroi* tunnel, ramifying as it does sometimes for hundreds of feet, or has seen the interior of a termitarium with its myriads of individuals, the utter futility of attempting to eradicate the pest by means of insecticides must be apparent, but insecticides will be found useful in killing the comparatively few individuals which continue their attack for some time after their termitarium is destroyed. I see that the custom of applying lime to the tree attacked still continues on some estates. This is utterly useless as a preventative, or even as a means of keeping the termites in check: but it is useful as a means of marking the trees attacked.

CROTALARIA AND GREEN MANURES AS AFFECTING *T. GESTROI*.

Crotalaria is undoubtedly of great advantage as a green manure, but it has yet to be proved if it is a means of cheapening the cost of weeding. There are two objections to it which can however be overcome.

Firstly the difficulty which is experienced in eradicating *T. Gestroi* and *Fomes semitostus*, will be enormously increased by the fact that all timber is hidden by growth rendering it necessary to closely inspect each rubber tree and to search about amongst the crotalaria for timber containing *T. Gestroi*. This can be overcome by, first eradicating the pest and then planting green manure. Secondly when the green manure is eventually killed out by shade, the rubber trees will experience a shock from their customary supply of nitrogen being cut off. This can be obviated by interplanting with leguminous trees, such as *Albizzia Moluccana*. These trees together with others of the leguminosae have been grown with great benefit to tea and coffee in Ceylon and elsewhere for at least twenty five years. Such growths as *Crotalaria*, *Mimosa*, etc: being utterly unsuited to this class of cultivation.

In conclusion there are no grounds for the alarmists view of the *T. Gestroi* pest, though it is imperative that it should be taken in hand at once and dealt with very thoroughly and although the initial cost may be heavy it will be more than justified by the subsequent saving in expenditure, on keeping the pest in check, to say nothing of the saving in loss of trees.

WALTER TOWGOOD.

FIELD NOTES.
ROOT DISEASE.

I have received a number of communications about the "Fomes" or white fungus root-disease of para rubber. The disease appears to be more widespread than I thought when I wrote in the last November number. A common mistake is cutting the trenches too broad—this demands extra and unnecessary labour, and the excessive quantity of earth taken out covers the inner area round the diseased tree so much that the turning-over does not go deep enough. Where circumstances do not allow of the outer trenches being made, the adjacent row of trees should be examined from time to time.

Crotalaria striata is also attacked by a root fungus, but up to the present I have not been able to infect healthy Para rubber from diseased *Crotalaria*. Planters who have sown *Crotalaria* should watch their plants carefully and should immediately notify the Department of Agriculture if any die or even look unhealthy. It is extremely important to know the extent of this *Crotalaria* disease and if Para is immune to it. The symptoms of diseased *Crotalaria* are much the same as those described for root disease in Para, but of course not so easily noticed.

CATCHCROPS.

Catchcrops still seem in favour with several planters though when we consider the difficulty of selecting a suitable plant, that the extra labour force required is not always available, and that three years is about the limit of exploitation, it is doubtful if they are worth attempting except on estates where an early return of money is desirable. Tapioca if carefully handled appears to do no harm in trees planted at a reasonable distances say 30 feet by 15 feet or 25 feet by 15 feet. I have seen a plot of trees of five years old which had been interplanted with tapioca and had never cost the owner a cent for upkeep. The trees were quite as good as any of the same age I have seen anywhere. The catchcrop was taken out by Chinese who in turn manured the soil and left the land clean. It was originally covered with lalang—no blukar. The decline in price of tapioca has brought it into disfavour for the moment. Possibly the German tapioca made, according to the "Journal d' Agriculture Tropicale" of February last, from potatoes and said to exhibit the firmness and whiteness of the best Singapore qualities, has affected the price.

Mr. Stevens has put up machinery to distil Citronella oil on Sungei Landon at Chenderiang: The experiment will be watched with interest. Citronella and Lemon grass can hardly be looked upon as saving weeding, but planted in rows across hill-sides, as Mr. Stevens has done, they certainly save wash.

Indigo is grown only by Chinese. Sesamum has been tried successfully by Mr. Palmer of Brieh Estate, but Mr. Salisbury of Padang Rengas finds it unsatisfactory; he says it makes the ground too dirty.

Musa textilis, a species of banana, better known as "Manila hemp," has been tried successfully by Mr. Vaughan at Tampin. It has the advantage of yielding a return

fairly quickly. An account of this fibre and its possibilities will appear in an early number of this "Bulletin." On many estates the swamps in which para rubber grows only precariously or not at all could be more profitably planted with Sago for the sake of its attaps, which at present can be sold at a good price. An account of this plant may be found in the "Agricultural Bulletin" January 1895.

The main points in putting down catcherops expected to pay is not to put down something which is consumed to only a small extent, and with which the market would be easily over-stocked. Patchouli and Papain are cases in point. The Department of Agriculture is always ready to supply statistics about tropical products, and its library, which is already fairly extensive, is at the disposal of planters who wish to read up the literature of any particular product.

I notice that the upper lateral roots of rubber trees lie much deeper where intertillage has been practised than in the ordinary clean-weeded virgin jungle soil.

PRUNING.

The question of pruning is still an unsettled one, and the majority of planters regard topping with disfavour. At any rate thumbnail pruning is preferable to cutting of a top two or three inches long. In the latter case a leader never grows up; two or three branches come out of the same level and at a wide angle. In a year or two when their leaf spread is larger one or more of these branches breaks off leaving a gaping wound in the stem, and which offers an entrance to wound-fungi. I think it is not wise to assert that pruning should or should not be followed. Much depends on the situation, the soil, and the rapidity of growth of the trees. Certain trees branch naturally at a suitable height; others grow up to 15 feet and higher without branching and these might certainly be helped by judicious pruning.

It is generally recognised now that all branches should be cut off when quite young up to a height of at least 10 feet, as tapping will ultimately be done to this height at least; a good clean step is wanted, and branches or big scars left where old strong branches had been cut off will only interfere with high tapping.

Formerly when two branches grew off near the ground both were allowed to develop on the view that double the tapping area would be available. Planters with old trees

find this is a mistake. Neither grows as thick as either would have done if alone. The foliage of each is one side only and such trees being lop-sided are very liable to suffer from wind.

“WARTS” AND “PEAS.”

The growths, commonly called “warts” or “peas,” are to be found on nearly all trees. Tapping does not appear to induce them as they are found on untapped trees of three years and older. I believe they are dormant buds. They should be taken out when quite young; this is easily done by a tap from a hammer or with a strong knife. The wound soon heals over completely. The practice of many planters having their old trees examined systematically at periodical intervals for these excrescences is worthy of wider application. The rough outgrowths, often several square inches or even square feet in area, which usually begin at the bottom on trees where the early tapping has been bad, seem to be a disease not due to any parasitic organism but to some derangement in the internal economy of the tree induced perhaps by severe tapping.

CLOSE PLANTING.

With regard to distance in planting it is of interest to record that on Caledonia Estate 378 lbs. of dry rubber per acre was obtained in one year from seven year old trees, planted 10 feet by 10 feet.

W. J. GALLAGHER.

PACKING DURIAN SEEDS FOR EXPORT.

During the past year several experiments have been carried out at the Botanic Gardens, Singapore, in order to determine the best method of packing Durian (*Durio zibethinus*) seeds for export to other tropical Colonies. Hitherto it had been thought that seeds of this much sought for fruit would not travel any distance successfully owing to it germinating so quickly after becoming ripe and there would appear to be some grounds for this assumption, in fact several attempts were made in years past to send seeds from this Department to Ceylon with scanty success. These failures must however, have been due to a want of knowledge as to the proper method of packing and not so much to the inability of the seeds to retain their germinating powers for any lengthy period.

Seeds of the nature of those of the Durian having no outside hard protecting covering or testa are as a rule difficult to transport to any great distance partly owing to the fact that they germinate so quickly if not properly dried and also to the fact that they rot very rapidly if there is the slightest suggestion of moisture in the packing material. As far as our knowledge goes we have proved fairly conclusively that those seeds travel best which have *no packing material*, provided that they are thoroughly sun dried previous to being put in the tins. Care should also be taken to see that the edible pulpy matter which surrounds the seeds is carefully removed. Seeds prepared in this manner by us have travelled thousands of miles and arrived at their destination in excellent condition.

On the 27th of August 1908 eight tins of Durian seeds were sent to the Superintendent, Agricultural Department, Onitsha, Southern Nigeria, packed as follows.—

Tin No. 1 seeds packed in Burnt Padi Husk

"	2	"	Wood-wool
"	3	"	Tissue Paper
"	4	"	Thoroughly Dried soil
"	5	"	Thoroughly Dried Moss dust
"	6	"	Slightly damp Moss
"	7	"	Slightly damp Moss
"	8	"	Had no packing whatever

Mr. Don, in his letter of acknowledgement reported as follows on the condition of seeds on arrival at Onitsha (28/10/08).—

"The seeds with the exception of those in tin No. 1 arrived in fair condition considering the long distance they had to travel.

"The seeds in tin No. 1 were completely spoilt.

" " " 2 five seeds out of 6 were good.

" " " 3 six out of 12 good, 4 germinated in the tin.

" " " 4 three out of 7 were good, 3 germinated in the tin.

" " " 5 eight out of 10 were good.

" " " 6 four out of 10 were good, 2 germinated in the tin.

" " " 7 nine out of 11 were good, 6 germinated in the tin.

" " " 8 thirteen out of 15 were good."

The seeds in tin No. 1 were packed in Burnt Padi Husk the material which we find most successful for packing Para Rubber seeds and it is interesting to note that in the case of the Durian seeds it totally failed to preserve them. The packing material employed for tins No. 2 and 5, namely fine Wood-wool and thoroughly dried Moss dust gave the best result whilst tin No. 8 in which no packing whatever was used was the most satisfactory of all.

A later consignment of several hundreds of seeds to the same Department in Southern Nigeria packed in powdered charcoal arrived in very bad condition.

Our observations lead us to believe that the most successful method to adopt is to first carefully clean all pulpy matter from the seeds and after thoroughly drying them in the sun for two or three days, pack them in tins sufficiently large to hold fifty seeds. The lids of the tins should not be soldered down and stout canvas should be used as a covering.

The method applies to all seeds of a like nature such as Mangosteen, etc., etc., packing large quantities of seeds together should be avoided as they quickly heat in bulk.

T. W. MAIN.

Botanic Gardens, Singapore.

MEMORANDUM ON 'SESAMUM' CULTIVATION IN KRIAN, PERAK.

BY R. G. PALMER OF BRIEH ESTATE.

I have been making experiments on Brieh Estate with the cultivation of Sesamum (Gingelly or Til) in which Mr. Lee-Warner when Collector of Land Revenue in Krian—was much interested, with a view of its possibilities as a rotation crop for Padi in the Krian Irrigation area.

The soil in most of the Krian mukims, where not too low lying, appears to be well adapted for the cultivation of this valuable product. Most of the seed cropped by me has been superior to the seed I originally planted and which was imported from India.

If the Malays could be induced to plant Sesamum, for which there is a large demand in Europe—principally from Marseilles, there can be no doubt that they would find it a profitable occupation.

The seed should be planted about the end of March and not later than the 15th April, which is usually a showery season in Krian. As soon as the Padi has been reaped the straw should be burned, and the soil lightly changkollod or ploughed, and weeded, and it is then ready to receive the Sesamum seed. In favourable weather the seed sprouts in 3 or 4 days, and should be ready for reaping in 3 months' time. The seed should be sown, and timed to ripen during July which is ordinarily a dry month, and favourable for harvesting operations, and the fields can immediately thereafter be prepared for Padi with very little trouble, and at a small cost. The plant requires a fair amount of moisture to enable it to get a good start, but after the first month, it can do with a very small amount of rain; at the same time even heavy rainfall will not injure the plant during the 3 months of its growth, provided the land is well drained. Stagnant water will kill it off immediately. Except in the event of the period between the 15th March—15th April being very dry, the plant will not require to be irrigated.

The cost of changkollod or ploughing, one weeding and thinning out,—and reaping, if done by hired labour, should not cost more than \$12 an acre. I have reason to believe that an average crop will not yield less than 150 gantangs of clean seed valued locally at about \$40. One gantang of seed is sufficient for sowing one acre of land.

In India this seed is sown as a rotation crop to Padi as well as wheat and other "Rabi" crops.

There might be one obstacle in developing the export trade in this article, and that is the probability of a high rate of freight being charged by the Conference for its transport to Europe, and it must be remembered that we shall be competing against very cheap freights from Bombay to Europe. At the same time a reasonable view might be taken by the Conference, with a view to developing a new industry. Krian is well situated as regards cheap transport to Penang, whereas a large proportion of the seed shipped from Bombay comes from a great distance in the interior.

A NEW METHOD OF COAGULATING RUBBER LATEX.

In the November number of the "Tropenpflanzer" D. Sandmann describes a new preparation, which he has invented and patented, for coagulating rubber latex. The

article is on the market by the name of "Purub," and is at present fairly widely advertised in the trade journals. The main and effective substance in it appears to be hydrofluoric acid, which is well known from its application in etching glass.

The germs of putrefaction (tackiness) are always present in latex, and the proteids therein offer them a suitable feeding ground. Various measures may be taken to prevent putrefaction. In the smoking process the strongly antiseptic smoke kills the germs, while the acetic acid which it contains at the same time coagulates the latex. Smoke is effective because owing to the way it is applied it acts on a very thin layer of latex and therefore penetrates every part of it. The putrefactive organisms being killed there is no reason to withdraw the entire moisture. In the other methods employed if moisture is present, even when in the interior and shut off from the air, heating easily occurs during transport encouraging the putrefactive germs to develop. Hence rubber prepared by acetic or other acid coagulators must have practically all its moisture extracted if it is to go on to the market free from "tackiness." It has been shown recently that well dried rubber is not so good as that containing moisture. By the Purub method it is immaterial, as far as preservation of the rubber is concerned, how much moisture is left behind.

Sandmann was led to experiment with fluorine compounds in coagulating rubber latex by his experiences in other fields. Thus it has been found that fluorine compounds possess the property of killing putrefactive germs, but affect yeast considerably less. On this account they have for a long time been used in the distilling and fruit-preserving industry. A very small quantity of hydrofluoric acid added to fruit juice keeps its fresh and preserves its aroma for years.

Coagulation with the fluorine compound is most simple. The freshly collected latex, pure or mixed with water, is strained through a cloth to remove foreign bodies into not too large pans; the liquid fluorine preparation added and thoroughly mixed by stirring. It is left for a few hours, after which the coagulated rubber, which in the meantime comes to the top, is removed, freed from water by pressure, and is then ready for shipping.

The fluorine which, as is well known, does not attack rubber, is used in such a small quantity that it is totally removed by water. In removing the water by pressing it

is immaterial, as far as the keeping quantities of the rubber are concerned, whether the entire moisture or only part of it is removed, as the moisture enclosed in the rubber is free from live putrefactive germs and can do no harm.

Rubber prepared by this method both in the Amazon District and in Ceylon has proved to be equal to the best para sorts. Goods made from Purub prepared rubber appear to have superior keeping properties. There was no difference at the time of manufacture between goods made from Ceylon rubber prepared in the usual way with acetic acid and goods made from Ceylon rubber prepared by the fluorine treatment, but after $1\frac{1}{2}$ years the material prepared with fluorine showed much more elasticity than the other. Dr. Frank and Dr. Marekwald have examined this characteristic and believe the difference arises in the vulcanisation. Purub rubber, they say, may be vulcanised extremely quickly. Added lead oxide was not sulphurised. In fact the rubber takes up the sulphur more quickly than a chemical combination between lead-oxide and the sulphur can be completed. It may be taken as fairly certain that rubber coagulated by Purub exhibits particularly good properties in manufacture.

There has been references to Purub in recent numbers of the "India Rubber Journal" arising out of a summary of a lecture on the material by Dr. Frank at the Rubber Exhibition. From these we gather that it would be wise for any Planter who gives Purub a trial to indicate clearly on his rubber that Purub has been used as a coagulator. One writer records a case where a parcel of rubber gave trouble because it vulcanised too quickly. A manufacturer who buys a sample of Purub-cured rubber under the impression that it has been cured in the acetic acid may suffer confusion and loss. Besides indicating that Purub has been used it will give manufacturers an opportunity of estimating its value. M. Victor Herin has shown that even "slight differences in the method of coagulation affect not only the strength and elasticity of the raw rubber but also such properties as its solubility in benzole."

If all the advantages claimed for Purub are true it is certainly a superior coagulator. It is at any rate well worthy of a trial.

W. J. GALLAGHER.

FLOOD-GATES.

Sungei Gadut, Negri Sembilan,

January 23rd, 1909.

DEAR SIR,

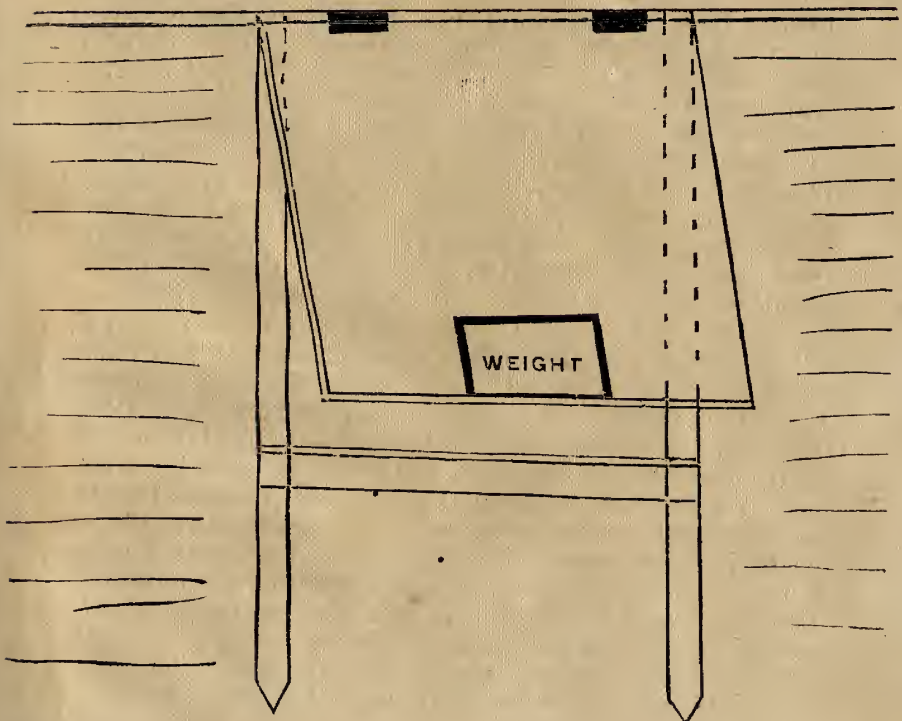
The following suggestion to planters in swampy districts with tidal rivers may be of some value. Instead of the usual flood-gates adopt a hanging door on hinges with a weight at the bottom. The rough diagram below will show what I mean.

This form of gate if properly constructed will not only prevent water from entering drains from the river, but will also at low tide permit of water escaping from the drains.

Such gates should not cost much and will require little or no attention, besides the risk of jamming is reduced to a minimum.

Yours faithfully,

C. A. LE DOUX.



MUSSAENDA ERYTHROPHYLLA.

This superb shrub has been one of the attractions of the Botanic Gardens in Singapore for some time, and last year small plants were sent to Kew which on flowering attracted the notice of many cultivators. The shrub is naturally a climber and is allied to our common white and yellow species, *M. glabra*, commonly known here as Balik Adap, *M. erythrophylla* is a slender woody climber with soft hairy leaves, and terminal corymbs of fairly large yellow tubular flowers. The flowers are borne on short branches in threes, and in one flower of each three, one sepal is developed into a large oval leaf often five inches long, and of a superb crimson or rather cherry-scarlet. Grown as a bush this splendid plant is in flower all the year round. It is easily reproduced from cuttings and can be grown either as a pot plant, a shrub or a climber. The history of the plant is rather curious. It was discovered by Thonning on the Gold Coast in 1827, and the first live plants were introduced into England by Gustav Mann from the Cameroons in 1863, but does not appear to have been established. Mr. Micholitz reintroduced it to Mr. Sander's firm in 1886, having found it on the French Congo, where he says it climbed to the tops of the highest trees covering them with a dazzling wall of scarlet. The plants were transferred to Mr. Bull of Chelsea, who distributed it in 1888. On Sept. 25th, 1889, two plants were received from Mr. Bull at the Botanic Gardens in Singapore, and were planted out soon after. The soil in which they were planted was probably too dry, and the plants though constantly in flower did not make any great growth. A year or two ago it was taken in hand, and propagated by cuttings. It then began to thrive in cooler and slightly shadier spots, and big bushes were formed. The stock was then worked up till an abundance of plants was obtained and two plants were sent to Kew in 1907, where they flowered and were figured in the Botanical Magazine (t 8222) (Nov. 1908). The plant seems to have entirely disappeared from cultivation elsewhere, and does not seem to have been ever seen in flower in England before. It is a plant that should be in all gardens in the tropics. The magnificent red of the sepals is much more brilliant here than represented in the Botanical Magazine, doubtless on account of our more brilliant light, and is less glaring than that of the *Poinsettia* having a pink tint through the scarlet, which softens the colour without interfering with its brilliancy. The habit too of the plant is good, and its soft green leaves, and

yellow flowers set off the red sepals. As a bedding plant grown in mass to a height of about four feet, it is a magnificent sight.

H. N. RIDLEY.

PERSONAL.

We have to announce that Mr. J. B. Carruthers the Director of Agriculture for the Federated Malay States and co-editor of this Bulletin, is leaving the Malay States to take up a position in Trinidad. It appears that the whole of the Botanical and Agricultural establishments of Trinidad are being reorganized under a Director, Mr. Carmody. Mr. J. H. Hart who has long been Superintendent of the Botanical Department retired last year after a service in the West Indies of thirty-three years, and last year saw also the retirement of Mr. Fawcett, in charge of the Botanic Gardens in Jamaica, and Sir Daniel Morris. Mr. Carruthers leaves early in March.

Erratum No. 2. Vol. VIII.

Page 41	Read	Semegambia for Senegambia
" "	"	22,000 tons for 23,000 tons
" "	"	(on bottom line) for British India—not from.
" 47	"	on 12th line host not post.
" "	"	on line 25th absorbed
" 48	"	on line 27 — supplies (some) of the rubber
" 49	"	on line 19 —:(is) reported has been (of) fine grade
" 50	"	on line 15 eugenifolins
" "	"	on line 23 Chonemorpha
" "	"	on line 33 require 5 men
" 51	"	on line 31 attract for attack
" 51	"	last line (are) apt, for and apt
" 56	"	on foot note, Mr. Herbert Wright
" 58	"	on line 9, were for was
" 59	"	on line 21 scruting for security
" 60	"	on line 13 R. G. Watson for Walson
" 62	"	on line 21 Loan Section
" 62	"	on line 23 were for was.

SINGAPORE MARKET REPORT.

January, 1909.

Articles.	Quantity sold.	Highest price.	Lowest price.
	Tons.	\$	\$
Coffee Palembang ...	...	...	...
Bali ...	23	24.00	23.50
Liberian ...	61	25.50	25.00
Copra ...	3,912	8.45	7.75
Gambier Bale ...	1,002	10.25	10.00
Gambier Cube, Nos. 1 & 2 ...	185	14.12½	12.75
Gutta Percha, 1st quality ...	...	300.00	240.00
Medium ...	...	240.00	120.00
Lower ...	...	80.00	12.00
Gutta Jelotong ...	...	9.50	7.30
Nutmegs, 110's ...	...	19.00	...
80's ...	...	25.00	24.50
Mace, Banda ...	...	85.00	78.00
Amboina ...	...	65.00	62.00
Black Pepper ...	547	12.50	12.00
White Pepper (Sarawak) ...	305	19.25	18.87½
Pearl Sago, Small ...	...	3.95	...
Medium ...	30	...	...
Large ...	5	...	...
Sago Flour, No. 1 ...	4,072	3.08	2.87½
No. 2 ...	205	1.65	1.55
Tapioca Flake, Small ...	563	5.50	5.25
Medium ...	...	...	...
Pearl, Small ...	194	8.25	4.65
Medium ...	386	6.00	5.65
Bullet ...	15	8.00	...
Tin ...	2,725	67.00	63.75

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

For the month of January, 15th & 31st.

Tons.

			15th.	31st.
Tin	Str. S'pore. & Penang to U. Kingdom & or		1,600	1,446
do.	" do.	U. S. A.	1,280	1,107
do.	" do.	Continent	145	155
Gambier	" Singapore	Glasgow	...	...
do.	" do.	London	...	75
do.	" do.	Liverpool	150	...
Cube Gambier	" do.	U. K. & or Continent	...	60
Black Pepper	" do.	United Kingdom	120	10
do.	" Penang	do.	25	...
White Pepper	" Singapore	do.	...	25
do.	" Penang	do.	120	110
Pearl Sago	" Singapore	do.	...	5
Sago Flour	" do.	do.	50	15
do.	" do.	London	180	150
do.	" do.	Liverpool	1,600	...
do.	" do.	Glasgow	100	...
Tapioca Flake	" do.	United Kingdom	300	110
T. Pearl & Bullet	" do.	do.	375	100
Tapioca Flour	" Penang	do.	320	480
Gutta Percha	" Singapore	do.	5	40
Buffalo Hides	" do.	do.	200	...
Pineapples	" do.	do.	17,500	7,500
Gambier	" do.	U. S. A.	575	75
Cube Gambier	" do.	do.	...	100
Black Pepper	" do.	do.	410	130
do.	" Penang	do.	70	130
White Pepper	" Singapore	do.	55	25
do.	" Penang	do.	25	15
Tapioca Pearl	" Singapore	do.	160	130
Nutmegs	" S'pore., Penang	do.	60	44
Sago Flour	" Singapore	do.	420	200
Pineapples	" do.	do.	6,250	4,250
do.	" do.	Continent	3,250	4,500
Gambier	" do.	South Continent	100	35
do.	" do.	North Continent	75	130
Cube Gambier	" do.	Continent	10	55
Black Pepper	" do.	South Continent	325	...
do.	" do.	North do.	60	175
do.	" Penang	South do.	25	15
do.	" do.	North do.	...	...
White Pepper	" Singapore	South do.	15	...
do.	" do.	North do.	30	170
do.	" Penang	South do.	...	...
do.	" do.	North do.	...	45
Copra	" S'pore., Penang	Marseilles	340	360
do.	" do.	Odessa	880	100
do.	" do.	Other S. Continent	200	...
do.	" do.	North Continent	460	600
Sago Flour	" Singapore	Continent	525	975
Tapioca Flake	" do.	do.	110	100
do. Pearl	" do.	do.	20	50
do. Flake	" do.	U. S. A.	75	25
do. do.	" Penang	U. K.	85	85
do. Pearl & Bullet	" do.	do.	125	270
do. Flake	" do.	U. S. A.	5	...
do. Pearl	" do.	do.	25	450*
do. Flake	" do.	Continent	...	70
do. Pearl	" do.	Continent	25	240

					Tons.	
					15th.	31st.
Copra	Str.	S'pore.	Penang	England	300	...
Gambier	"	do.		U. S. A.	..	..
Cube Gambier	"	do.		do.	...	...
T. Flake & Pearl	"	do.		do.	..	...
Sago Flour	"	do.		do.	..	...
Gambier	"	do.		South Continent	...	...
Copra	"	do.		Marseilles	...	...
Black Pepper	"	do.		South Continent	...	...
White Pepper	"	do.		do.	...	...
do.	"	do.		U S. A.	...	...
Pineapples	"	do.		do.	...	...
Nutmegs	"	do.		do.	...	...
Black Pepper	"	do.		do.	...	...
do.	"	Penang		do.	...	...
White Pepper	"	do.		do.	...	...
T. Flake & Pearl	"	do.		do.	...	...
Nutmegs	"	do.		do.	...	...
Tons Gambier					700	150
Tons Black Pepper					420	10

Wired on 16th November & 1st December.

GOW, WILSON & STANTON, Limited— India Rubber Market Report For The Year 1908.

13 & 23, ROOD LANE, LONDON, E.C.

THE YEAR'S SALES.—The quantity of Plantation Rubber brought to auction in London during 1908 was 24,647 pkgs., being an increase of 9,267 pkgs. (amounting to 48 1½ tons), as compared with the previous year. The auction average price for 1908 of all grades was 4/1¾ per lb. The following table shows the increase in sales on this market during the last three years:—

TABLE SHOWING TOTAL QUANTITY AND AVERAGE PRICE OF
PLANTATION RUBBER OFFERED AT AUCTION IN LONDON
DURING THE LAST THREE YEARS.

		No. OF PKGS. OFFERED.	QUANTITY IN TONS.			No. OF PKGS. SOLD.	AVERAGE PRICE PAID.
			Ceylon.	Malaya.	Total.		
1st Jan. to 31st Dec.,	1906	6,462	98½	250½	348½	4,130	5,6½
Do.	Do. 1907	15,380	192½	621½	814	7,388	4/9½
Do.	Do. 1908	24,647	290	1,055½	1,295½	16,018	4/1¾

MARKET CONDITIONS.— The period under review has been one of marked changes. The industry at the beginning of the year was still suffering from the set-back in prices which took place during the latter part of 1907; both stocks and visible supplies exceeded requirements, and there was little inclination on the part of buyers to operate with any freedom.

During the summer, however, a gradual improvement was steadily taking place, and while in February the price of Fine Hard Para had receded to 2/9 (the lowest quotation for over sixteen years), by the beginning of August it stood at over 4/-per lb., and in the middle of November reached 5/4½, which was the highest price recorded for more than two years. The marked recovery that has thus taken place in prices is clearly shown by the Diagram which will be found overleaf.

The statistical position is now on a sounder basis than it has been for some considerable time past, owing not to any marked falling off in supplies, but to the steady and continual improvement in trade, which has resulted in the absorption of surplus stocks, more especially in America, where for some months past stocks in warehouse have been negligible.

THE POSITION OF THE PLANTATION RUBBER INDUSTRY has become more important, owing to the increase in production, and in many instances a marked improvement in preparation of the Rubber has been readily appreciated by buyers. It is satisfactory to note that some samples of Plantation Rubber have been pronounced to be equal in all respects to Fine Para, but on the other hand, in certain cases weakness and variation of quality are still complained of, and it is evident that every effort must be made to raise the *standard of quality* to a higher level.

VARIETIES ON THE MARKET.—As the quantity of Plantation Rubber produced has been increasing varieties new forms and methods of preparation have been tried and a large number of different varieties have consequently been put on the market. This has led to some confusion, and it is advisable that the number of different forms and grades should be reduced as far as possible consistent with proper sorting.

Biscuits, Sheets, Crepe and Scrap continue to meet with steady support, but there has been an increase in the proportion of Crepe, more estates having started the use of machinery. Though certain buyers continue to take Sheets and Biscuits in preference to Crepe, the demand for the latter has been well maintained, and very satisfactory prices have been paid for the more carefully prepared samples.

The enquiry for very pale pure Rubber which has been in evidence for some time past continues, and premiums of up to about 4d. per lb. over ordinary Fine Quality Plantation Rubber have been readily paid increasing quantities. Up till now the supplies of such Rubber have only been small, but the uses for it may still expand considerably, and there should be room for a largely increased quantity in the future.

For all kinds of Crepe, provided the preparation has been thorough, there is a good sale, and prices even for the lower qualities have compared very favourably with those for other grades.

PRODUCTION OF PLANTATION RUBBER.—From the table below it will be seen that the total production of Ceylon and Malaya Rubber for 1908 was about 767 tons more than that of the previous year. The bulk of this increase has been derived from Malaya, Ceylon only showing a small expansion. Owing to the rather large area of land which was put under cultivation in the East during 1902-1903, we anticipate that a relatively greater increase in supplies will be seen in 1909, while in a few years time the production of Plantation Rubber is likely to form an appreciable proportion of the world's supply.

EXPORTS OF PLANTATION RUBBER FROM MALAYA AND CEYLON.

	Singapore.	Penang.	Ceylon.	Total.
	Tons.	Tons.	Tons.	Tons.
1905	83	47	75	205
1906	327	58	149	531
1907	649	236	248	1,133
*1908	966	574	364	1,900

* The December figures are estimated.

THE PARA CROP.—Contrary to expectations, the shipments of Amazon Rubber from Para so far this season (*i.e.*, since July 1st, 1908) have exceeded those for the same period of the previous season. This is to some extent accounted for by the supplies having come down from the forests more rapidly than usual, and it does not follow that the total crop will be larger than last seasons, whilst on the other hand, stocks throughout the world have been materially reduced.

RECEIPTS AT PARA DURING THE LAST TEN SEASONS.

						Tons.
1899-00	...	...	...	...	...	26,693
1900-01	...	...	...	...	...	27,640
1901-02	...	...	...	...	...	29,997
1902-03	...	...	...	...	...	29,890
1903-04	...	...	...	...	...	30,580
1904-05	...	...	...	...	...	33,100
1905-06	...	...	...	...	...	34,710
1906-07	...	...	...	...	...	37,810
1907-08	...	...	...	...	...	36,680

RECEIPTS FROM JULY TO DECEMBER FOR THE LAST FOUR YEARS.

1905,	...	...	...	...	...	tons.	14,690
1906,	...	...	...	...	...	tons.	14,680
1907,	...	...	...	...	...	tons.	14,240
1908,	...	...	...	...	...	tons.	15,765

December 31st, 1908.

COW, WILSON & STANTON, Ltd.,
13 & 23 ROOD LANE,
E.C.

JOHN HADDON & CO. SPECIAL PRODUCE LETTER.

London, January 8th, 1909.

STRAITS REPORT.

- BEESWAX** The demand has been quiet. Parcels of good quality yellow have sold at very fair rates. Shipment coming along in March will arrive at a good time.
- CAPSICUMS** There has been a steady demand, high prices have been paid for good bright red beans which have sold from 50/- to 65/- per cwt. For common and inferior low rates have had to be accepted.
- CHILLIES** The offerings which have consisted mostly of good quality sold well at 40/- to 50/- per cwt, but inferior dark shrivelled and mixed yellow have sold down to 25/- per cwt.
- COPRA** A strong market, and a large business has been done in most descriptions at an advance of 30/- to £2 per ton. During the recent holidays there was a quiet tendency prices dropping 10/- per ton which has since recovered. Speaking generally we anticipate smaller supplies, and a firm to dearer market.
- GUM COPAL** There is very little change to note, market has remained about steady with the exception of scraped kinds which have been neglected. Manila and Macassar. Fair dark brown to fine pale scraped 50/- to, 70/-, Mid, to fair half hard 32/6 to 47/6, Nuts ordy. to hard 18/6 to 35/-, Chips 18/- to 35/-, Soft blocky sorts 19/- to 24/-. Pontianac, dark to pale scraped hard 55/- to 45/-, Nuts, small to bold 26/- to 40/-, Chips, 23/- to 29/- per cwt.
- GUM BENJAMIN** Market steady. Present prices :—Sumatra-Marbled, to fine 2nds £7. 15., to £8. 15., common to fair 65/- to £7. Palembang, Com. to fair, part almondy 25/- to 42/6. Siam, Fr. blk. to fine bld. almnds £8 to £26.
- GUM DAMAR** Market has been very slow, and prices rather in buyers favours. Singapore siftings sold at 32/- to 33/-, black at 26/- to 27/6, hard block at 25/- to 25/6, small siftings 25/6 to 26/6, hard block ditto 20/- to 27/-. Borneo Block Rough Coated 6/- per cwt. We value Singapore specky to fine clean at 26/- to 70/- per cwt. Betavia, fair to fine 65/- to 80/- per cwt. Borneo Blocky Rough Coated 6/- to 11/- per cwt. This Gum might be considerably improved by being carefully handled, sifted, scraped and picked.

GUM DAMAR,
(Continued).

A few years since we established a very promising business in Borneo which was discontinued owing to illness and the Shipper consequently having to leave the country.

ISINGLASS

Since the last Sales of the year only a few small sales have taken place at steady prices.

The first of the New Year will be held on the 19th inst. Present values :—Penang leaf, pickings to fine pale 1/3 to 4/3, tongue, pickings fine pale 10d to 4/2d. Purse, small to fair pale 5d to 1/8d, Saigon, leaf, pickings of fine pale 1/- to 1/9 per lb.

PEPPER

Black Singapore—A fair business has been done. After the advance noticed in our last report the market has fluctuated closing sellers January March shipment at $3\frac{3}{4}$ d per lb c. i. f.

White Pepper has also followed a similar course. On the whole comparatively a moderate business has been done closing January March shipment at $4\frac{1}{4}$ d c. i. f. delivered weights.

RUBBER

The improved demand noticed in our last report has continued, the small supplies available well maintaining present high rates.

The market has fluctuated, but we close to-day fine hard Para on the spot 5/2, and Soft fine 4/10d.

The last sales of the old year held on the 31st Dec. contained 1,450 packages of Plantation, the bulk selling at fair prices.

Malay and Straits (about 63 Tons) : Sheet, good to fine at 5/4d to 5/4 $\frac{1}{4}$ d, mixed part immature at 5/1d to 5/3d. Crepe, good to very fine pale at 5/4 $\frac{1}{4}$ d to 5/6 $\frac{3}{4}$ d, fair to good palish at 5/2 $\frac{3}{4}$ to 5/4d, palish mottled at 5/0 $\frac{1}{2}$ d to 5/2 $\frac{1}{4}$ d, clean brown mixed dark at 4/8 $\frac{1}{4}$ d to 5/-, mixed dark and black at 4/0 $\frac{1}{4}$ d to 4/7d, Rambong at 4/9 $\frac{3}{4}$ d. Block, fine pale "Lanadron" at 5/10d to 5/10 $\frac{1}{4}$ d. Scrap, fair to fine at 4/2 $\frac{1}{4}$ d to 4/4 $\frac{1}{4}$ d, mixed inferior at 4/1 $\frac{3}{4}$ d to 4/1 $\frac{3}{4}$ d.

Ceylon (about 13 Tons) : Sheet and Biscuits, fair to fine at 5/4d to 5/4 $\frac{1}{2}$ d. Crepe, good to fine pale at 5/5 $\frac{1}{4}$ d to 5/6 $\frac{1}{2}$ d, fair palish at 5/1 $\frac{1}{2}$ d to 5/4 $\frac{3}{4}$ d, clean brown at 4/9 $\frac{3}{4}$ d to 5/0 $\frac{3}{4}$ d, dark brown at 4/6 to 4/9d, mixed dark and black at 4/3 $\frac{1}{2}$ d to 4/4 $\frac{3}{4}$ d. Worms, fine white at 5/7 $\frac{3}{4}$ d, fair palish at 5/3 $\frac{3}{4}$ d to 5/ $\frac{3}{4}$ d. Scrap, fair to fine at 4/3 $\frac{1}{4}$ d to 4/4 $\frac{3}{4}$ d, mixed part inferior at 3/6 $\frac{1}{2}$ d to 4/0 $\frac{1}{2}$ d. Uganda Plantation : 163 packages offered and sold, clean hard pressed sheet and Crepe at 4 $\frac{1}{2}$ /0d to 4/1d, fair unpressed and lump at 3/3d.

Java Plantation : 12 Cases offered and 10 sold, pressed sheet at 4/1 $\frac{1}{4}$ d.

SAGO

The market has been quiet and business difficult. On the spot trade has been very slow. Pearl, dull to fine 14/- to 16/-, medium, dull to fine 12/6 to 15/-, small, dull to fine 11/- to 13/-. Flour, good pinky to white 9/- to 10/6 per cwt. To arrive a few sales have taken place in small at 10/- to 10/6 per cwt c. i. f. and flour at 7/- to 9/- per cwt according to quality.

TAPIOCA

There has been more enquiry and a moderate business has taken place. To-days values :— Jan/March shipment or any position up to the end of April is $1\frac{1}{3}\frac{3}{4}$ d to $1\frac{1}{2}$ d c. i. f. PEARL TAPIOCA has sold well closing rather weaker Jan/March shipment at $14/1\frac{1}{2}$ d to 14/- c. i. f. New York, and fair Penang at 12/9 to 13/- per cwt. c. i. f.

TAPIOCA FLOUR also has been in good request and a fair business transacted at prices ranging from 6/- to 10/6 per cwt according to quality.

VANILLOES

The first sales of the New Year will take place on the 20th when we anticipate a firm market.

We value firsts good crystallized $3\frac{1}{2}$ to $8\frac{1}{2}$ " at 7/- to 14/-, seconds foxy red $3\frac{1}{2}$ to $8\frac{1}{2}$ " at 6/- to 10/-, thirds leans and inferior 6/- to 7/6 per lb.

All descriptions of Produce sold to the best possible advantage.

JOHN HADDON & Co. *Salisbury Square. E. C.*

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of December, 1908.

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DISTRICT.	Mean Barometrical Pressure at 32 Fm.	Maximum in Sun.	TEMPERATURE				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 Hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, K. Lumpur	29.879	147.7	80.2	89.6	72.2	17.4	76.5	0.827	73.4	78	N.E.	4.17	1.07
Pudoh Gaol Hospital "	4.27	1.81
District Hospital "	3.73	1.25
" Klang	88.0	71.9	16.1	...	...	...	...	...	4.54	1.11
" Kuala Langat	83.8	75.2	13.6	...	...	...	...	...	4.87	1.22
" Kajang	86.6	75.1	11.5	...	...	...	...	...	7.73	2.25
" Kuala Selangor	7.24	2.12
" Kuala Kubu	91.0	70.3	20.7	...	...	...	...	...	1.50	0.42
" Serendah	91.9	70.8	21.1	...	...	...	...	...	4.92	1.28
" Rawang	89.5	71.2	18.3	...	...	...	...	...	7.31	2.45
Beri-beri Hospital, Jeram
Sabak Bernam	4.46	2.00

OFFICE OF THE SENIOR MEDICAL OFFICER, STATE SURGEON'S OFFICE,
Kuala Lumpur, 2nd February, 1909.

E. A. O. TRAVERS,
Senior Medical Officer. Selangor.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of January, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
125 General Hospital, K. Lumpor	29.876	146.3	80.8	89.1	71.1	18.0	76.3	0.823	73.4	78	Calm	8.73	2.33
Pudoh Gaol „	9.01	2.37
District Hospital „	7.81	1.70
„ Klang.	88.1	70.9	17.2	...	...	...	...	...	8.63	2.24
„ Kuala Langat	89.7	74.6	15.1	...	...	...	...	...	1.82	0.90
„ Kajang	86.1	74.5	11.6	...	...	...	...	...	6.05	1.32
„ Kuala Selangor	9.40	2.22
„ Kuala Kubu	90.9	69.7	21.2	...	...	...	...	...	16.59	2.50
„ Serendah	91.4	70.5	20.9	...	...	...	...	...	11.59	2.05
„ Rawang	89.4	70.2	19.2	...	...	...	...	...	12.02	2.70
Beri-beri Hospital, Jeram	10.33	4.20
Sabak Bernam	6.10	1.75

OFFICE OF SENIOR MEDICAL OFFICER,
Kuala Lumpur, 19th February, 1909.

A. J. M. CLOSKY,
Acting Senior Medical Officer, Selangor.

Penang.

Abstract of Meteorological Readings in Criminal Prison Observatory for the month of January 1909.

DISTRICT.	Mean Barometrical Pressure at 32 Fah.	Mean Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory	29.921	143.4	81.4	88.7	74.8	13.9	76.8	860	73.7	80	N.W.	3.39	1.25

CRIMINAL PRISON PENANG,

19th February, 1909.

W. H. FRY,

Senior Medical Officer, Penang.

Perak.

Abstract of Meteorological Readings in Perak for the month of January, 1909.

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DISTRICT	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taipeng	...	155	80'49	91	70	21	76'58	863	...	82	...	25.17	8'35
Kuala Kangsar	79'82	91	69	22	75'14	814	...	79	...	9.61	2'04
Batu Gajah	...	155	79'51	91	73	18	76'04	852	...	85	...	10'99	2'60
Gopeng	79'34	90	63	27	74'49	792	...	79	...	14'20	3'00
Ipoh	80'42	91	70	21	76'29	853	...	82	...	15'57	2'82
Kamper	79'66	90	69	21	75'48	837	...	84	...	20'17	3'00
Teluk Anson	80'50	92	69	23	76'01	838	...	80	...	10'63	1'65
Tapah	79'67	92	65	27	74'59	792	...	78	...	13'48	2'38
Parit Buntar	80'38	89	70	19	76'26	853	...	81	...	8'71	2'07
Bagan Serai	80'66	90	71	19	76'47	858	...	81	...	9'44	2'31
Selama	80'71	92	71	21	76'17	844	...	80	...	14'82	3'10

STATE SURGEON'S OFFICE,

Taipeng, 13th February, 1909.

M. J. WRIGHT,

State Surgeon, Perak.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of December, 1908.

128

DISTRICT.	Mean Barometrical Pressure at 32° Fah.		Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
		Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis	77.8	91	67	17.64	74.9	...	...	...	...	8.81	1.47
Raub	79.5	92	66	19.58	74.4	...	...	...	...	10.21	2.40
Bukit Fraser	54	...	...	...	...	...	...	8.95	1.45
Bentong	80.5	95	70	17.3	75.5	...	...	...	...	6.67	2.14
Temerloh	92	71	15.1	...	...	...	...	...	6.73	1.80
Pekan	79.0	88	71	13.2	76	...	...	...	...	29.48	13.86
Kuantan	81.9	88.5	70	13.4	76.2	...	...	...	...	13.37	3.55

OFFICE OF THE MEDICAL OFFICER, PAHANG.

W. FLETCHER,

Kuala Lipis, 21st January, 1909.

For Medical Officer, in Charge, Pahang.

Negri Sembilan.

Abstract of Meteorological Readings in Negri Sembilan Hospitals for the month of January, 1909.

129

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Seremban	...	141	80	87	69	18	76	813	72	75	N.W.	4.35	1.02
Mantin	6.14	1.71
Ayer Kuning	13.76	4.60
Tampin	6.31	1.78
Kuala Pillah	6.84	1.60
Jelebu	6.07	.95
Port Dickson	5.06	1.34
Port Dickson Beri-Beri Hospital	4.07	1.10

W. O. I. C. OFFICE,
Seremban, 13th February, 1909.

S. LUCY,
W. O. I. C. Negri Sembilan.

10/6

Seremban.

Table Showing the Daily Results of the Reading of Meteorological Observations taken at the General Hospital, Seremban, for January 1900.

DATE.	TEMPERATURE OF RADIATION.					TEMPERATURE OF RADIATION.		WIND DIRECTION.	TEMPERATURE OF EVAPORATION.			COMPUTED VAPOUR TENSION.			RELATIVE HUMIDITY.			CLOUDS 0 TO 10				WEATHER INITIALS.		RAIN
	H.	H.	Mean.	Maximum.	Minimum.	Range.	Sun.		Difference Sun & Shade.	H.	H.	Mean.	H.	H.	Mean.	H.	H.	H.	H.	H.	H.	H.	H.	
1	78	83	80.5	85	69	16	55	9	72.9	76.3	74.6	810	905	837.5	84	80	82.0	7	3	2	9	C	S	
2	78	87	82.5	89	70	19	54	15	71.2	73.9	72.5	705	857	801	84	80	72.0	3	2	2	9	C	S	
3	78	85	81	88	69	18	57	15	76.1	60.0	63.6	624	524	572	63	43	55.0	3	3	4	9	C	S	
4	78	87	82.5	88	70	18	54	15	65.1	59.1	62.7	906	502	704	64	39	60.5	3	10	4	9	C	S	
5	78	84	80.5	85	69	16	55	15	68.5	74.0	71.2	627	840	768.5	75	75	73.5	4	2	2	9	C	S	
6	77	83	80	84	69	14	55	15	65.1	73.0	69.1	620	810	715	67	72	79.5	4	2	2	9	C	S	
7	77	85	82	85	69	17	56	15	70.6	73.4	72.0	749	876	802	75	80	71.5	3	3	3	9	C	S	
8	78	85	81.5	87	70	17	55	15	68.9	74.2	74.8	765	823	789	75	88	79.5	4	2	2	9	C	S	
9	79	86	82.5	88	70	18	56	15	68.9	79.1	71.6	707	853	806.5	71	80	79.5	4	2	2	9	C	S	
10	79	86	82.5	88	70	18	56	15	68.5	76.7	72.6	697	822	809.5	75	76	75.5	3	2	2	9	C	S	
11	77	85	81	89	72	17	58	15	71.2	73.3	74.1	775	819	843	85	81	73.0	7	7	7	9	C	S	
12	77	88	82.5	89	72	17	58	15	65.7	71.6	68.6	687	775	702.5	85	81	73.0	7	7	7	9	C	S	
13	77	88	82.5	89	72	17	58	15	63.4	73.3	74.1	633	792	854	63	61	62.0	4	5	5	9	C	S	
14	76	88	82.5	86	63	26	49	15	71.6	71.6	74.5	533	804	819	84	84	74.0	4	4	4	9	C	S	
15	79	87	83.5	89	71	18	54	15	72.9	70.7	71.5	819	751	783.5	80	80	72.0	4	4	4	9	C	S	
16	79	84	81.5	85	70	15	58	15	72.9	73.0	71.7	819	751	783.5	80	80	72.0	4	4	4	9	C	S	
17	78	84	81	81	70	16	58	15	70.3	73.0	70.4	722	819	770.5	85	84	74.0	4	4	4	9	C	S	
18	82	84	83	83	70	15	63	15	63.5	73.3	71.4	712	819	786	85	84	74.0	4	4	4	9	C	S	
19	78	88	83	80	70	19	58	15	72.9	70.7	71.7	722	819	770.5	85	84	74.0	4	4	4	9	C	S	
20	77	87	82	83	71	17	58	15	71.9	72.2	72.0	783	792	787.5	84	84	72.0	4	4	4	9	C	S	
21	76	87	82.5	88	71	19	50	15	71.9	72.2	72.0	900	837	871.5	84	84	72.0	4	4	4	9	C	S	
22	76	86	81.5	88	71	19	50	15	75.3	74.4	74.9	877	888	886.5	94	68	85.0	4	4	4	9	C	S	
23	77	84	80.5	84	69	15	46	15	75.3	74.4	75.5	877	888	886.5	94	68	85.0	4	4	4	9	C	S	
24	75	80	79	80	69	15	50	15	73.3	74.7	74.0	820	836	838	94	76	81.0	4	4	4	9	C	S	
25	75	83	80.5	86	69	15	50	15	72.3	76.0	74.5	793	857	825	94	76	83.0	4	4	4	9	C	S	
26	74	86	79.5	87	63	18	52	15	72.3	76.0	75.5	867	904	883.5	94	76	85.0	4	4	4	9	C	S	
27	80	85	82.5	89	69	17	51	15	75.0	76.0	75.8	867	922	894.5	85	80	76.0	4	4	4	9	C	S	
28	79	86	82.5	87	70	17	48	15	75.0	76.0	75.8	867	922	894.5	85	80	76.0	4	4	4	9	C	S	
29	80	85	82.5	88	70	17	48	15	79.0	75.0	77.1	990	873	911.5	100	72	86.0	4	4	4	9	C	S	
30	79	86	82	89	71	19	54	15	78.3	76.0	77.1	963	904	933.5	95	72	86.0	4	4	4	9	C	S	
31	80	86	83	89	70	19	54	15	71.9	73.5	72.7	787.04	839.3	813.3	82.4	68	75.2	4	4	4	9	C	S	
Total.	77.28	85.9	81.5	87.2	69.9	18.14	141.2	53.98	71.9	73.5	72.7	787.04	839.3	813.3	82.4	68	75.2	4	4	4	9	C	S	.35

General Hospital Seremban, 13-2-1900.

S. LUCY,

M. O. I. C. Ngari Sembilan.

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

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APRIL, 1909.

[VOL. VIII.]

CLEAN WEEDING V. TEPHROSIA.

For a long time scientists have called attention to the disadvantage of weeding and have advised the introduction of new methods; but their ideas have not been well received, and so far little has been done on practical lines.

Interest has however been awakened, experiments with leguminous and other plants are common, and I hope to be able to show, that one plant may be used with both economical and other advantages.

In this article it is not proposed to go into the theoretical side of the matter. What at present appeals most to people is the cash expenditure for keeping weeds down—or out, the cheapest way being naturally the most popular one, and weeding will here only be dealt with from this point of view.

Of course with virgin jungle properly dealt with from the start, the weeding bill should never look high, and old established estates will perhaps naturally adhere to their old method.

Most plantations have however in one corner or another a block of old abandoned paddyfields or Malay kampongs and in such places a cheap method of getting rid of weeds is much wanted.

I at any rate to get have had the bad luck of getting a few acres of such land indifferently burnt and all the planters who have seen it, have invariably advised me to changkol the whole place at a cost of anything between \$20 and \$60 an acre.

For various reasons this work was not done, but I believe most planters will from experience be able to state, if the above price is correct.

For some time experiments have had been carried on with a view to introduce a plant, which would be able to keep weeds out and at the same time itself benefit or at least do no harm to the rubber trees, and for this purpose I have found *Tephrosia purpurea* admirably adapted.

As this plant, seed of which was kindly presented me by Dr. Treub of Buitenzorg, is new to the F. M. S., some information of how it was established may be of interest.

The first plot was only 20' by 40' and was planted up with one or two seeds in every square foot. The place was then clean of weeds but had not been changkolled, and some lalang had only been cut down, while the roots were untouched.

In the second plot conditions were different.

In belukar land, to save expense, a path or rentis 6 feet wide had been cut along each row of trees, and when at this work the coolies had generally scraped aside a little earth by which gradually two ridges had been formed one on each side of the row of trees. In these ridges every few feet a couple of seeds were put in, and after 5-7 weeks all failures were supplied. Otherwise no special care was taken, only of course the coolies were told not to pull these plants up when weeding, and care should be taken to choose a rainy season for this work.

The *Tephrosia* will grow slowly at first, and at 4 months old it has only grown into a small bushy plant, but it then commences to assert itself amongst the surrounding weeds. When full grown it is about 5-6 feet high and each plant spreads to the same extent.

My oldest plot was sown in June and has not been weeded since the end of August 1907, viz; during 19 months.

One creeper has grown up in it, but in other ways it looks all right and the lalang, which formerly was on this spot has now disappeared.

My second plot was planted May last partly in lalang. The *Tephrosia* now form two solid hedges through which nothing penetrates, and the weeding is here done at a very small cost.

The hedges are sufficiently apart to allow the air to circulate along the trees, and the ground is always soft and nice. So far the time has been too short to show any advantage in growth of trees, but they certainly look as good as any in my clean weeded area.

To make the *Tephrosia* grow in hedges has the advantage of a better air-circulation around the roots, and it also makes it easier to get about when inspecting the plantation; but other methods have also advantages. To take

an example where trees are circled, it would be very easy to put in a few seeds around each tree.

The *Tephrosia* grows rather high and ought on this account to be cut down once or twice a year, but in other respects this height gives the plant a great advantage, when fighting lalang and other high weeds. As it is not a creeper it may safely be planted together with rubber stumps, coffee, etc., without fear of their being interfered with; and as it is a good fertiliser, has few natural enemies, is very hardy and propagates itself when once established, it must be considered an ideal plant for its purpose.

Under the conditions mentioned the planting of *Tephrosia* represents a great and direct saving. Having however reached so far, it might be rather interesting to see, if the step could not be taken in full, and the same plant be introduced with advantage also in clean estates.

The question is what clean weeding costs, and how much money could be saved by planting *Tephrosia*.

The general opinion is that 30 cents an acre a month is a low price for weeding. This is often not sufficient and also it is only the pay of the coolies and does not include anything for management and other consequent expenses, so that really the expenses are much higher, and a fair idea of what it costs would be obtained by charging all expenses for upkeep of an estate to weeding, as of course little other work remains to be done.

If an estate when first planted up could be left to itself until the trees came into bearing, then the saving ought to be at least \$1.50 an acre a month and in many cases much more, or say as a low figure \$20.00 per annum; and it now remains to be seen, what it costs to establish *Tephrosia*, and if by this proceeding the above money could be saved.

The first item is easy to settle, I have found \$4.00 an acre ample and to spare.

The second point is also easy; experience from abandoned estates and other places show, that if not hampered by lalang or grass, trees will grow as well or better under natural condition that is in weeds, as in clean land.

When now comparing the merits of the two methods we get:

TEPHRÓSIA.

Cost of establishing <i>Tephrosia</i>	\$4.00
Weeding expenses for 5 years per acre ..	\$100.00
	<hr/>

TEPHRESIA.

Cost of establishing Tephrosia	\$4.00
Keeping drains clean	1.00
Land Rent	1.00
Cut down Tephrosia twice	2.00
Various	1.00
Supervision	1.00
<hr/>	
Total cost 1st Year	\$10.00
<hr/>	
2nd and following years.	
As above less \$4.00 for establishing Tephrosia	\$6.00
<hr/>	
Total expenses for 5 years	\$34.00
<hr/>	
Total saving	\$66.00
<hr/>	

F. ZERNICHOW,
 Jendarata Estate,
 Teluk Anson.

VARIOUS NOTES.

During a visit of inspection to Penang and Province Wellesley in February, I had the pleasure of visiting Caledonia estate, and Tali Ayer estate as well as some other sugar and rubber plantations under the management of the Hon. John Turner, who was kind enough to let me see as much of the working of these estates as time permitted. It was a treat to see the rubber at Caledonia which I had seen in its very earliest days, now producing a good return of high class rubber. Part of this ground was originally a lalang field, with the grass high all over it, and through this the rubber was planted, and no expensive digging or changkoling used. Now the rubber having shaded and the lalang gone, not a blade can be seen anywhere, and the rubber trees are strong large and healthy. In old sugar land, cleared of cane or planted through the cane, the rubber has done well, and the fields at Tali Ayer where Mr. Petrie is at work managing, are about as good as anything one can desire. Trees of $3\frac{1}{2}$ to 4 years measuring 18 to 20 inches round at 3 feet from the ground were not the exception, and these were turning out excellent sheet

and crepe. The trees over this very large area were very uniform, and regular. While walking round with Mr. Petrie we came across the corpse of a rhinoceros beetle (*Oryctes*). These beetles he assured me had taken to experimenting on Para rubber tree leaves as a food, rather an unusual thing for a beetle which does not as a rule at least eat leaves. The result to the beetle was disastrous its mouth and gullet were soon choked with latex and it fell to the ground in a moribund state and was soon attacked and killed by ants. The dead one I examined and found that it had quite a string of rubber in its gullet and mouth. It was another example of the way the Para rubber defends itself from insect attacks by its latex. The rubber at Tali Ayer was being made in temporary quarters in the form of a Krani's house, but a new building was being erected for the factory. It had naturally not been expected that the tree would be ready to produce so soon as three and a half years. The basal V was the form of tapping used and the cutting by the Tamil coolies all over these estates was as perfect in fineness of cut, and in absence of slips into the cambium layer as one could desire. The renewed bark was smooth, regular and full of strong latex.

There was no fungus to be seen anywhere and but few trees damaged by Termites. Mr. Turner however has put up a Carbon-bisulphide plant at Caledonia which will enable him to deal with these pests wherever they occur.

I have been impressed lately more and more with the importance of planting Para rubber seed right way up, that is to say with the flat side down. Some planters seem to think that it does not matter at all whether you plant it upside down or not, and that it will right itself. And so it will to a certain extent, but if you get the tap root curved, this may remain as a permanency. The defect may not show for some years, but the result is that the main root or part of the root through which the water supplies ascend to the tree is permanently bent and the ascent of the water, and of course the plant food in it is seriously retarded. The tree is stunted. It is shorter and less well developed than the others with straight roots, and in most trees or shrubs when this happens the life of the tree is short. There is no reason why rubber seeds should be planted on the rounded side instead of the flat. It is really just as quick to plant them properly as to plant them anyhow when one has got the knack of the thing and it should be made imperative on the coolie to plant each seed properly. When planting seedlings out care should be taken to get the tap root straight. In the old days of coffee

planting it was often the custom in planting out the seedlings to give the plant when put in the ground a short sharp pull to straighten the tap root in case it had got bent in inserting it, an excellent plan. I well remember a now-long abandoned coffee estate which I visited some years ago, and which was then practically abandoned. It had been a failure from more reasons than one. The trees were stunted and wretched looking, nearly worthless. On examination of the number it was seen that the tap root was completely curled round in at least 80 per cent, apparently the seedlings had been conveyed to the ground with the roots twisted round in the baskets for convenience of carrying and then the coolies had planted them just as they were without straightening the roots, practically ruining them.

It may be presumed that most planters are well acquainted by now with the difference in use of the green-soiling or nitrogenous plants such as *Crotalaria*, *Mimosa* and *Tephrosia* and the lalang-killing plant *Passiflora foetida* but the large number of enquiries received show that there are a considerable number of persons interested in rubber planting who are quite confused as to the difference, and who think that *Crotalaria* is intended to kill weeds, *Crotalaria* is a weed itself but differs from white weed (*Ageratum*) and other such herbaceous plants which appear in estates in possessing the nitrogenous bacteria in tubercles of the roots which supply nitrogen to the soil. In fact it may be said to be a living fertilizer. *Passiflora* is only intended to kill lalang grass by creeping over it and cutting off its light supply. It is however also useful in covering steep bare clay slopes on which one so often sees rubber planted and saving wash. It is not expected to supply nitrogen to the soil nor to kill harmless or possibly useful little weeds which have crept in to the estate. We should be inclined to apologise to our readers for printing an explanation of this kind on matters of which so much has already been published but after receiving numerous confused letters from would-be planters who do not seem to have realized the difference between the two classes of plant and after overhearing planters elaborately explaining to strangers the virtues of *Crotalaria* as a weed killer, we may conclude that there are a large number of people engaged more or less in planting, and anxious to do as every one else is doing without knowing what they are doing or why they are doing it. And it is for these that these remarks are published.

ESTATE MARKS ON PLANTATION RUBBERS.

An interesting article on this important subject appears in the current issue of "The India Rubber Journal" The writer points out that the India Rubber Manufacturers Association some time back took up the subject and addressed letters to the Governors of Ceylon and Malaya pointing out the advisability of planters registering trade marks for various brands of Rubber in order to facilitate identification. It is further stated that it is very gratifying to notice the interest which many manufacturers are now taking in plantation rubber, and especially with reference to the establishment of brands on the produce from the various estates in the Indo-Malayan region.

A manufacturer writing in the same issue of the "India Rubber Journal" states that at the present time the bulk of plantation rubber is bought from sample and as the many different forms appear in many different grades and in various conditions the result is a want of uniformity in the parcels offered. If proper steps, he says, were taken to standardize and brand the various grades of rubber, there seems no adequate reason why in course of time the bulk of the product of each Estate should not be sold under its marks and without reference to samples at all. This is done in the case of wild Para and should be more easily done in the case of Plantation Rubber.

A number of Estates have already adopted this system of branding their rubber but a great number have not and many brands are said not to be recognized or understood by the majority of manufacturers but as the number of estates increases and the quantity of rubber produced becomes much larger than at present the wide difference in the qualities of the samples exposed will become more marked and it will become necessary to buy from recognized brands and not from sample. As is rightly pointed out the mere branding of cases is not sufficient and is obviously likely to aid fraud. Each sheet, block or biscuit should contain the brand of the estate clearly marked.

This should be easily done during the process of preparation. At the present time when estates are wrestling with each other for the top price no man can say which will obtain the best price in the near future and it behoves each one to see that his rubber is plainly branded and that manufacturers and buyers at home are made acquainted with the various brands or marks. Another advantage

sufficiently obvious lies in the fact that branding sheets and blocks would prevent theft.

T. W. M.

PRECOCITY IN RUBBER TREES.

Dear Mr. Ridley,

With reference to your article in the August number of the Bulletin on "Precocity of Rubber Trees" it may interest you to learn that on 23rd Dec. 1908 we successfully raised seedlings from seed obtained from a Para tree planted as a stump in June 1906: the fruit set in 28 months, and the resultant seedlings sprouted 30 months, from date of planting out the stump.

Over fifty trees flowered within 28 months of planting out the stumps and four of these set fruit within 30 months.

In all cases stumps were not more than 12 months old when planted out.

As to the undesirability of such "precocity" I would quote the opinion of Sir W. T. Thiselton-Dyer of Kew Gardens "I am not aware of any grounds theoretical or" "practical for thinking that the age of the seed parent" "makes any difference to the offspring in the case of" "Para rubber or any other tree. The first Para plants" "were sent from Kew to the Straits Settlements in 1876:" "it may be presumed therefore that all the trees now" "growing there are the progeny of comparatively young" "parents."

Yours faithfully,

FRANK E. LEASE.

Note on above. Mr. Lease's trees though very precocious are not much more so than the ones mentioned in the paper referred to as their age works out to 40 months from seed i.e. 3 years 4 months. The objection to precocity is not based on any supposed weakness of the offspring of the trees, about which as Sir William-Thiselton Dyer says we have no evidence but upon its action on the tree itself, i.e. whether or no such trees are short lived: In the case of Nutmegs fruiting in three years instead of the normal seven, it is strongly believed and there is some evidence for it that such trees die out more quickly than the normal ones. There is no advantage to be gained by the rubber planter in his trees *fruiting* early, but there is a great advantage in their being large and stout trees early. In the early fruiting trees I have seen and mentioned the stems were

very well developed and as big as they would have been ordinarily at the usual time for fruiting four and a half to five years. The original Singapore trees fruited in the fifth year, but the bulk of the trees descended from them were raised from seed when the trees were much older.

A NEW USE FOR JELUTONG RUBBER.

The uses of rubber increases every day, and rubbers of various kinds are used for most unexpected things thus we see the notice of a new patent for chewing gum, consisting of resin and rubber, the rubber being partly at least Pontianak Rubber that is to say Jelutong. One would not think it would make a very delectable sweetmeat, but no doubt it will be popular in America.

ED.

AGRI-HORTICULTURAL SHOW 1909.

At a Meeting of the General Committee held in the Governor's Office Govt. Buildings Penang on the 5th inst., it was decided to hold the next Agri-Horticultural Show on the 9th, 10th and 11th of August. These dates were considered as most suitable by reason of the fact that the fruit season is about at its best then, and further there are two Public Holidays in Penang at that time—thus enabling the Sub-Committees to have more time for the receiving and despatching of exhibits. Circulars in the various vernacular languages are being prepared, and will be issued this week stating the objects for which the Exhibition is held. It is hoped that all intending Exhibitors will begin at once to prepare their Exhibits.

W. Fox.

A CRICKET (BRACHYTRUPES ACHATINUS) ATTACKING YOUNG TAPIOCA AND RUBBER.

During 1906 a cricket was reported from Sumatra as damaging the young Para seedlings in that country. Since that time I have observed it attacking young Tapioca with rather disastrous effects, and have conducted some experiments against it successfully.

The following information regarding its attack on rubber will interest the planters here, while some notes are

appended referring to its habits on Tapioca plantations. For the note relating to the crickets on rubber seedlings I am indebted to the Manager of an Estate in Sumatra. "The insect bores very rapidly a long tunnel in the ground and at varying depths from six inches to more than a foot in some cases.

"It appears that it feeds in the evening and early morning, since damage done to young plants has always been after 5 o'clock in the afternoon and prior to 6 o'clock in the morning. For the purpose of feeding the animal comes to the surface where in the case of Para rubber it has in some cases completely bitten the stem from the root and in other cases partially eaten through the stem causing it to fall down.

"The pest is one known greatly as troubling the Tobacco planter and he has noticed that the plant bitten off is dragged away underground, but this has not yet been discovered in the rubber plantations."

With regard to the last sentence it is highly probable that if the burrows were carefully followed up some leaves and sticks would be found within. The burrows are frequently very long and of considerable size often having several distinct passages. On the whole its attack on young Tapioca is the same as on Para seedlings, but it is to a certain extent encouraged on those plantations carrying the first crop.

The insect prefers sandy soil, and is very seldom found when the character of the land is hard. When a loose sandy soil is thrown up for banking, as is done on tapioca plantations a perfect home for the cricket is formed, and of which it quickly takes advantage. Shortly after the young tapioca shoots, one may see in the early morning, a very large percentage of plants "eaten down" as the planter terms it. This damage is done by the cricket during the night. They commence to leave their holes at dusk and rapidly nibble the soft stem of young tapioca, frequently severing them close to the ground, at other times robbing the young plant of its leaves. Both the stems, and leaves are then drawn into the burrows. When walking round in the morning spaces in the young field will be noticed, and these spaces continue to increase until very little green foliage is left. Supplies have to be planted, but when a field is infected the supplies suffer in the same way as the previous crop.

Owing to the banking the holes are extremely easy to detect. Usually there are about $\frac{3}{4}$ inch in diameter at the exit, but if followed up it will be found that beneath the

ground some of the burrows are so large as to enable a man to insert his hand. They are often of considerable length, several feet, and their depth varies a great deal, but seldom exceeds 18 inches below the surface.

In an infected area holes partially stopped up may be noticed. These are holes leading to burrows where it may be safely concluded that crickets are contained. To continually dig out these crickets costs a great deal of time and labour and it will be found that the Carbon bisulphide applied in the following way is most effective and very cheap. I have treated 108 holes in 1 hour 20 minutes having to find and clear the holes myself.

Three coolies is a useful number to treat the holes. One man to go in front and mark the holes the other two to apply the poison.

Take a piece of cotton wool about the size of an ordinary thimble and soak this in the Carbon bisulphide, insert quickly into the hole, and close with some of the surrounding earth. As the efficacy of the application depends on the distribution of the gas through the burrow, it is advisable to dig away a little of the earth surrounding the entrance hole, so as to make a clear space for the insertion of the cotton wool. A small knife is the best implement for this purpose. When treating an infected field the coolies must be made to treat the holes systematically in order to insure the Carbon bisulphide being contained within the burrows. Treatment of holes here and there is useless as the gas escapes through other exits and further the cricket is able to retreat.

There is no necessity to close the entrance very tightly as by so doing one is liable on a sandy soil to stop up the passage behind the cotton wool which is disastrous.

Coolies must be informed that Carbon bisulphide is a very dangerous substance if any light is brought close to it, further the bottle must always be kept corked otherwise a great deal of the liquid will evaporate.

The best time to apply the Carbon bisulphide is between the hours of 4 to 6 p.m.

H. C. PRATT.

Note. Notes on the *Brachytrupes* have already appeared in the Bulletin (see Vol. IV. 457; Vol. V. 69).

The animal is very abundant in the Singapore Botanic Gardens and is often to be seen in and about the rubber, but as there is plenty of grass about it does no harm, contently itself with eating grass blades.

Many years ago a trap for insects was used at Caledonia estate. It consisted of trays or shallow basins containing molasses above which stood a lamp. On examining the contents of the trays I observed that some were quite full of *Brachytrupes* which flying to the light had fallen into the molasses and were caught. A sheet of glass put erect across a pan of this kind adds to the catch of insects as they strike the glass and fall into the Molasses. This plan might be used effectively as an adjunct to searching for the holes, and is easier and not dangerous as the Carbon bisulphide certainly is.

ED.

REPORT ON A SAMPLE OF CITRONELLA OIL.

It is not often that analysis of agricultural products are published in the Agricultural Bulletin unless these have been carried out at home and perhaps published previously in other journals. I thought the following might therefore be of interest to planters and others who were interested in growing catcherops among rubber, etc. and so encouraging another if small agricultural industry.

COMPOSITION OF CITRONELLA OIL.

The most important odoriferous constituent of Citronella oil is an aldehyde known as Citronellal. The second important constituent is an alcohol known as Geraniol. It is to these two constituents that the oil owes its value.

The proportions of these constituents vary somewhat in different samples and the difference between Ceylon oils and Java oils is considerable, the former containing about 60 per cent of geraniol and citronellal, and the latter up to 90 per cent of these constituents.

The oil from the Federated Malay States resembles the Java oil of commerce which is superior to the Ceylon oil.

COMPOSITION OF SAMPLE.

The sample examined in the laboratory yielded the following results, shewing its similarity to the Java oil of commerce.

The oil was of a pale yellow colour and possesses the fragrant odour characteristic of this oil.

It was clear and free from water and had been carefully prepared.

RESULTS OF CHEMICAL EXAMINATION.

Colour	Light yellow
Appearance	Clear
Specific gravity at 15.5° C	0.8890
Geraniol per cent	27.7
Citronellal	54.7
Solubility in 80 per cent alcohol	1 in 1 or more volumes.

In a future number of the Bulletin I hope to publish the results of analysis of other samples of Citronella oil, and to give a general description of the origin and properties of the two distinct varieties of the oil on the market.

In conclusion I have to thank Mr. J. Nevitt-Stevens of Chenderiang Estate, Perak, for his kindness in permitting me to publish the above analysis of this oil which was derived from Chenderiang Estate.

B. J. EATON,

Government Chemist, F. M. S.

A NEW RUBBER JOURNAL.

We have received a copy of the first number of the Bulletin de l'Association des Planteurs de Caoutchouc, a new journal on rubber from the cultivator's point of view. The journal is published in Antwerp where it is proposed to establish a central office for the receipt and dissemination of information on matters useful to members, to form a library of works on the subject and to publish the Bulletin. The Association is already founded and the Committee includes many well-known men whose names are familiar to all Tropical Agriculturists.

Active members, or technical members pay a subscription of £4 per annum, ordinary Members 8 shillings. Persons who endow the Association with £20 will be known as Associates. The bulletin appears monthly at a cost of 12.50 francs to persons outside Belgium and Holland. The articles are at present chiefly extracts from other journals and commence by an article on the origin of the rubber plantations which contains the same old errors as to the Federated Malay States plantations being started by cuttings from the Peradeniya gardens in 1877! and by seeds from the same place in 1886. These errors have been so often pointed out that there is no necessity to repeat the disproof. The distribution of seeds from the plantations of Ceylon to Australia, Borneo, West Indies, Africa is mentioned, but no mention is made of those exported from

the Singapore Botanic Gardens, which are nowhere alluded to in the article, although probably a vastly larger number of the plants now in these countries are derived from the Singapore plants than from those of Ceylon. The history of the introduction of the cultivation is however well-known to our readers, it is unnecessary to say more on this subject, but as it is the only original article except one on "Notre programme" in the bulletin one cannot help thinking that it would have been easy to compile it accurately.

Ed.

FIBRE CONGRESS AT SOURABAYA IN 1910.

Sourabaya, 25th February, 1909.

NOTICE.

With a view to promoting the cultivation of fibre-producing plants, the "NEDERLANDSCH-INDISCH LANDBOUW SYNDICAAT" has decided to hold, at SOURABAYA, JAVA, NETHERLANDS EAST-INDIA, in October 1910, a CONGRESS, combined with an EXHIBITION of fibre producing plants, of the fibres produced therefrom and of the machinery used in the preparation of same.

During the Congress, the cultivation and preparation of the raw fibre, both mechanically and manually, will be discussed.

The extraction, preparation for market and packing of the fibre will, as far as possible, be demonstrated.

Various prizes (medals, diplomas and money-prizes) will be offered for machinery. Such prizes will be awarded to the exhibitors of machines, which shall work for a sufficient time during the congress and be considered worthy of an award by a committee of impartial experts.

The expenses of the Congress and Exhibition will be defrayed by the *Syndicate*, which is enabled to do so by a liberal grant from the *Netherlands Indian Government* and substantial contributions from Commercial Houses and private persons.

In conjunction with the *Director of Agriculture* a Committee has been formed to prepare and carry out the scheme, whilst a number of gentlemen in Holland have been requested to form a Sub-Committee there.

A prominent place in the programme will be given to the consideration of the cultivation and preparation of

those fibres most suitable for culture on a large scale in the tropics.

Special attention will be given to the following viz:

- (1). AGAVE FIBRE, the cultivation of which is spreading so largely and which is specially adapted for dry tropical countries.
- (2). MANILLA HEMP, also a fibrous plant fit for cultivation on a large scale and which produces a profitable crop in the moister districts of tropical countries.
- (3). JUTE and JUTE SUBSTITUTES. Of importance in all tropical countries, seeing that a large part of the packing material necessary for other produce is made therefrom.

As the cultivation of Fibres 1 and 2 and the like can only be remunerative when carried on with efficient machinery for the treatment of fibre on a large scale and when suitable handmachines be available for the use of the small producer, special attention will be paid to the testing of machines sent in for exhibition, both as regards the extraction and treatment of the fibre.

In addition to the above named, other fibres may be dealt with more or less fully according to the interest shown at the Congress.

A detailed programme will shortly be published dealing with the project in all its particulars and enumerating the prizes to be awarded.

This preliminary notice will serve to make known to all those who are interested in the cultivation of fibres in tropical countries, the opportunity shortly to be offered of exchanging ideas on the subject, and will give timely notice to manufacturers of machinery of the opportunity to be given for displaying the merits of their respective specialities.

The Nederlandsch-Indisch Landbouw-Syndicaat,
A. PAETS TOT GANSOYEN, D. J. R. PUTMAN CRAMER,
President. *Secretary.*

MINUTES OF A GENERAL MEETING OF THE PLANTERS' ASSOCIATION OF MALAYA.

*Held at the Masonic Hall, Kuala Lumpur, at 11 a.m.
on February 28th, 1909.*

Present. For the Perak Planters' Association: Mr. H. E. Darby, Mr. Alma Baker and Mr. W. Duncan. For the

Kuala Lumpur District Planters' Association: Mr. F. G. Harvey, Mr. C. Burn-Murdoch, Mr. E. B. Skinner, Mr. A. J. Fox and Mr. H. C. E. Zacharias. For the Kuala Selangor District Planters' Association: Mr. Edgar Smith, Mr. Thos. More (by proxy), Mr. J. A. Hunter and Mr. A. Irving. For the Kampar District Planters' Association: Mr. N. C. S. Bosanquet. For the Klang District Planters' Association: Mr. R. W. Harrison, Mr. J. Gibson and Mr. A. B. Lake. For the Batu Tiga District Planters' Association: Mr. P. W. Parkinson, Mr. H. L. Jarvis, and Mr. C. Henly. For the Kuala Langat District Planters' Association: Mr. C. E. S. Baxendale and Mr. E. Macfadyen. For the Malacca Planters' Association: Mr. J. A. H. Jackson, Mr. S. W. Moorhouse and W. Sime. Visitors: Messrs. F. A. Clements, G. H. Anderson, C. F. Lushington. Chairman: Mr. R. W. Harrison.

I. The Secretary, after reading the notice convening the Meeting, explains, that it had originally been decided to accept the invitation of the Johore Planters' Association and to hold the February Meeting accordingly at Johore Bahru, by way of celebrating the opening of the railway; but that, owing to the line not yet been available for traffic, the *venue* had been changed to Kuala Lumpur, the alteration originating in the Johore planters themselves. Further a letter had been received from the Hon. Secretary of the Johore Planters' Association, stating that neither their Chairman nor he would be able to attend the meeting, the former being prevented by illness.

II. The Minutes of the previous Meeting having been taken as read, are put to the Meeting for confirmation and passed unanimously.

III. **ABSCONDING COOLIES.** The Secretary reads the following correspondence:

18th December, 1908.

The Federal Secretary, F. M. S.

Kuala Lumpur.

SIR,—I have the honour to acknowledge receipt of your letter No. 5172/1908, and in reply am to express the regret of this Association that the Resident-General cannot see his way to adopt the suggestions made in my letter of October 9th, as the members feel that the provisions of the Enactment, as it stands at present, are quite inadequate.

But I am further to state that even what rules for registration have been laid down in this Enactment are not

carried into effect by the Executive. As an example I may state that one of our members only quite recently had occasion to refer to the Klang Department, but was quite unable to receive any assistance in tracing some bolters from his estate, as it transpired that, in the register provided for in the Enactment, no entries had been made for several months. Whilst this case apparently is one due to the departure of one officer and the interregnum created by the late arrival of his successor, it is typical of the manner in which the staff is under-manned, whose duty it is to enforce the provisions of the said Enactment.

My Association therefore submit that, if the introduction of a more adequate method of registration is quite out of the question, such steps at least be taken as will ensure that the portions of the Immigration Enactment relative to the registration of Indian immigrants be in future carried out to the letter.

(Sgd.) H. C. E. ZACHARIAS,

Secretary.

Kuala Lumpur, F. M. S.

21st January, 1909.

SIR,—With reference to your letter dated the 18th December, 1908, I am directed to inform you that enquiries with regard to the subject matter of your letter have elicited the following report:—

“The register is not often consulted by employers, but about November 10th, Mr. Jarvis of Batu Tiga called at the office and asked to see it. After looking at it for a minute or so, he left without asking for any further information or stating what he was looking for. Had Mr. Jarvis asked for any assistance in the matter, it might have been possible to help him.

(Sgd.) R. G. WATSON,

Federal Secretary.

To The Secretary,

The Planters' Association of Malaya,

Kuala Lumpur.

30th January, 1909.

The Federal Secretary, F. M. S.

Kuala Lumpur.

SIR,—I have the honour to acknowledge receipt of your letter No. 5172 of the 21st instant,

I have submitted the report received by you to Mr. H. L. Jarvis, and now beg to enclose his reply.

(Sgd.) H. C. E. ZACHARIAS,
Secretary.

January 28th, 1909.

DEAR SIR,—Thank you for forwarding the answer received from the Federal Secretary, *re* cooly bolting.

I have been to Klang at least three times during the past half year to try and trace bolted coolies with the help of information which should be easily obtainable at the office of the Assistant Superintendent of Immigrants. At the time of my visit in November, the A. S. I. was away visiting estates, and I asked the clerk for the register. This had not been written up for several months, but he pointed to some bundles of paper on the floor, told me I might look through them, and asked me where my coolies had bolted to. I paid another visit on December 7th, but could find no entries in the register kept, from May.

My object in mentioning the matter at the P. A. M. meeting was to show what a dead letter Enactment No. 1 of 1907 (Selangor) is. To my own knowledge many hundreds of local coolies have been engaged and no intimation has been sent the Superintendent of Immigrants, and it would be interesting to know in how many cases the Government has taken proceedings against such employers for not sending in the particulars required by the Enactment.

The Government wish to get as many new coolies brought over as possible, and is defeating its aim in thus easily allowing labour to be engaged locally, and by giving such poor encouragement to those who do legitimately recruit from India.

(Sgd.) HAROLD L. JARVIS.

Mr. Jarvis having further explained the circumstances of the case, it is resolved, to let the matter stand over, until a reply is received from Government.

IV. RETURN OF CONVICTED ABSCONDERS. The Secretary reads the following correspondence:

14th December, 1908.

The Federal Secretary, F. M. S.

Kuala Lumpur.

SIR,—I have the honour to acknowledge receipt of your letter No. 5171 of October 21st.

In reply I am instructed to say that the replies received by me from the four Residents and referred to in my letter of October 9th, seem to indicate that the existing law is not

generally carried into effect, viz., Sec. 91 of the Labour Enactment Gen. 1904, and Sec. 33, III of the Indian Immigration Enact. 1904.

I am further to add that the members of this Association are quite satisfied with the tenour of the law, as it stands, provided it is carried into effect; but would respectfully submit that an additional rule be issued, enjoining the Prison Authorities to give timely notice direct to the employer in question regarding the exact date of release from gaol of convicted absconders.

(Sgd.) H. C. E. ZACHARIAS,
Secretary.

Kuala Lumpur, F. M. S.

22nd December, 1908.

SIR,—I am directed to acknowledge the receipt of your letter dated the 14th December, 1908, on the subject of the return to their estates of coolies who have been convicted of absconding and have served a term of imprisonment, and to state that the Resident-General trusts that your fear that the existing laws are not generally carried into effect, may prove on further inquiry to be unfounded.

2. I am to add that employers are presumably aware of the periods of imprisonment to which labourers in their employment are sentenced, and that they have only to make a note of this to enable them to adopt suitable measures in connection with the release of their employees.

(Sgd.) M. S. H. McARTHUR,
Ag. Federal Secretary.

To The Secretary,

The Planters' Association of Malaya,

Kuala Lumpur.

Mr. F. G. Harvey says he had ascertained that all they had to do was to represent the matter to the magistrate, and the coolies would then be sent back to the estate.

Mr. Hunter cites a case where such return of coolies had cost the estate \$9.

Mr. C. E. S. Baxendale thanks that the alternative was to send up a kangany.

Mr. Lake agrees that that could be done, but pointed out that they did not know when the coolies were being released.

Mr. Duncan states that a case had occurred in Perak where a coolie was liberated without being sent back to his estate, and the gaoler had got into serious trouble with regard to it.

Mr. Lake thinks that they ought to get a definite pronouncement as to what the usage was, for their guidance.

After some further discussion it is decided, to let the matter stand over for the time being.

V. WHITE ANT REWARD. The Secretary reads the following correspondence:

14th December, 1908.

The Federal Secretary, F. M. S.

Kuala Lumpur.

SIR,—I have the honour to acknowledge receipt of your letter No. 3995 of October 30th, and in reply am instructed to say that, inasmuch as it does not appear how the planters' interests will be safeguarded, this Association beg to ask for information as to the lines on which Government proposes to decide the award.

2. My Association further wishes me to suggest that the Director of Agriculture's Department be appointed as the office to which all letters, putting forward a claim to this award, should be addressed.

(Sgd.) H. C. E. ZACHARIAS,

Secretary.

Kuala Lumpur, F. M. S.

19th December, 1908.

SIR,—I am directed by the Resident-General to acknowledge the receipt of your letter dated the 14th December, 1908, and in reply to request you to inform the members of the Planters' Association of Malaya that the Government will obtain the best possible advice and require evidence of the absolute success of any method of extermination of white ants that may be submitted before payment of the reward offered. I am to add that the Resident-General has no doubt that the services of the Agricultural Department will be made use of in this connection.

(Sgd.) M. S. H. McARTHUR,

Ag. Federal Secretary.

To The Secretary,

The Planters' Association of Malaya,

Kuala Lumpur.

22nd December, 1908.

The Federal Secretary, F. M. S.

Kuala Lumpur.

SIR,—I have the honour to acknowledge receipt of your letter No. 6153 *re* Mr. H. McGill's white ant remedy.

I have received an analogous letter from the same gentleman under same date.

This, I think, is a good instance of how wasteful the present want of system is, regarding the award in question.

In my letter of the 14th instant I suggested that the Director of Agriculture's office be appointed the receiving office for all applications of this nature, and as your letter No. 3995 on the same subject does not seem to be opposed to such a course being taken, I beg to submit our suggestion once more for the consideration of your Government, and now beg to enclose all applications, as far as they have been received by me.

F. G. WEST (2), NAI CHIM (copy), R. E. COX, V. RIS, CHAS. F. PEARS (2), H. MCGILL, A. A. THOMAS, W. L. VANDERSLOTT.

While thanking you for your courtesy in sending me copies of all applications received by you, I hardly think that any useful purpose is served thereby.

All that would seem necessary is to appoint somebody (Director of Agriculture?), whose duty it would be to receive all applications, to deal with them in a preliminary way, and eventually to lay the whole matter before a Select Committee, the latter, I would further suggest, to consist of, say, three members nominated by this Association and an equal number by your Government, these six to co-opt their own Chairman.

(Sgd.) H. C. E. ZACHARIAS,

Secretary.

Kuala Lumpur, F. M. S.

29th December, 1908.

SIR,—I am directed to acknowledge the receipt of your letter dated the 22nd December, 1908, and to say that the Government of the Straits Settlements is being consulted as to the formation of a Committee to consider claims in connection with the offer of a reward for the discovery of a white ant remedy.

2. In the meantime I am to suggest that all applications received by you should be forwarded to this office.

(Sgd.) M. S. H. McARTHUR,

Ag. Federal Secretary.

To The Secretary,

The Planters' Association of Malaya,

Kuala Lumpur.

Kuala Lumpur, F. M. S.

1st February, 1909.

SIR,—In continuation of my letter of even number dated the 29th December, 1908, I am directed to inform you that the Government of the Straits Settlements has agreed to the formation of a Committee of three to consider claims in connection with the offer of a reward for the discovery of a white ant remedy.

2. The nominee of the Straits Settlements Government is Mr. H. N. Ridley, Director, Botanic Gardens; the Director of Agriculture or officer acting as such will represent this Government; and it is suggested that the third member of the Committee should be nominated by your Association.

(Sgd.) R. G. WATSON,

Federal Secretary.

To The Secretary,

The Planters' Association of Malaya,

Kuala Lumpur.

Mr. Baxendale asks whether it was not a remote contingency that the award would have to be paid, and whether the money had been found.

The Chairman thinks that there would be no difficulty in getting the money, but considered it very remote that the money would be claimed.

With regard to the representative of the Association who, the Government suggested, should be elected to serve on the Committee of three, Mr. Parkinson proposes that the Chairman for the time being should so act.

Mr. Skinner thinks that some one with technical knowledge should be appointed.

Mr. Macfadyen seconds Mr. Parkinson, and states that he disagrees with Mr. Skinner. As the Colonial and F. M. S. Government were both appointing experts as their re-

representatives, he thinks that the planters should nominate some one whose experience was of a practical nature.

Mr. Parkinson's motion is then carried.

VI. LONDON RUBBER EXHIBITION. The Secretary places the following correspondence on the table:

14th December, 1908.

The Federal Secretary, F. M. S.

Kuala Lumpur.

SIR,—I have received a letter from Mr. L. Wray, I.S.O., of the 15th ultimo, in which he informs me, that he has got a balance of £332-6-7 over, after defraying all expenses of the Exhibition.

As the accounts of this Association, notwithstanding the liberal monetary support received from its Members, show a deficit under this head of nearly £100, I trust that your Government will see their way to refund to us this amount out of the surplus, now available.

I have etc.,

(Sgd.) H. C. E. ZACHARIAS,

Secretary.

Kuala Lumpur, F. M. S.

29th December, 1908.

No. 4014/1908.

SIR,—I am directed to acknowledge the receipt of your letter, dated the 14th December, 1908, and to inform you that a statement of the accounts in connection with the London Rubber Exhibition is being prepared.

2. In this connection I am to say that it would probably be a convenience if a statement could be given showing the extent of the monetary support to which you refer in your letter under reply.

I have etc.,

(Sgd.) M. S. H. McARTHUR,

Ag. Federal Secretary.

To The Secretary,

The Planters' Association of Malaya,

Kuala Lumpur.

6th January, 1909.

The Federal Secretary, F. M. S.
Kuala Lumpur.

SIR,—I have the honour to acknowledge receipt of your letter No. 4014 of the 29th ultimo.

I now append statement of our accounts to date, from which you will see, that all we ever received from Government, was one sum of \$1,371.43, out of which £50 were sent to Mr. L. Wray, leaving us with a nett grant of only \$940.07. You will therefore see, that, although we received donations totalling \$2,024, we are still left with a deficiency of \$809.34.

I have etc.,

(Sgd.) H. C. E. ZACHARIAS,
Secretary.

To floor space... \$2,588.76		By Donations—	
„ less Gov. grant 1,371.43	\$1,217.33	„ K. Lumpur District P. A.	\$364.00
„ Malay house ...	663.62	„ Malay Pen. Agricultural A.	350.00
„ £50 to L. Wray ...	431.36	„ K. Sel. District P. A.	345.00
„ Freight on Exhibitions	453.42	„ Perak Planters' Association	230.00
„ Mementoes ...	149.36	„ K Langat District P. A.	190.00
„ General Charges ...	58.25	„ Klang District P. A.	175.00
		„ Batu Tiga District P. A.	160.00
		„ Negri Sembilan Planters' A.	90.00
		„ Johore Planters' Association	70.00
		„ Kapar District Planters' A.	50.00
			\$2,024.00
		„ Fees	140.00
		„ Deficiency	809.34
	<u>\$2,973.34</u>		<u>\$2,973.34</u>

London,

15th November, 1908.

SIR,—I have written to H. E. the Governor giving an account of the expenses incurred in the late International Rubber Exhibition and doubtless the Federal Secretary will communicate with you on the subject.

2. I may here state that the total expenditure was £150-10-8, and the Crown Agents should have a balance of £332-5-7 after paying me what I have spent.

3. I sent the accounts, together with the receipts, to them on the 30th October, according to instructions received from the Earl of Crewe, Secretary of State for the Colonies.

4. All the Exhibits were handed over to the various agents of the exhibiting estates. A very considerable

amount of trouble and expense was caused by the fact that no information was sent as to who these Agents were.

5. In regard to the Conference an official reporter was appointed and we were informed that no others would be permitted. We therefore subscribed for 15 copies of the report of the Conference, five copies to be sent to Mr. Ridley for the use of the Colony, and 10 copies to the Federal Secretary for distribution in the F. M. S. I trust that this will be sufficient.

6. I sent, at the cost of the Exhibition, 12 copies of a photograph of the Stand to the Director of Agriculture, for distribution.

7. We were given a floor space of 30 ft. by 60 ft.; that is 300 sq. ft. more than was promised. I will take this opportunity of stating that we received great assistance and consideration from Mr. A. Staines Manders and Col. Bosworth.

8. Mr. Derry is writing a report on the Exhibition, so that I will not go into the matter here; except to say that the British Malaya court compared very favourably with the others. Had there been more rubber and had a full detailed list of exhibits been sent beforehand, so that all might have had proper labels and a catalogue printed, it would have been a great improvement. As it was, until the cases were opened we did not know what had been sent and in several cases even then we had to guess at what the exhibits were, as there were no labels in the boxes or information on the outsides of them. One box only had the name of a Penang forwarding Agent on it.

9. The model of the Malay house did not arrive till the opening day and the photograph, showing how the screens were to be put together, never arrived at all.

I have etc.,

(Sgd.) L. WRAY.

To The Secretary,

The Planters' Association of Malaya,

Kuala Lumpur.

14th December, 1908.

L. Wray, Esq., I.S.O.,

London.

SIR,—I have the honour to acknowledge receipt of your letter of the 15th ultimo.

2. From this I take it, that my letter of July 23rd did safely reach you; and as this included the photo of the Malay House and a complete list of all exhibits sent, I am at a loss to understand your remarks sub paragraph 8 of your letter, from which I gather, that these enclosures did not reach you. I sent a similar list of all exhibits on the same day to Mr. Manders, who, as you must have noticed, inserted these particulars in his catalogue.

3. As regards the accounts, I have written to the Federal Secretary and shall no doubt in time hear from him.

4. The Director of Agriculture has handed me two photos.

5. I thank you for having booked 10 copies of the Conference Reports. If more are required, I will write for same to Mr. Manders direct.

6. It is my pleasing duty to inform you, that at the last Meeting of this Association, held on the 6th instant, it was resolved by acclamation to place on record a hearty vote of thanks to you, Sir, for the excellent work done by you, at this Exhibition on behalf of the Planting Industry of the Malay Peninsula. At the same time I would beg of you to accept from this Association a small memento of the occasion and enclose draft for 6 guineas, asking you to make your own selection of the form, which you would best like this memento to take.

I have etc.,
 (Sgd.) H. C. E. ZACHARIAS,
Secretary.

London,

3rd February, 1909.

SIR,—In answer to the second paragraph of your letter of the 14th December, it would appear that the only difference between us is the meaning of the words "a complete list."

2. We did the best we could with the list sent and furnished Mr. Manders with the information contained in the Catalogue.

3. In writing my paragraph 8 I thought it only right to point out these matters, so that at any future exhibition you may be in a position to make a better show. I now en-

close a memo, giving the particulars, which should be sent at least 3 weeks before the date of the opening.

I have etc.,

(Sgd.) L. WRAY.

MEMO OF PARTICULARS.

A.

Name and description of exhibit.

Name of Estate, or exhibitor.

Locality.

State or name of Colony.

B.

Name and address of London Agents.

No. or Mark on packing case.

a. for the catalogue and tickets.

b. for information of those looking after the exhibition.

London,

3rd February, 1909.

SIR,—I have the honour to ask you, to be good enough to convey my very best thanks to the Members of the Planters' Association of Malaya, for the vote of thanks which they were so kind as to place on record in their minutes; and also for the draft which they generously presented to me.

With it I have purchased a piece of plate, which I shall prize as a souvenir of my connection with the Rubber Exhibition.

It was a great pleasure to me, to have this opportunity of rendering some slight service to the planting industry of the Federation and Colony.

I have etc.,

(Sgd.) L. WRAY.

14th December, 1908.

R. Derry, Esq.,

Botanical Gardens,

Penang.

DEAR SIR,—It is my pleasing duty to inform you, that at the last Meeting of my Association, held on the 6th instant, a hearty vote of thanks was unanimously passed, expressing the Association's indebtedness to you for the excellent work done by you on behalf of the Planting In-

dustry of the Malay Peninsula on the occasion of the recent Rubber Exhibition held in London.

I am at the same time to ask you to accept a small memento of the occasion and in enclosing a cheque for the equivalent of five guineas, would be glad, if you would kindly make your own choice of the form, which you would best like this memento to take.

Believe me, Dear Sir,

Yours faithfully,
(Sgd.) H. C. E. ZACHARIAS,
Secretary.

Botanic Gardens, Singapore.

16th January, 1909.

DEAR SIR,—I have the pleasure to acknowledge your letter of the 14th ultimo, which had reached me at Singapore and to thank your Association for their expression of my work and for their memento of the occasion.

I am, Sir,

Yours very truly,
(Sgd.) R. DERRY.

To The Secretary,

The Planters' Association of Malaya,
Kuala Lumpur.

14th December, 1908.

J. B. Carruthers, Esq.,

Kuala Lumpur.

DEAR SIR,—It is my pleasing duty to inform you, that at the last Meeting of my Association, held on the 6th instant, a hearty vote of thanks was unanimously passed, expressing the Association's indebtedness to you for the excellent work done by you on behalf of the Planting Industry of the Malay Peninsula on the occasion of the recent Rubber Exhibition held in London.

I am at the same time to ask you, to accept a small memento of the occasion and, in enclosing a cheque for \$50.00, would be glad, if you would kindly make your own choice of the form which you would best like this memento to take.

Believe me, Dear Sir,

Yours faithfully,
(Sgd.) H. C. E. ZACHARIAS,
Secretary.

16th December, 1908.

DEAR SIR,—I am in receipt of your letter of the 14th instant. Will you kindly convey to the Planters' Association of Malaya my thanks for their kind and courteous acknowledgement of what I did in connection with the London Rubber Exhibition. I am much gratified by their vote of thanks.

In regard to the cheque which you enclosed, the gift of your Association, please give them my hearty thanks for this. Much of the work that I did was on behalf of Government and might be considered as coming within the scope of my official work and therefore while appreciating the kindness of this gift for a memento of the show, I hope they will not consider me discourteous in declining it.

Considering the many difficulties in arranging for the Malayan Court I think the Exhibit was not discreditable.

Yours faithfully,

(Sgd.) J. B. CARRUTHERS,

Director of Agriculture and Government Botanist.

To The Secretary,

The Planters' Association of Malaya,

Kuala Lumpur.

VII. M. S. V. R. Referring to section 13 of the last Minutes, the Secretary reports that the information then asked for is contained in section 4 of the Minutes of a Committee Meeting of the United Planters' Association, held on the 5th October 1907, which reads as follows:

"A letter from the Commandant, M. S. V. R., *re* attendance of camps is laid on the Table."

He further reports the following correspondence:

9th February, 1909.

SIR,—I have the honour to enclose a copy of a letter I addressed to the Chairman of the United Planters' Association on 28th August, 1907, to which I have received neither answer nor acknowledgement.

2. I would invite your attention to the inquiry contained in the letter referred to and ask you to inform me whether the Managing Planters of Selangor can assist in encouraging the Volunteer movement.

3. I understand in Ceylon there is a Rifle Corps of over 400 strong composed entirely of Planters and that the Managers of Estates not only encourage their assistants to

join the corps but give them every facility to attend camps and parades.

4. With the large number of Planters in Selangor now, there is no reason why at least one company of the Malay States Volunteer Rifles should not be entirely composed of Planters, and I shall be very glad if you can give me any assistance in inducing Planters to join the local corps of Volunteers.

(Sgd.) A. B. HUBBACK, Major.

To The Chairman,
The Planters' Association of Malaya,
Kuala Lumpur.

(Enclosure.)

Kuala Lumpur, F. M. S.

28th August, 1907.

Sir,—I have the honour to enquire whether you can approach the Managers of the various Estates in Selangor especially in the Klang District with a view to granting assistants on their Estates who are Volunteers facilities to attend the monthly camps of instruction held in Kuala Lumpur.

2. The number of drills required for efficiency is twelve per annum, attendance at the annual inspection, qualification as a 3rd Class shot is necessary; this year the annual camp will open on October 5th and close with the annual inspection by the General Officer Commanding the Troops, Straits Settlements, on October 12th, and although it can hardly be expected that assistants on Estates can attend for the whole period, I would particularly ask the Managing Planters in Selangor to give their assistants every possible chance of becoming efficient.

3. Government provide free Railway passes to and from camp and free rations in camp, so that the question of expense is almost *nil*.

(Sgd.) A. B. HUBBACK, Major.

10th February, 1909.

The Commandant,
The Malay States Volunteer Rifles,
Kuala Lumpur.

Sir,—I have the honour to acknowledge receipt of your letter No. 14 dated yesterday and shall forward enclosure to our Chairman on his return.

Your original letter of August 28th, 1907, to the Chairman of the U. P. A., was by him laid on the Table at the last meeting of that body ever held, viz., on October 5th, 1907. The matter was intended to rest there and I never received any further instructions regarding same.

The U. P. A. was dissolved a few weeks later, and the matter of recruiting for your Corps never came before this Association until the 5th December, 1908, when Mr. Corbetta asked a question on the subject, which will come up for discussion at our next meeting on the 28th instant.

In the meantime, however, and as this Association now represents the whole of the Malay Peninsula, inclusive of Johore, Malacca and Province Wellesley, I would suggest that it might be more advantageous if you were to address the different Planters' Association of Selangor (viz. the Kuala Lumpur D. P. A., Kuala Selangor D. P. A., Klang D. P. A., Batu Tiga D. P. A., and K. Langat D. P. A.)

(Sgd.) H. C. E. ZACHARIAS,
Secretary.

Mr. P. W. Parkinson considers the last paragraph of the Secretary's letter unnecessary, as the Commandant was right to address the head Association. He is of opinion that every assistant could manage the 12 drills, and he therefore moved:—

“That this Association is in sympathy with the Volunteer movement and would urge managers of estates to encourage assistants to join and grant them facilities to attend camps and parades.”

Mr. A. J. Fox seconds the motion.

Mr. A. B. Lake says that there were already many calls on a planter's time, such as cricket, football, &c. Personally he thought that a man could be useful with a double-barrelled gun. Sport was absolutely necessary, if a man was to keep fit.

Mr. J. Gibson considers it an Imperial duty to uphold the country, and planters, he said, should be prepared to do their duty by it. A matter like the one under discussion should take precedence of cricket.

Mr. Fox points out that matters had been arranged so as to obviate the clashing of important cricket matches with camps.

Mr. Parkinson draws attention to the fact that it was now possible for a Volunteer to put in two drills at a week-

end, and therefore he did not think there could be any excessive call upon his time.

The motion is then put to the meeting and carried *nem. con.*

VIII. RECRUITING ALLOWANCE. The Secretary reads the following correspondence:

14th December, 1908.

The Chairman,
Immigration Committee,
Penang.

SIR,—I have the honour to inform you that at the last meeting of my Association, held on the 6th instant, the recent rule made by your Committee, fixing the total of recoverable advances at \$3 per male immigrant, was made the subject of much adverse criticism.

The members of my Association wish me to this point to entirely leave out of the question the merits of the new rule itself, but they feel that they cannot too strongly protest against the manner in which your Committee make drastic financial changes affecting the interest of employers of labour, without giving this Association any opportunity of expressing the opinion of its members.

Rush legislation of this sort, as inaugurated by the advent of the Indian Immigration Fund Enactment, is hardly likely to produce good results, nor is it conducive to that co-operation between your Committee and the Planting Community, which to foster is in the best interests of the Industry in particular and of this country in general.

(Sgd.) H. C. E. ZACHARIAS,
Secretary.

24th December, 1908.

SIR,—In reply to your letter dated December 14th, I have the honour to inform you that no rule fixing the total of recoverable advances at \$3 per male immigrant has been passed by the Immigration Committee.

2. In connection with the question of recoverable advances, I would call your attention to the terms of Section 26 of The Labour Enactment 1904, No. 1 (General).

(Sgd.) L. H. CLAYTON,
Chairman, Immigration Committee.

To The Secretary,
The Planters' Association of Malaya,
Kuala Lumpur.

6th January, 1909.

The Chairman,
Immigration Committee,
Penang.

SIR,—In reply to your letter of the 24th ultimo, (No. 1845), I was aware that the rule referred to provides for a refund by your Committee of \$3 per male immigrant, and prohibits the recovery of any recruiting disbursements from the immigrant, and I regret that you found the wording of the sentence in my last letter referring to this not sufficiently explicit to follow my meaning.

The point my Association wish me to raise is the inadvisability of your Committee passing drastic financial measures without giving this Association any opportunity of expressing an opinion; but I notice that this, the real subject matter of my letter of the 14th ultimo, is not being replied to at all in your letter of the 24th ultimo.

Section 26 of the Enactment, quoted by you, of course only refers to cash advances, and not to any expenses incurred.

(Sgd.) H. C. E. ZACHARIAS,
Secretary.

18th January, 1909.

SIR,—In reply to your letter dated January 6th, I would point out that the responsibility for the administration of the Immigration Fund rests with the Immigration Committee whose powers in that connection are clearly defined by the Tamil Immigration Fund Enactment.

2. The views of your Association, if communicated to me, on the subject of any particular decision of the Committee will, however, I need hardly say, be laid before the Committee in due course and carefully considered.

3. The contention put forward in paragraph 3 of your letter under reply, that Section 26 of the Labour Enactment refers to cash advances and not to any expenses incurred, does not appear to be warranted by the terms of the section to which I would again refer you.

(Sgd.) L. H. CLAYTON,
Superintendent.

To The Secretary,
The Planters' Association of Malaya,
Kuala Lumpur.

The Chairman considers that this correspondence covers the same ground, as the next item on the agenda, and before inviting discussion, therefore calls upon Mr. A. Irving to propose the motion, standing in his name, viz.

“That the proposed rebate as per notice published in the “Malay Mail” dated Penang 10th December, 1908, is against the interest of the planting community in that it stipulates that no advances incurred prior to their arrival on the Estate may be deducted from coolies.”

Mr. Irving believes it was generally agreed that it was quite impossible to recruit at from \$2 to \$3 per head, and therefore they would be the losers under the new scheme. He contended that the coolies under advances were more satisfactory and worked better than others, while employers had a better hold over them than in the cases of men free of debt. And there was another point that must not be overlooked: the coolies, if deprived of the usual advances from the estates, could always get the money elsewhere; while if such advances were not put through the estate books, it would lead to crimping. It was impossible to land coolies here under \$5 per head, and therefore estates lost \$2 per coolie, whereas previously they could recover advances. The matter of the change had been forced upon them by the Immigration Committee without planters being represented, and his Association felt great dissatisfaction with regard to it.

He would therefore formally propose the motion, standing in his name.

Mr. J. Gibson, in seconding the proposition, points out that now the money was to be advanced by the kangany, but not charged to the estate. Looking at the matter from the coolie's point of view, the speaker said that the coolie thought that he would have to refund not only the debt, but interest besides. Previously he had confidence in the planter. Now, however, the kangany would not give the coolie to understand that the whole amount was not recoverable, and therefore the law would defeat its own ends. It was grand-motherly legislation in the extreme, and of a type calculated to interfere with private enterprise. Moreover, if the coolie now found himself in an unhealthy locality, he would go away, as he had no responsibility. Personally he had never experienced any difficulty in getting coolies to recognise their obligations, but without advances the planters had no hold over them. He hoped that when their Chairman went back to the board, he would use his weight in having the matter put right, and he appealed to those at the meeting to give him their support.

Mr. Lake reminds the meeting, that the whole measure was only a tentative one, and that there was perhaps therefore no need at present for them to pass any resolution regarding its merits. The point, however, which they should strongly drive home, was the non-consultation of this Association by the Immigration Committee.

Mr. F. G. Harvey believes himself in the minority, but he heartily supports the action of the Immigration Committee. What was \$2 or \$2.50 per head (the amount of the loss represented) if spread over a number of years, and especially with the labour problem placed upon a sound and satisfactory footing? He considered it a shame that coolies brought into this country should have their pay deducted, especially as they came here to benefit the planters. In conclusion, he was of opinion that the landing of a labour force here free of debt would be one of the finest things possible.

Mr. Duncan supports the last speaker, on the ground that the best interests would be served by following a free-from-debt system.

Mr. E. B. Skinner also supports Mr. Harvey, stating that there was nothing a coolie hated so much as being under advances.

Mr. Parkinson is of opinion that the kangany would charge the coolies, whether they were under advances or not, and there would be no check from the estate books. The planters might find next that they were paying \$10 per coolie. But it was the principle that was at stake with the Immigration Committee.

Mr. Lake says that if they got the country flooded with coolies, the latter would have nowhere to go to in the event of them leaving their employment. If the kanganies were told that they would be dismissed if they made advances, the trouble would cease.

The Chairman considers that the coolies lived in a system of debt, and would go on so living. One of the first things that struck him when he first came to this country was the infinitely better way in which labour was managed here, with regard to its financial side, than in Ceylon. There they had a vast floating debt that would have to be written off some day. He had seen small children brought up and told that they represented \$200 or \$300. With the new Rule in force, he was sure, they would soon see gangs of coolies going about the country with debts of \$40 to \$50 per head. If planters like to give advances, he did not think that the question of legality would come in at all.

Mr. Macfadyen seems to see two divergent views, with a very strong underlying current of agreement. He would not offer his own opinion with regard to the coolies, as his experience of them had been only a short one, comparatively. He had found, however, that if he wrote off a debt, the kangany was only too glad to claim it himself. The really important point was, however, that they found themselves committed to an arrangement that affected their pockets: and they were told that that arrangement might be only a temporary one—which alone condemned it. That no taxation should be imposed without representation, was a fundamental maxim of the British race; but this had been done; while, further, the Immigration Committee possessed great legislative power—greater even than that of the State Councils—for, whereas, the latter were restricted in their scope, the Immigration Committee was controlled by nobody under heaven. He proposed that, if necessary, they should carry the matter to H. E. the High Commissioner, and failing satisfaction there, then to the Secretary of State for the Colonies, or, finally, should move Members of the Commons to ask questions in the house. It seemed to him that, as the situation stood at present, it was one that they could not accept with the slightest vestige of self-respect.

Mr. Macfadyen then proposes that voting on this subject be deferred, until the discussion on item 6 has taken place.

This point of order is seconded by Mr. Parkinson, put to the Meeting and carried by 12 to 7.

IX. Mr. Irving, rising to propose paragraph 4 on the agenda, intimates that as the motion standing in the name of the Kapar District Planters' Association was covering the same ground, he would withdraw his own and now propose:

“That at the Annual General Meeting of the Planters' Association of Malaya, every member of any affiliated Association be allowed to attend and vote.”

He characterizes the present system as quite unsatisfactory, as it often happened, that a District Association was in favour of a measure, which their own delegates might disapprove of. This present system gave no chance to any planter, who was not on the Planters' Association of Malaya and he knew there was great dissatisfaction.

Mr. Bosanquet seconds the motion.

Mr. Gibson is afraid this motion would defeat the very end, for which this Association was founded. He would suggest that the word “speak” be substituted for “vote.”

Mr. Harrison sketches the initial difficulties, they had

had to contend with in the formation of this Association and would dissuade them from taking any hasty steps. He suggests the formation of a Sub-Committee, to thoroughly consider this matter.

Mr. Hunter thinks that people attending the Annual Meeting should not only have the right to speak, but also to vote. However, he quite agreed with Mr. Harrison's suggestion regarding a Sub-Committee and had much pleasure in formally proposing its appointment.

Mr. Parkinson then seconds Mr. Gibson's amendment.

Mr. Harvey proposes that no action of any kind be taken, as he thinks the Association has existed too short a while to permit of their tinkering with its very constitution.

Mr. Lake seconds Mr. Hunter's amendment.

Mr. Skinner seconds Mr. Harvey's amendment.

Mr. Harvey's amendment is then put to the vote and declared lost by 11 to 9 votes.

Mr. Hunter's amendment is then put to the Meeting and declared carried by 10 votes to 6.

Mr. Macfadyen proposes that the Sub-Committee consist of Messrs. Harrison, Hunter and Duncan. Carried unanimously.

X. RULE 4. Mr. Jarvis says the following motion was standing in his name: "That the new Rule 4 be rescinded and that former Rule 4 stand, as the new rule tends to increased expenses per delegate, and decreased representation." However it might perhaps be better to leave this question over, until they heard the Report of the Sub-Committee, which had just been appointed, and he would therefore withdraw his motion.

Mr. Macfadyen in any case will like to point out, what dangerous practice it would be, if they were to reopen at a following meeting, that which had been settled only a few months ago.

XI. IMMIGRATION COMMITTEE MEETINGS. The motion standing in the name of the Perak Planters' Association finding no proposer, the next item on the agenda is dealt with.

XII. PLANTERS' MEMBERS ON IMMIGRATION COMMITTEE. Mr. Jarvis moves: "That with a view to securing a representative opinion of Planters, the Government be asked that the Planting Members on the Immigration Committee be elected by this Association." He observes that, if the planters had had their own selection representative on the Immigration Committee, it was very unlikely that the Com-

mittee would have passed the rule regarding recruiting allowances.

Mr. Gibson supports the motion, as he thought that they should have their own representative, and he was certain that such a course would avoid much friction in the future. He thinks that when a candidate was nominated by the Government, his views were apt to be affected.

Mr. Lake supports Mr. Jarvis, but disagrees with Mr. Gibson's remarks *re* the Government nominee's attitude. Did they mean to imply, that their elected representative should have no opinion of his own at all, but be merely a mouthpiece of theirs?

Mr. Skinner would assure them, that during the time that he had served on the Immigration Committee, he had always endeavoured to represent the planters' views; but surely every man had a right to his own opinions. As for the principle of the motion, he was thoroughly in favour of it and had much pleasure in supporting it.

Mr. Jarvis' proposition is then put to vote and carried unanimously.

XIII. Voting then takes place on Mr. Irving's motion (vide paragraph 8), which, however, is slightly modified, viz.

“That the Recruiting allowance is against the interests of the Planting Community.”

This is carried by 10 votes to 6.

XIV. Mr. Harrison having welcomed the visitors from Malacca, the affiliation of the “Malacca Planters' Association” and of the “Raub District Planters' Association” is approved of, to take effect from April 1st.

XV. The Secretary places on the Table:

a. The Annual Report of the Planters' Association of Ceylon for 1908.

b. A letter, dated the 16th February, from the Borneo Co. Ltd., in *re* Negri Sembilan Planters' Association.

c. A letter, dated January 8th, from Mr. W. K. Rutherford.

XVI. DIRECTOR OF AGRICULTURE. The Chairman thinks, that before closing, the members of the Association would like to express their appreciation of the efforts of Mr. Carruthers, Director of Agriculture—who was on the point of departure to Trinidad. He had had many difficulties to contend against, in organizing and equipping his department thoroughly. He would propose that a hearty vote of thanks be recorded on their Minutes to the first

Director of Agriculture of the F. M. S., Mr. J. B. Carruthers, for the excellent services, which he had rendered in that capacity to the Planting Industry of the Malay Peninsula.

This proposition is seconded by Mr. Parkinson and carried unanimously.

XVII. The Secretary is instructed to convene the next Meeting on April 25th, 1909, at Kuala Lumpur.

The Meeting then terminates at 1-45 p.m.

H. C. E. ZACHARIAS,

Secretary.

OBITUARY.

SIR GEORGE KING.

It is with the deepest regret we have to record the death of Sir George King, well-known here for his work on the Botany of the Peninsula. He was born in 1840 and entered the Bengal Medical Service in 1865, and was appointed Director of the Botanic Gardens at Calcutta in 1871 and in 1891, was also appointed Director of the Botanical Survey of India. He retired in 1898, and died at San Remo Feb. 13. His chief connection with the Malay Peninsula was in his Botanical Researches. He visited Singapore once and made an expedition to Gunong Pulai. He employed a collector, Kunstler in collecting plants chiefly in the Thaiping Hills for some years. Kunstler's very extensive collections went to Calcutta where they were distributed a number of duplicates being sent to the Herbarium of the Singapore Botanic Gardens. Sir George King was also the Author of many works dealing with the Malay Flora including the Materials for a Flora of the Malay Peninsula, which is as yet unfinished and various volumes of the Annals of the Botanic Gardens Calcutta, giving descriptions and figures of the *Anonaceae* Figs. *Artocarp*i, Oaks and chestnuts, Orchids and plants of other orders. His chief agriculture work was connected with quinine of which he improved and cheapened the method of production. It was originally intended that he in collaboration with Sir Joseph Hooker should publish the complete Flora of the Malay Peninsula, but his death has prevented this from being carried out.

ED.

COFFEE AS A CATCHCROP WITH RUBBER.

Golden Hope State Klang 27th, February 1909.

DEAR SIR,

The following may be of some interest to an of your readers who may have planted coffee as a catcherop with rubber or planted rubber through old coffee in allurial soil.

They are figures giving result of the working for year 1908 on this estate.

ACREAGE	PLANTED WITH COFFEE 10 × 10	INTERPLANTED WITH PARA RUBBER 30 × 15	FIELD OF CLEAN COFFEE PER ACRE 1908
30	13 Years ago	April 1905	5½ piculs.
35	do.	do.	3½ „
35	do.	do.	5 ⁵ / ₇ „
33	do.	do.	6 ² / ₅ „
27	12½ Years ago	not interplanted	10 „
152	11 „ average	interplanted Apr. 03.	1 ⁴ / ₅ „

I have &c., your obedient servant,

EDMOND B. PRIOR.

RAIN FALL AT BANG NARA SIAM.

						1907	1908	1909
						inches	inches	inches
January	...	...	...	...	...	...	4'98	7'79
February	...	...	...	...	...	...	8'62	...
March	...	...	...	...	...	...	2'99	...
April	...	...	...	...	...	...	5'28	...
May	...	...	...	...	...	...	5'15	...
June	...	...	...	...	...	...	3'45	...
July	...	...	...	...	...	14th 31st 4'19	6'41	...
August	...	...	...	...	...	2'06	5'83	...
September	...	...	...	...	...	8'40	12'30	...
October	...	...	...	...	...	12'34	8'11	...
November	...	...	...	...	...	22'82	33'33	...
December	...	...	...	...	...	43'68	19'51	...
						93'49	115'96	...

As Recorded on Bukib Bulut Estate.

Auttun Peage.

COMPARATIVE RUBBER EXPORT TABLE.

*Comparative Statement of Cultivated Rubber Exported from the
Federated Malay States During the Years 1909 and 1908.*

—	Exported during Feb., 1909.	Previously.	Total ex- port during 1909.	Export dur- ing similar period of previous year.	Increase.
Perak ...	lbs.	lbs.	lbs.	lbs.	lbs.
Selangor ...	60,249	52,727	112,976	71,241	41,735
Negri Sembilan	224,520	202,889	427,409	272,142	155,267
Pahang ..	76,656	89,977	166,633	125,012	41,621
	nil	nil	nil	nil	nil
Total ...	361,425	345,593	707,018	468,395	238,623

Of the rubber exported from Selangor during February, 1909, 2,787 lbs., were produced in Perak, and 6,983 lbs., in Negri Sembilan.

KUALA LUMPUR,

10th March, 1909.

J. R. O. ALDWORTH,

Commissioner of Trade and Customs.

JOHN HADDON & CO. SPECIAL PRODUCE LETTER.

London, February 5th, 1909.

STRAITS REPORT.

BEESWAX

A good steady demand has existed for all yellow descriptions which have sold well, shipments coming along will find a ready Buyers.

CAPSICUMS

Trade has been fair, the demand running for the better qualities, fine bright red beans ranging from 40/- to 55/- per cwt, but common qualities have moved off slowly.

CHILLIES

Demand has been good and all descriptions have sold at high prices.

COPRA

During the past month a large business has been done at high prices, but during the past fortnight the tendency has been against Sellers.

F. M. Straits is worth £18.5.0. per ton, Sundried £19, Java £19.10.0., Manila £18 per ton c. i. f. n. d. w.

GUM BENJAMIN Trade has been rather quiet and consequently prices favouring Buyers.

In the last Sales 139 Cases were offered and only 32 sold, pea and bean sized Siam almond slightly blocky at £14 to £14.2.6, small grains and dust blocky at £7.15. good garblings in block at £7 5.0. fair Sumatra 2nds in Tins part drossy at 44/- per cwt.

GUM COPAL Market quite. Of 5,361 packages offered only 1,200 sold; Pontianac, clean amber and dark hard scraped at 60/- to 65/-, nuts, fair amber 36/-, Manila Nuts good pale 36/- to 36/6, Macassar, pale and amber scraped much weaker 30/- to 32/-, Unassorted, pale and amber pipey sorts at 30/-, Nuts, palish pipey at 28/6 to 31/-, ambery at 27/6, mixed chips 26/-, amber 25/-, chips, pale and rather drossy at 24/-, pale soft blocky sorts at 22/-, dark and drossy at 19/- per cwt.

GUM DAMAR Market flat. We value Singapore siftings at 32/6, blocky ditto at 27/-, hard block at 25/-, small siftings at 26/- hard block blocky siftings at 20/- to 27/- per cwt.

GAMBIER Market has been fairly steady, prices ranging from 24/- up to 24/6 and down to 23/9 afterwards advancing to 24/6 per cwt c. i. f. delivered weights. We close however Sellers at 24/- c. i. f., small Sales of cubes on the spot at 34/- per cwt.

PEPPER Black Singapore has been an irregular market, prices advanced from 3d to 37-32d declining to 3½d and back again to 3 7-32d at which we close.

White Pepper has fluctuated in a similar way from 4½d to 4½d per lb., closing at 4 25-32d for Jan/March shipment and March/May 4½d c.i.f., delivered weights.

RUBBER The market during the past month has had rather an easier tendency, this naturally has affected all Plantation kinds. At the last Sales the offerings were—Plantation—Malay—33 tons offered and mostly sold. Sheet, good 5/2½d to 5/3d, Crepe, good to very fine pale 5/2½d to 5/4d, fair to good palish 5/1 to 5/2½d, light brown and grey 4/10½d to 5/0½d, clean and dark brown 4/7½d to 4/9½d, dark, fair black and specky 4/3½d to 4/6½d. Scrap, fair to fine 4/1½ to 4/3½d. Mixed part inferior 3/3½d to 4/0½d.

CEYLON:—15 Tons sold; Biscuits and Sheet, fair to fine pale 5/2½d to 5/4d. Worms, fair palish (1 lot) 5/3½d. Crepe, fine pale 5/3½d to 5/4½d, fair palish 4/11½d to 5/2½d, clean brown 4/9½d to 4/10½d, dark brown 4/7 to 4/8½d, dark and black 4/3½d to 4/6½d. Scrap, fair to fine 4/- to 4/4½d, mixed part inferior 3/10d to 3/11d.

SAGO

Market quiet, but a steady business has been done to arrive in small at 10/- to 10/6 per cwt c.i.f.

TAPIOCA

Has been a firm market and a good business has been done; flake at 1 7-16d to 1 9-16d and back to 1 1/2d closing Sellers thereat. Pearl also has been firm business ranging from 13/3 to 14/3d back to 13/9 closing Sellers Jan/March shipment at 14/- for London and 13/9 for New York with fair Penang at 12/3 c.i.f., New York. Seed, business at 11/9 to 12/6 and back to 11/9 at which there are Sellers. Flour, a good business has been done at 6/6 to 11/- per cwt according to quality.

VANILLOES

The first Sales of the year marked a fair demand for all descriptions, first quality sold rather irregularly but on the average steady prices were obtained. Split foxy and pickings showed a decline of about 6d per lb.

Prices realised:—fair to good firsts 7 1/2" to 8 1/2" 10/- to 13/-, 6 1/2 to 7 1/2" 8/3d to 11/-, 5 1/2 to 6 1/2" 7/9 to 9/- 3 to 5" 6/6 to 8/-, split, fair to good 6/9 to 8/-, foxy split and pickings 4/6 to 7/3d per lb.

All descriptions of produce sold to the best possible advantage.

JOHN HADDON & Co. Salisbury Square. E. C.

GOW, WILSON & STANTON, Limited— India Rubber Market Report.

13 & 23, ROOD LANE, LONDON, E.C.

12th, February 1909.

Since the last sale we have had a further improvement in the tone of the market, and although there was a slight set back early this week, to-day's auction, at which the offerings were larger than at the last, a strong demand prevailed, and out of 1,680 pkgs. only about 58 were withdrawn, and prices generally marked an irregular advance of from 2d. to 4d. per lb. and more in some cases.

The darker kinds of crepe and unwashed scrap were most enquired for and met with keen competition; in some instances there was an advance on these kinds of up to 6d. per lb.

The offerings of Sheet and Biscuits were fairly large, and there were some fine parcels of Crepe represented; one of these from C.M.R.E., Ltd. realised the highest price of the sale, viz. 5/8 1/2, a small lot of L. coming next with 5/8 1/4, and Warriapolla biscuits sold at 5/7 1/4.

A. R.
Co.

NUMBER OF PACKAGES ADVERTISED.	Quantity in Tons.			Price of Plantation Rubber.		Comparative Prices.		
	Ceylon.	Malaya.	Totals.	No. of Packages sold.	Price.	Hard Fine Para.	Plantation.	
							Fine	Scrap.
To-day 1,680	17 $\frac{3}{4}$	74	91 $\frac{3}{4}$	1,622	5/3 $\frac{3}{4}$	5/3	5/5 to 5/8 $\frac{1}{2}$	4/4 to 4/9 $\frac{3}{4}$
Corresponding } Sale Last year }	741	10 $\frac{3}{4}$	28 $\frac{1}{2}$	39 $\frac{1}{4}$	404	3/2 $\frac{1}{4}$	3/5 to 3/7 $\frac{3}{4}$	2/1 to 2/6 $\frac{1}{4}$

TO-DAY'S QUOTATIONS.

SHEET AND BISCUITS.		CREPE.		UNWASHED SCRAP.	
Very Fine Biscuits	5 7 $\frac{1}{4}$	Very Pale	5 7 $\frac{3}{4}$ to 5 8 $\frac{1}{2}$	Medium to Fine	4 5 $\frac{1}{2}$ to 4 9 $\frac{3}{4}$
Good to Fine Biscuits	5 5 $\frac{1}{4}$ to 5 5 $\frac{3}{4}$	Medium and Palish	5 3 $\frac{1}{4}$ to 5 6 $\frac{1}{4}$	Darkish	4 3 $\frac{3}{4}$ to 4/4
Good to Fine Sheet	5 5 to 5 5 $\frac{1}{2}$	Dark and Brown	4 1 to 5 3		

PLANTATION EXPORTS.

CEYLON—1st January to
31st December.MALAYA—1st January to
31st December.

		Singapore.	*Penang.	Total.
1908	... .. 371 $\frac{1}{4}$ tons	1908... 919 $\frac{3}{4}$ tons...	655 $\frac{1}{2}$ tons*	1575 $\frac{1}{4}$ tons
1907	... .. 237 tons	1907... 645 $\frac{3}{4}$ tons...	229 tons...	874 $\frac{3}{4}$ tons
1906	... .. 130 tons	1906... 327 $\frac{3}{4}$ tons...	39 tons...	366 $\frac{3}{4}$ tons
1905	... .. 67 $\frac{3}{4}$ tons			

*These figures are only up to December 15th.

*TOTAL EXPORTS FROM THE F. M. S. DURING THE YEAR 1908 & 1907 (In Tons.)

1908.	1907.	Increase.
1,413 $\frac{1}{4}$	885 $\frac{3}{4}$	527 $\frac{1}{2}$

*These figures do not include exports from the Straits Settlements.

PARA FIGURES.

Receipts at Para for January. (In Tons.)					Total Crop Receipts—July, 1908, to January 1909. (In Tons.)				
1909.	1908.	1907.	1906.	1905.	1909.	1908.	1907.	1906.	1905.
5,450	4,875	3,750	5,710	4,592	21,215	19,115	18,430	20,400	17,850

LONDON STATISTICS (IN TONS):—

	Plantation.	Other kinds.	Total.
Imports during January	177½	145½	322½
Deliveries during January	159¼	114½	273¾
Stocks 1st January, 1909	138½	227½	365¾
Stocks 1st February, 1909	156¼	259½	415½

PARTICULARS AND PRICES OF TO-DAY'S SALE.

CEYLON.

MARK.	PKGS.	DESCRIPTION.	PRICE.
B. W., etc.	9	Brown to black pressed crepe ...	3/9 to 5/1¼
Warriagalla	1	Scrap ...	4/2
	2	Good biscuits ...	5/5¼
Doranakande	5	Biscuits ...	5/5¼
	7	Scrap ...	4/7½ to 4/9½
Clara	1	Biscuit ...	5/5½
Waharaka	7	Good to fine biscuits ...	5/5¼
	2	Crepe ...	5/- to 5/2½
Ayr	3	Biscuits ...	5/5¼
	1	Scrap ...	4/7¾
Sorana	9	Biscuits ...	5/5½ to 5/5¾
Tallagalla	4	Biscuits ...	5/5½
	3	Scrap ...	4/4½ to 4/9
Warriapolla	5	Very fine pale biscuits ...	5/7¼
	2	Darker ...	5/5¼
	3	Scrap ...	4/4 to 4/9¾
Mahawalla	2	Good sheet ...	5/5½
Geragama	2	Rough and rejected biscuits ...	4/- to 5/5
	1	Scrap ...	4/3
Glanrhos	6	Fine pale biscuits ...	5/5½
	11	Dark crepe and block ...	pt. sold, 5/1½ to 5/3
	14	Fine pale crepe ...	5/7½ to 5/7¾
Clontarf	4	Fine pale crepe ...	5/7¼
	3	Dark crepe ...	5/1¼ to 5/2¾
Chesterford	1	Biscuit ...	5/5½
Halwatura	9	Good amber crepe ...	5/4¾ to 5/5¼
	4	Dark ...	5/0¾
	1	Black ...	4/1½
Katugastota	1	Fine biscuit ...	5/5½
	1	Scrap ...	4/9¼
Hapugastenne	8	Good biscuits ...	5/5½
	3	Scrap ...	4/9¼
Maddegedera	3	Good biscuits ...	5/5¼
	2	Good scrap ...	4/9¼
Edengoda	8	Good biscuits ...	5/5½
	9	Good scrap ...	4/9¼
Halgolle	2	Good biscuits ...	5/5½
	2	Good scrap ...	4/9¼
Alupolia	2	Good biscuits ...	5/5½
	2	Dark scrap ...	bought in
Glencorse	1	Fine biscuit ...	5/5½
	1	Rejected biscuit ...	5/5¼
	2	Good scrap ...	4/9 to 4/9¼
St. George	2	Good biscuits ...	5/5½
	1	Scrap ...	4/9¼
St. George	4	Biscuits ...	5/5¼
Matugama	1	Scrap ...	4/4¾
Gikiyanakande	25	Fine pale and palish worm ...	pt. sold, 5/4¾ to 5/5
	2	Crepe ...	5/6
	7	Good to dark pressed crepe ...	4/6 to 4/7
E. H.	1	Cutting ...	5/5¼
Suduganga	3	Good sheet ...	5/5¼
	3	Crepe ...	5/0½

MARK.	PKGS.	DESCRIPTION.	PRICE.
Kepitigalla	2	Scrap	... bought in
Old Haloya	1	Ceara biscuits	... 5/5 $\frac{1}{4}$
N. A. N. A.	9	Good to fine pale crepe	pt. sold, 5/7 $\frac{1}{2}$ to 5/7 $\frac{3}{4}$
	27	Good palish and brown crepe	... 5/- to 5/5 $\frac{1}{4}$
	18	Dark & pressed crepe	... 5/- to 5/3 $\frac{1}{2}$
Galatura	2	Biscuits	... 5/5 $\frac{1}{4}$
	3	Scrap	... 4/7
Ingoya	10	Good crepe	... 5/5 $\frac{1}{2}$
	1	Dark	... 5/2 $\frac{3}{4}$
Rosehaugh	29	Dark crepe and block	pt. sold, 4/11 $\frac{1}{4}$ to 5/1 $\frac{1}{2}$
Hattangalla	1	Good crepe	... 5/2 $\frac{1}{4}$
M. C.	4	Rough sheet	... 5/5 $\frac{1}{4}$
Tudungalla	6	Good crepe	... 5/5 to 5/5 $\frac{1}{2}$
	8	Good to dark crepe	... 5/0 $\frac{3}{4}$ to 5/4 $\frac{1}{4}$
Elston	1	Biscuits	... 5/5 $\frac{1}{4}$
Polatagama	7	Good crepe	... 5/5 $\frac{1}{2}$
	3	Dark	pt. sold, 5/0 $\frac{3}{4}$ to 5/1 $\frac{1}{2}$
Weoya	5	Good biscuits	... 5/5 $\frac{3}{4}$
	3	Good to black crepe	... 5/- to 5/1 $\frac{1}{2}$

MALAYA.

MARK.	PKGS.	DESCRIPTION.	PRICE.
Highland Est.	59	Fine sheet	... 5/5 to 5/5 $\frac{1}{4}$
	9	Fine palish crepe	... 5/5 $\frac{3}{4}$
	64	Good to brown crepe	... 4/11 to 5/3 $\frac{1}{4}$
R. M. P. Ltd.	16	Good crepe	... 5/5 to 5/5 $\frac{1}{4}$
	8	Dark	... 5/2
Batu Caves	7	Good sheet	... 5/5 $\frac{1}{4}$
	1	Dark	... 4/9
S. K. R. Co., Ltd.	15	Good crepe	... 5/4 to 5/6 $\frac{1}{4}$
	5	Dark	... 5/2
B. & D.	5	Crepe	... 5/4 $\frac{1}{4}$ to 5/4 $\frac{3}{4}$
	5	Rambong	... 2/6 to 4/4
	11	Good to fine sheet	... 5/5 to 5/5 $\frac{1}{2}$
E. K. K. P.	3	Good sheet	... 5/5 $\frac{1}{2}$
	1	Scrap	... 4/5 $\frac{1}{2}$
	2	Rejections	... 4/5 $\frac{1}{2}$
L. E. D.	12	Sheet	... 5/5
	4	Scrap and rejections	... 4/10 to 4/7 $\frac{1}{2}$
Bila	10	Sheet	... 5/5 $\frac{1}{4}$ to 5/5 $\frac{1}{2}$
	21	Brown crepe	... 5/1 $\frac{1}{2}$ to 5/3
S. R.	13	Sheet	... 5/4 $\frac{3}{4}$ to 5/5 $\frac{1}{2}$
	1	Crepe	... 5/2
U. S. R. E. Ltd.	4	Sheet	... 5/5 $\frac{1}{4}$
	1	Scrap	... 4/9 $\frac{3}{4}$
	1	Rambong	... 4/2 $\frac{1}{2}$
	1	Rejections	... 4/1
Linggi	11	Fine pale crepe	... 5/6 $\frac{2}{4}$ to 5/7 $\frac{3}{4}$
	15	Darker	... 5/0 $\frac{1}{4}$
Sungei Krudda	16	Fine pale crepe	... 5/6 $\frac{3}{4}$ to 5/7 $\frac{3}{4}$
	9	Darker	... 5/5 $\frac{1}{4}$ to 5/7 $\frac{1}{4}$
	10	Dark	... 5/0 $\frac{1}{2}$ to 5/3
C. M. R. E. Ltd.	4	Very fine pale crepe	... 5/8 $\frac{1}{2}$
	30	Darker	... 5/5 $\frac{3}{4}$ to 5/6 $\frac{1}{2}$
	10	Clean brown & mottled	... 5/3 $\frac{1}{4}$ to 5/5
	12	Dark	... 5/0 $\frac{1}{4}$
R. S.S.C.	13	Good sheet	... 5/5 $\frac{1}{4}$ to 5/5 $\frac{1}{2}$
	9	Good to dark crepe	... 4/0 $\frac{3}{4}$ to 5/2 $\frac{3}{4}$
P. S. E.	3	Good sheet	... 5/5 $\frac{1}{4}$
Salaba	1	Dark crepe	... 5/1 $\frac{1}{2}$
Yam Seng	12	Sheet	... 5/5 $\frac{1}{2}$
	1	Scrap	... 4/8

MARK.	PKGS.	DESCRIPTION.	PRICE.
Shelford	12	Sheet	... 5/5
	16	Good to dark crepe	... 5/0 $\frac{1}{4}$ to 5/2 $\frac{1}{2}$
Beverlae	7	Good to dark crepe pt. sod.	... 4/1 to 5/2 $\frac{1}{4}$
	2	Scrap	... 4/9 $\frac{1}{4}$
N. B. T. C. L.	6	Scrap	... 4/9 $\frac{1}{2}$ to 4/9 $\frac{3}{4}$
	1	Sheet	... 5/5 $\frac{1}{4}$
Ayar Angat	24	Fine pale crepe	... 5/7 to 5/7 $\frac{1}{4}$
	12	Good to dark crepe	... 5/- to 5/3 $\frac{1}{4}$
Linsum	17	Fine crepe	... 5/7 $\frac{1}{2}$
Terentang	46	Fine pale crepe	... 5/7 $\frac{1}{4}$
	6	Darker	... bought in
	7	Good to dark	... 5/- to 5/2 $\frac{1}{2}$
L. A. R. Co.	7	Good sheet	... 5/5 $\frac{1}{4}$
	1	Very fine pale crepe	... 5/8 $\frac{1}{2}$
	4	Darker	... 5/4 $\frac{3}{4}$ to 5/5 $\frac{3}{4}$
	5	Good brown to black pressed	... 4/1 to 5/1
R. W. & Co.	13	Good to dark crepe	... 5/- to 5/5
H. C.	1	Good sheet	... 5/5 $\frac{1}{4}$
	1	Scrap	... 4/8
G. H.	11	Good crepe	... 5/6
	4	Darker	... 5/1 to 5/3 $\frac{1}{4}$
Sundry Marks	4	Crepe	... 4/10 to 5/2
	8	Biscuits & sheet pt. sold	... 5/4 to 5/5 $\frac{1}{4}$
	10	Scrap	... 4/6 to 4/8
	1	Fine crepe	... 5/5 $\frac{1}{2}$
	7	Good „	... 5/3 to 5/5 $\frac{1}{2}$
	1	Block	... bought in
V. R. Co., Lt. Klang F. M. S.	22	Good sheet	... 5/5 $\frac{1}{2}$ to 5/5 $\frac{3}{4}$
	42	Good to fine crepe	... 5/4 $\frac{3}{4}$ to 5/5 $\frac{1}{4}$
	36	Dark	... 5/1 $\frac{1}{4}$ to 5/2 $\frac{1}{2}$
Matang	32	Good to fine crepe	... 5/5 $\frac{1}{4}$ to 5/7 $\frac{1}{4}$
	4	Mottled	... 5/4 $\frac{3}{4}$
	15	Dark	... 4/11 $\frac{1}{2}$ to 5/1 $\frac{1}{2}$
K. P. C. Ltd.	8	Good to fine sheet	... 5/0 $\frac{1}{4}$ to 5/5 $\frac{1}{2}$
	6	Crepe	... 5/0 $\frac{3}{4}$ to 5/1 $\frac{1}{4}$
S. R. & Co, Ltd.	1	Good sheet	... 5/5 $\frac{1}{2}$
	68	Good to fine crepe	... 5/3 to 5/6
	116	Dark crepe	... 5/- to 5/0 $\frac{3}{4}$
	2	Good & pressed Rambong	... 4/8
S. etc.	22	Rough & virgin sheet	... 4/9 to 5/5 $\frac{1}{2}$
	1	Rambong	... 3/9
	1	Scrap	... 4/2
P. S. E. C.	9	Good to fine sheet	... 5/5 $\frac{1}{4}$ to 5/5 $\frac{3}{4}$
	12	Fine pale and palish crepe	... 5/5 $\frac{1}{4}$ to 5/7 $\frac{3}{4}$
	14	Good brown to dark crepe	... 4/- to 5/3 $\frac{1}{4}$
B. R. R. Co., Ltd.	48	Good sheet	... 5/5 $\frac{1}{4}$ to 5/5 $\frac{1}{2}$
	58	Good crepe	... 5/2 $\frac{3}{4}$ to 5/4 $\frac{1}{4}$
	63	Dark	... 4/11 to 5/1 $\frac{3}{4}$
	3	Rambong crepe	... 5/11 $\frac{1}{2}$ to 5/-
Merton	2	Black crepe (dirty)	... bought in
F. (S) R. Co., Ltd.	6	Sheet	... 5/5 $\frac{1}{4}$
	17	Good to dark crepe	... 5/11 $\frac{1}{2}$ to 5/3 $\frac{3}{4}$
S. S. B. R. Co., Ltd.	19	Fine sheet	... 5/5 $\frac{1}{2}$
	7	Good to dark crepe pt. sold	... 5/1 to 5/2
Goleonda	6	Sheet	... 5/5 $\frac{1}{2}$
	7	Dark crepe	... 4/9 $\frac{1}{2}$ to 5/2 $\frac{1}{2}$

BORNEO.

MARK.	PKGS.	DESCRIPTION.	PRICE.
B. & B.	6	Good sheet	... 5/5 $\frac{1}{2}$
Sekong	2	Scrap	... 49/ $\frac{1}{4}$

GOW, WILSON & STANTON, Limited—
India Rubber Market Report For The Year 1909.

13 & 23, ROOD LANE, LONDON, E.C.

26th February, 1909.

Since our last there has been a slight improvement in the market, but prices have given way during the past few days and a more quiet tone has set in, the quotation for Para being $\frac{1}{4}$ d. per lb. lower than the last auction.

The offerings to-day were on a very small scale, a large consignment in the "Theseus" arriving too late to be included.

On the whole rates were hardly up to those established a fortnight ago, Scrap especially being rather lower. The best price realised was $5/9\frac{3}{4}$ for a very pale lot of Kondasale Sheet. Warripolla Biscuits sold at $5/9\frac{1}{4}$ and P S E Crepe at $5/7\frac{1}{4}$ per lb.

It is satisfactory to note that, in spite of rather quieter demand, the average for Plantation Rubber remains unchanged.

NUMBER OF PACKAGES ADVERTISED.	Quantity in Tons.			Average Price of Plantation Rubber		Comparative Prices			
	Ceylon.	Malaya.	Total.	No. of Packages sold.	Price.	Hard Fine Para	* Plantation. Fine Scrap.		
To-day	857	15 $\frac{1}{2}$	31	46 $\frac{1}{2}$	644	5/9 $\frac{3}{4}$	5/2 $\frac{3}{4}$	5/4 $\frac{3}{4}$ to 5/9 $\frac{3}{4}$	4/4 $\frac{1}{4}$ to 4/7 $\frac{3}{4}$
Corresponding } Sale Last year }	884	12	37	49	184	2/10 $\frac{1}{4}$	2/9	2/11 to 3/5	1/- to 2/3 $\frac{1}{2}$

TO-DAY'S QUOTATIONS.

SHEET AND BISCUITS.		CREPE.		UNWASHED SCRAP.
Very Fine Pale Biscuits	5/9 $\frac{1}{4}$	Very Pale	5/6 to 5/7 $\frac{1}{4}$	Medium to Fine
Good to Fine Biscuits	5/5 to 5/5 $\frac{1}{2}$	Medium and Palish	5/3 to 5/5 $\frac{1}{2}$		4/7 to 4/7$\frac{3}{4}$
Very Fine Pale Sheet	5/9 $\frac{3}{4}$	Dark and Brown	4/6 to 5/2 $\frac{1}{2}$	Darkish
Good to Fine Sheet	5/4 $\frac{1}{4}$ to 5/5 $\frac{1}{2}$			4/4 $\frac{1}{4}$ to 4/6 $\frac{1}{2}$

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PLANTATION EXPORTS.

CEYLON.—1st JANUARY TO				MALAYA.—1st JANUARY TO		
1st FEBRUARY.				31st DECEMBER.		
				Singapore	Penang.	Total.
1909.	...	...	29 tons			
1908.	...	...	11 tons	1908. 919 $\frac{3}{4}$ tons	719 $\frac{1}{4}$ tons	1,639 tons
1907.	...	...	11 $\frac{3}{4}$ tons	1907. 645 $\frac{3}{4}$ tons	236 $\frac{1}{4}$ tons	881 $\frac{3}{4}$ tons
1906.	...	...	9 $\frac{3}{4}$ tons	1906. 327 $\frac{3}{4}$ tons	58 tons	385 $\frac{3}{4}$ tons

EXPORTS OF PLANTATION RUBBER FOR THE LAST 4 YEARS.

	Ceylon.		Malaya.		Total.
1905.	...	75 tons	...	130 tons	205 tons
1906.	...	146 tons	...	385 tons	531 tons
1907.	...	248 tons	...	882 tons	1,130 tons
1908.	...	371 tons	...	7,639 tons	2,010 tons

PARA FIGURES.

LIVERPOOL IMPORTS.				*STOCKS.			
FOR JANUARY.				AT 31st JANUARY.			
1909.	..	...	1,108 tons	1909.	...	...	698 tons
1908.	...	...	1,199 tons	1908.	...	...	1,931 tons
1907.	...	...	754 tons	1907.	...	...	8 $\frac{7}{8}$ tons

*Excluding those in Dealers hands.

PARTICULARS AND PRICES OF TO-DAY'S SALE.

CEYLON.

MARK.	PKGS.	DESCRIPTION.	PRICE.
Welkandala	6	Good biscuits	... bought in
	4	Dark crepe	... bought in
T	11	Biscuits and sheet	... bought in
Glanrhos	1	Dark block	... bought in
Elston	1	Biscuit	... 5/5
	3	Crepe	... 4/6 to 5/3
Kumaradola	7	Biscuits	... 5/5 to 5/5 $\frac{1}{4}$
	1	Scrap	... 4/7
	1	Dark crepe	... 5/1
Yogama	2	Biscuits	... 5/5 $\frac{1}{4}$
	1	Crepe	... 5/0 $\frac{1}{4}$
Mudumana	4	Biscuits	... 5/5
	1	Dark crepe	... 4/10
Rosehaugh	8	Fine thick pale crepe	... bought in
	12	Brown crepe	... 5/- to 5/2 $\frac{1}{2}$
	22	Dark crepe	... bought in
Sunnycroft	1	Biscuit	... 5/5 $\frac{1}{4}$
Clara	1	Biscuit	... 5/5
	2	Crepe	... 5/2 $\frac{1}{2}$
Ayr	3	Biscuits and sheet	... 5/5 $\frac{1}{4}$
Warriapolla	5	Very fine pale biscuits	... 5/9 $\frac{1}{4}$
	6	Fine biscuits, scrap, etc.	... pt. sold, 4/6 $\frac{1}{2}$
Tallagalla	5	Biscuits	... 5/5 $\frac{1}{4}$
	2	Scrap	... 4/6 $\frac{3}{4}$
Sorana	8	Biscuits	... 5/5 $\frac{1}{4}$ to 5/5 $\frac{1}{2}$
Doranakande	8	Good to rough sheet and biscuits...	... 4/7 to 5/5 $\frac{1}{4}$
	10	Scrap	... pt. sold, 4/6 $\frac{3}{4}$ to 4/7 $\frac{3}{4}$

MARK.	PKGS.	DESCRIPTION.	PRICE.
Waharaka	5	Biscuits	... 5/5 $\frac{1}{4}$
	1	Crepe	... 5/2 $\frac{1}{4}$
Tablva	1	Fine worm	... 5/6
Warriagalla	1	Block	... bought in
Glencorse	1	Good biscuit	... 5/5 $\frac{1}{4}$
	1	Dark "	... 5/5 $\frac{1}{4}$
	3	Good to fine scrap	pt. sold, 4/7 to 4/7 $\frac{1}{4}$
Ingoya	8	Good crepe	... 5/4 $\frac{1}{4}$ to 5/5
	1	Dark "	... 4/9 $\frac{1}{2}$
Rosehangh	26	Fine thick pale crepe	... pt. sold, 5/6 $\frac{1}{2}$
	11	Dark crepe	... 5/0 $\frac{1}{2}$ to 5/2
Glendon	12	Biscuits	... 5/5 to 5/5 $\frac{1}{4}$
O. B. E. C.	4	Very fine pale sheet	... 5/9 $\frac{3}{4}$
	1	Dark sheet	... 5/5 $\frac{3}{4}$
	1	Good scrap	... 4/7 $\frac{1}{4}$
Arapolakande	19	Biscuits	... 5/5 $\frac{1}{2}$
	10	Fine pale crepe	... 5/7
	6	Dark and brown crepe	... 5/0 $\frac{1}{2}$ to 5/2 $\frac{1}{4}$
Yaha Ella	1	Biscuit	... 5/5 $\frac{1}{4}$
	1	Scrap, etc.	... 4/7 $\frac{3}{4}$
Hattangalla	7	Biscuits	... 5/5
	8	Brown to dark crepe	... 4/9 $\frac{1}{2}$ to 5/2 $\frac{1}{4}$
	1	Block	... bought in

MALAYA.

MARK.	PKGS.	DESCRIPTION.	PRICE.
Sungei Krudda	17	Good to fine pale crepe	... bought in
	7	Dark crepe	... bought in
Linggi	29	Fine crepe	... bought in
	5	Dark crepe	... bought in
S. S. B. R. Co. Ltd.	16	Good to fine sheet	... 5/5 $\frac{1}{4}$ to 5/5 $\frac{1}{2}$
	7	Good dark crepe	... 5/0 $\frac{3}{4}$ to 5/3
Capis	8	Sheet	... 5/5 $\frac{1}{4}$
	1	Rejections	... 4/7 $\frac{1}{2}$
Goleonda	11	Sheet	... bought in
	8	Good to dark crepe	... 4/7 to 5/3 $\frac{3}{4}$
L. E. D.	11	Sheet	... 5/5 $\frac{1}{4}$
	3	Good scrap and rejections	... 4/6 $\frac{1}{2}$
Senewang	7	Sheet	... 5/- to 5/5 $\frac{1}{4}$
	1	Scrap	... 4/4 $\frac{1}{4}$
S. & D.	10	Sheet	... 5/5 to 5/5 $\frac{1}{4}$
	1	Scrap	... 4/7 $\frac{1}{4}$
	4	Dark crepe	... 4/10
R. M. P. Ltd.	12	Good to fine crepe	... 5/5 to 5/7
	13	Good brown and dark crepe	... 4/11 $\frac{3}{4}$ to 5/3
Jugra Est.	7	Sheet	... 5/5 $\frac{1}{4}$
	10	Good to dark crepe	... 5/- to 5/3 $\frac{3}{4}$
Batu Caves	9	Sheet	... 5/5 to 5/5 $\frac{1}{4}$
Damansara	14	Good to dark pressed crepe	... 4/8 to 5/1
B. & D.	11	Sheet and biscuits	... 5/4 $\frac{1}{2}$ to 5/5 $\frac{1}{4}$
Edinburgh	10	Sheet	... 5/5 to 5/5 $\frac{1}{4}$
	2	Darkish crepe	... 4/7 $\frac{1}{4}$ to 5/3
S. K. R. Co. Ltd.	19	Good to fine crepe	... 5/4 $\frac{3}{4}$ to 5/6 $\frac{1}{2}$
	6	Good dark crepe	... 5/1
C. M. R. E. Ltd.	10	Very fine pale crepe	... 5/7
	10	Very fine palish crepe	... 5/6 $\frac{1}{4}$ to 5/6 $\frac{3}{4}$
	6	Good mottled and brown	... 5/4 to 5/4 $\frac{1}{4}$
	19	Good dark	... 5/0 $\frac{1}{2}$
Shelford	10	Good sheet	... 5/5 to 5/5 $\frac{1}{4}$
	6	Good crepe	... 5/2 $\frac{3}{4}$
	7	Dark crepe	... 5/- to 5/0 $\frac{3}{4}$

MARK.	PKGS.	DESCRIPTION.	PRICE.
N. S. S. S. C.	1	Rough sheet and biscuit	... 5/4
S.	7	Good sheet	... 5/5 $\frac{1}{4}$
	3	Good scrap and rejections	... 4/2 to 4/7 $\frac{1}{4}$
V. R. Co., Ltd.	Klang		
F. M. S.	19	Good sheet	... 5/5 $\frac{1}{4}$
	5	Fine crepe	... 5/6
	31	Dark brown	... 5/1 to 5/3 $\frac{1}{2}$
K. P. Co. Ltd.	6	Sheet	... 5/5 $\frac{1}{4}$
	12	Good and dark crepe	... 5/- to 5/1 $\frac{1}{4}$
K.	18	Sheet	... 5/5 $\frac{1}{4}$ to 5/5 $\frac{1}{2}$
	11	Good crepe	... 5/2 $\frac{3}{4}$ to 5/5
	10	Dark crepe	... 5/1 $\frac{1}{4}$
	1	Black block	... 2/6
P. S. E. C.	10	Good sheet	... 5/4 $\frac{1}{2}$ to 5/5 $\frac{1}{4}$
	1	Very fine pale crepe	... 5/7 $\frac{1}{4}$
	5	Very fine pale and palish crepe	... 5/6 to 5/6 $\frac{1}{4}$
	11	Darkish	... 4/10 $\frac{1}{2}$ to 5/3 $\frac{3}{4}$
P. S. E. T.A.	1	Darkish crepe	... 5/0 $\frac{3}{4}$
K.	4	Good sheet	... 5/5 $\frac{1}{4}$
	6	Good crepe	... 5/4 $\frac{1}{2}$ to 5/5
S.	30	Good and rough sheet	... pt. sold 5/5 $\frac{1}{4}$
K. M.	1	Good sheet	... bought in
F. P. R.	9	Good crepe	... 5/5 $\frac{1}{4}$
G. P. R.	6	Brown	... 4/10 to 6/3 $\frac{1}{2}$
	1	Black	... 4/10
Damansara	25	Good crepe	... bought in

JAVA.

MARK.	PKGS.	DESCRIPTION.	PRICE.
Pasir-Oetjing	2	Good smoked sheet	... pt. sold 5/5 $\frac{1}{4}$
	1	Scrap	... 4/6 $\frac{1}{4}$

CEYLON, STRAITS AND MALAY STATES PLANTATION RUBBER REPORT.

February 12th, 1909

The following Lots, comprising about 70 Tons Straits and 14 Tons Ceylon, were offered at Auction to-day and sold as follows:—

STRAITS AND MALAY STATES.

MARK.	PKGS.	DESCRIPTION.	PRICE.
Highland Estate	59	Cases Sheets	... 5/5 at 5/5 $\frac{1}{4}$
	73	„ Crepe most sold	... 4/11 $\frac{1}{2}$ at 5/3 $\frac{1}{4}$
R.			
M. P.	24	„ „	... 5/2 at 5/5 $\frac{1}{4}$
Ltd.			
Batu Caves	7	„ Sheets	... 5/5 $\frac{1}{4}$
S. K. R. & Co., Sungei Kapar	20	„ Crepe	... 5/2 at 5/6 $\frac{1}{4}$
B. & D.	12	„ Sheets part sold	... 5/5 at 5/5 $\frac{1}{4}$
	4	„ Crepe	... 5/4 $\frac{1}{4}$ at 5/4 $\frac{3}{4}$
	1	„ Scrap	... 4/3 $\frac{3}{4}$
E.			
K. K.	3	„ Sheets	... 5/5 $\frac{1}{2}$
P.			
R. R.	12	„ „	... 5/5
L. E. D.			

MARK.	PKGS.	DESCRIPTION.	PRICE.
Bila	10	Cases Sheets	... 5/5½ at 5/5½
	21	" Crepe	... 5/1½ at 5/3
S. R.	13	" Sheets	... 5/4½ at 5/5½
U. S. R. E. Ltd.	4	" "	... 5/5½
	2	" Scrap	... 4/2½ at 4/9¾
Linggi Plants	26	" Crepe	... 5/0½ at 5/7¾
Sungei Krudda	35	" "	... 5/0½ at 5/7¾
C. M. R. E., Ltd.	56	" "	... 5/0½ at 5/8½
R.			
S. S. C.	5	" Sheets	... 5/5½
P. S. E.	3	" "	... 5/5½
Yam Seng	12	" "	... 5/5½
	1	" Scrap	... 4/8
Shelford	12	" Sheets	... 5/5
	16	" Crepe	... 5/0½ at 5/2½
Beverlac	7	" "	... 4/1 at 5/2½
	2	" Scrap	... 4/9½
B. & B.			
Sekong	6	" Sheets	... 5/5½
Ayer Angat	36	" Crepe	... 5/- at 5/7½
Linsum	17	" "	... 5/7½
Terentang	59	" "	... 5/- at 5/7½
L.			
A. R.	7	" Sheets	... 5/5½
Co.			
C. R.	7	" Crepe	... 5/0½ at 5/5
R. W.			
C.			
E.			
Batu Tiga	8	" Sheets	... 5/5½
	4	" Crepe	... 5/0½
G. H. Anchor	15	" "	... 5/1 at 5/6
Suduganga	3	" "	... 5/0½
	5	" Sheets	... 5/5½
N. A. N. A.	54	" Crepe	... 5/- at 5/7½
V. R. Co., Ltd., Klang	22	" Sheets	... 5/5½ at 5/5¾
F. M. S.	78	" Crepe	... 5/1½ at 5/5½
Matang	50	" "	... 5/0½ at 5/7½
K. P. C. Ltd.	8	" Sheets	... 5/5½ at 5/5½
	6	" Crepe	... 5/0¾ at 5/1½
S. R. Co., Ltd.	185	" "	... 4/8 at 5/6
S.	10	" Sheets	... 5/5½
R.			
R.			
K. M.	2	" " and Biscuits	... bought in
P. S. E.	5	" "	... 5/5½
C.	29	" Crepe	... 4/- at 5/7½
B. R. R. Co., Ltd.	48	" Sheets	... 5/5½ at 5/5½
	124	" Crepe	... 4/11 at 5/4½
Merton	2	" "	... bought in
R. (D) R. Co., Ltd.	6	" Sheets	... 5/5½
	17	" Crepe	... 4/11½ at 5/3½
S. S. R. R. Co., Ltd.	18	" Sheets	... 5/5½
	7	" Crepe	... 4/10 at 5/2
Golconda	6	" Sheets	... 5/5½
	7	" Crepe	... 4/9½ at 5/2½

CEYLON.

MARK.	PKGS.	DESCRIPTION.	PRICE.
B. W.	4	Cases Crepe	... 5/0½
Y. D. A.	4	" " "	... 4/9 at 5/1½
Doranakande	5	" Biscuits	... 5/5½
	4	" Scrap	... 4/9 at 4/9½

MARK.	PKGS.	DESCRIPTION.	PRICE.
Clara	1	Cases Biscuits	... 5/5 $\frac{1}{2}$
Waharaka	7	" "	... 5/5 $\frac{1}{2}$
	1	" Crepe	... 5/2 $\frac{1}{2}$
Ayr	3	" Biscuits	... 5/5 $\frac{1}{2}$
Sorana	9	" "	... 5/5 $\frac{1}{2}$
Tallagalla	4	" "	... 5/5 $\frac{1}{2}$
	3	" Scrap	... 4/4 $\frac{1}{2}$ at 4/9
Warriapolla	5	" Biscuits	... 5/7 $\frac{1}{4}$
Mahawalla	2	" Sheets	... 5/5 $\frac{1}{4}$
Sunnycroft	3	" Biscuits	... not up
Glanrhos	6	" "	... 5/5 $\frac{1}{2}$
	25	" Crepe	... 5/1 $\frac{1}{4}$ at 5/7 $\frac{3}{4}$
Clontarf	7	" "	... 5/1 $\frac{1}{4}$ at 5/7 $\frac{3}{4}$
Halwatura	14	" "	... 4/1 $\frac{1}{2}$ at 5/5 $\frac{1}{4}$
Katuagastota	1	" Biscuits	... 5/5 $\frac{1}{2}$
Hapugastonne	8	" "	... 5/5 $\frac{1}{2}$
Maddagera	3	" "	... 5/5 $\frac{1}{2}$
Ed. a. G. G. G.	8	" "	... 5/5 $\frac{1}{2}$
	9	" Scrap	... 4/9 $\frac{1}{4}$
Glencorse	1	" Biscuit	... 5/5 $\frac{1}{2}$
St. George	6	" Biscuits	... 5/5 $\frac{1}{4}$ at 5 $\frac{1}{2}$
	1	" Scrap	... 4/9 $\frac{1}{4}$
Gikiyanakande	23	" Worms	... bought in
	7	" Crepe	... 4/6 at 4/7
Galatura	2	" Biscuits	... 5/5 $\frac{1}{4}$
	3	" Scrap	... 4/7
Ingoya	11	" Crepe	... 5/- at 5/5 $\frac{1}{2}$
Rosehaugh	29	" "	... 4/1 $\frac{1}{2}$ at 5/1 $\frac{1}{2}$
Hattangalla	1	" "	... 5/2 $\frac{1}{4}$
M. C.	4	" Biscuits & Sheets	... bought in
Tudugalla	14	" Crepe	... 5/0 $\frac{1}{4}$ at 5/5 $\frac{1}{2}$
Elston	1	" Biscuit	... 5/5 $\frac{1}{4}$
Polatagama	10	" Crepe	... 5/1 $\frac{1}{4}$ at 5/5 $\frac{1}{2}$
Weoya	4	" Biscuits	... 5/5 $\frac{1}{4}$

The price of FINE HARD to-day on the spot is 5/3 per lb.

CEYLON, STRAITS AND MALAY STATES PLANTATION RUBBER REPORT.

February 26th, 1909.

The following Lots, comprising about 32 $\frac{1}{4}$ Tons Straits and 13 Tons Ceylon, were offered at Auction to-day and sold as follows:—

STRAITS AND MALAY STATES.

MARK.	PKGS.	DESCRIPTION.	PRICE.
Sungei Krudda	24	Cases Crepe	... bought in
Linggi Plants Ltd.	34	" "	... " "
S. S. B. R. Co., Ltd.	16	" Sheets	... 5/5 $\frac{1}{4}$ at 5/5 $\frac{1}{2}$
	7	" Crepe	... 5/0 $\frac{1}{4}$ at 5/3
Gapis	8	" Sheets	... 5/5 $\frac{1}{4}$
W. F.			
Goleonda	11	" "	... bought in
	8	" Crepe	... 4/7 at 5/3 $\frac{1}{2}$
W. Figg	1	" "	... 4/9 $\frac{1}{4}$
L. E. D.	11	" Sheets	... 5/5 $\frac{1}{4}$
	2	" Scrap	... 4/6 $\frac{1}{2}$
N. S.	1	" "	... 4/4 $\frac{1}{4}$

MARK.	PKGS.	DESCRIPTION.	PRICE.
Senawang	6	Cases Sheets	... 5 4 $\frac{1}{4}$ at 5/5 $\frac{1}{4}$
S. & D.	10	" "	... 5/5 at 5/5 $\frac{1}{4}$
	4	" Crepe	... 4/10
R. M. P. Ltd.	25	" "	... 4/11 $\frac{1}{4}$ at 5/5 $\frac{1}{2}$
Jugra Estate	7	" Sheets	... 5/5 $\frac{1}{4}$
	10	" Crepe	... 5/- at 5/3 $\frac{3}{4}$
Batu Caves	8	" Sheets	... 5/5 $\frac{1}{4}$
Damansara, Selangor	14	" Crepe	... 4/8 at 5/1
B. & D.	11	" Sheets	... 5/4 $\frac{1}{2}$ at 5/5 $\frac{3}{4}$
Edinburgh Estate	8	" "	... 5/5 $\frac{1}{4}$ at 5/5 $\frac{1}{2}$
	2	" Crepe	... 4/7 $\frac{1}{4}$ at 5/3
S. K. R. Co., Ltd.	25	" "	... 5/1 at 5/6 $\frac{1}{2}$
C. M. R. E. Ltd.	47	" "	... 5/0 $\frac{1}{2}$ at 5/7
Shelford	10	" Sheets	... 5/5 at 5/5 $\frac{1}{4}$
	13	" Crepe	... 5/0 $\frac{1}{4}$ at 5/2 $\frac{3}{4}$
N. S.	1	" Sheets & Biscuits	... 5/4
S. S. C.			
S.	7	" Sheets	... 5/5 $\frac{1}{4}$
	3	" Scrap	... 4/2 at 4/7 $\frac{1}{4}$
Vallambrosa			
V. R. Co., Ltd., Kalang	19	" Sheets	... 5/5 $\frac{1}{2}$
F. M. S.	36	" Crepe	... 5/1 at 5/6
K. P. Co., Ltd.	6	" Sheets	... 5/5 $\frac{1}{4}$
	12	" Crepe	... 5/- at 5/1 $\frac{1}{4}$
K.	22	" Sheets	... 5/5 $\frac{1}{4}$ at 5/5 $\frac{1}{2}$
	28	" Crepe	... 2/6 at 5/5
P. S. E.	10	" Sheets	... 5/4 $\frac{1}{4}$ at 5/5 $\frac{1}{4}$
C.	12	Pkgs. Crepe	... 5/0 $\frac{1}{4}$ at 5/7 $\frac{1}{4}$
S.			
R. R.	20	Cases Sheets	... 5/5 $\frac{1}{4}$
K. M.			
P. R.	1	" "	... bought in
S.			
R. R.	10	" "	... 5/5 $\frac{1}{4}$
F. P. R.	9	" Crepe	... 5/5 $\frac{1}{4}$
G. P. R.	5	" "	... 5/3 $\frac{1}{2}$
Damansara Selangor	25	" "	... bought in

CEYLON.

MARK.	PKGS.	DESCRIPTION.	PRICE.
Welkandala	5	Cases Biscuits	... bought in
	3	" Crepe	... "
T.	6	" Biscuits	... "
	2	" Biscuits & Sheets	... "
Glaurohos	1	" Block	... "
Elston	1	" Biscuits	... 3/5
	2	" Crepe	... 5/3
Kumaradola	7	" Biscuits	... 5/5 at 5/5 $\frac{1}{4}$
	1	" Crepe	... 5/1
Yogama	1	" "	... 5/0 $\frac{1}{4}$
	2	" Biscuits	... 5/5 $\frac{1}{4}$
N. A. N. A.	1	" "	... bought in
Mudumana	4	" "	... 5/5 at 5/5 $\frac{1}{4}$
Rosehaugh	42	" Crepe part sold	... 5/- at 5/2 $\frac{1}{2}$
Sunnycroft	1	" Biscuits	... 5/5 $\frac{1}{4}$
Clara	1	" "	... 5/5
	2	" Crepe	... 5/2 $\frac{3}{4}$
Ayr	2	" Biscuits	... 5/5 $\frac{1}{4}$
Wartiapolla	5	" "	... 5/9 $\frac{1}{4}$
Tallagalla	5	" "	... 5/5 $\frac{1}{4}$
	2	" Scrap	... 4/6 $\frac{3}{4}$
Serana	8	" Biscuits	... 5/5 $\frac{1}{4}$ at 5/5 $\frac{1}{2}$

MARK.	PKGS.	DESCRIPTION.	PRICE.
Doraukande	4	Cases Biscuits	... 5/5 $\frac{1}{4}$
	2	Sheets	... 5/5
Waharaka	10	Scrap	7 sold ... 4/6 $\frac{3}{4}$ at 4/7 $\frac{3}{4}$
	5	Biscuits	... 5/5 $\frac{1}{4}$
Glencorse	1	Crepe	... 5/2 $\frac{1}{4}$
	1	Biscuit	... 5/5 $\frac{1}{4}$
Ingeya	9	Crepe	... 4/9 $\frac{1}{2}$ at 5/5
Rosohaugh	19	Crepe	... 5/0 $\frac{1}{2}$ at 5/6 $\frac{1}{2}$
Glendon	12	Biscuits	... 5/5 $\frac{1}{4}$
O. B. E. C.	5	Sheets	... 5/5 $\frac{3}{4}$ at 5/9 $\frac{3}{4}$
Arapolakande	19	Biscuits	... 5/5 $\frac{1}{2}$
	16	Crepe	... 5/0 $\frac{1}{2}$ at 5/7
Yaha Ella	1	Biscuits	... 5/5 $\frac{1}{4}$
Hattangalla	7	"	... 5/5
	8	Crepe	... 4/9 at 5/2 $\frac{3}{4}$
Rosehaugh	18	Crepe	... bought in

The price of FINE HARD on the spot to-day is 5/2 $\frac{3}{4}$ per lb.

Penang.

Abstract of Meteorological Readings in Criminal Prison Observatory for the month of February 1909.

DISTRICT.	Mean Barometrical Pressure at 32 • Fahr.	Mean Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory	29'908	148'0	81'6	88'8	74'8	14'0	76'4	843	72'3	78	N.W.	5'19	1'90

CRIMINAL PRISON PENANG,

11th March, 1909.

W. H. FRY,

Senior Medical Officer, Penang.

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Perak.

Abstract of Meteorological Readings in Perak for the month of February, 1909.

188

DISTRICT	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taipeng	...	152	79'63	91	70	21	76'05	852	...	85	...	20'87	3'33
Kuala Kangsar	79'43	91	69	22	75'14	817	...	81	...	4'69	1'60
Batu Gajah	...	159	79'35	93	70	23	75'87	846	...	84	...	6'12	1'48
Gopeng	79'09	90	62	28	74'61	798	...	80	...	9'33	3'91
Ipoh	79'98	92	70	22	76'11	851	...	83	...	6'49	2'50
Kampar	78'94	91	69	22	75'20	826	...	83	...	11'13	2'70
Teluk Anson	80'36	93	69	24	76'02	842	...	81	...	8'86	1'73
Tapah	79'38	92	67	25	74'81	804	...	80	...	11'21	2'11
Parit Buntar	80'49	89	70	19	76'36	853	...	81	...	15'15	4'87
Bagan Serai	80'23	90	71	19	76'33	854	...	83	...	12'51	2'08
Selama	80'09	92	71	21	75'87	838	...	81	...	23'19	3'55

STATE SURGEON'S OFFICE,
Taipeng, 15th March, 1909.

M. J. WRIGHT,
State Surgeon, Perak.

Negri Sembilan.

Abstract of Meteorological Readings in Negri Sembilan Hospitals for the month of February, 1909.

189

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun 3 p.m.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum 3 p.m.	Minimum 3 p.m.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Seremban	...	144	81	86	70	16	76	828	73.8	79.1	N.W.	8.62	3.00
Mantin	9.94	2.25
Ayer Kuning	6.60	2.00
Tampin	4.30	1.00
Kuala Pillah	6.83	1.73
Jelevu	6.76	1.70
Port Dickson Hospital	5.86	2.75
Port Dickson Beri-Beri Hospital	6.73	2.90

S. M. O'S. OFFICE,
Seremban, 12th March, 1909.

S. LUCY,
W. O. I. C. Negri Sembilan.

10/09

Kelantan.

Abstract of Meteorological Readings in Kelantan for the month of January, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
				Mean F	Mean F	Mean F						Inches	Inches
Kuala Lebir	83.66	71.76	11.90	...	...	...	...	...	6.78	1.78
Kuala Kelantan	81.51	72.32	9.19	...	...	...	...	...	7.83	1.70
Kuala Pergau	13.03	2.13
Taku Plantation	6.46	1.34

STATE SURGEON'S OFFICE,
Kuala Lebir, 7th February, 1909.

A. G. H. SMART,
State Surgeon, Kelantan.

Kelantan.

Abstract of Meteorological Readings in Kelantan for the month of February, 1909.

191

DISTRICT.	Mean Barometrical Pressure at 320 Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lebir	Mean. 84°59	Mean. 72°32	Mean. 212°27	...	...	...	...	...	8°67	3°71
Kuala Kelantan	80°21	72°64	7°57	...	...	...	...	...	10°57	2°45
Kuala Pergau	11°27	2°98
Taku Plantation	8°80	2°70

STATE SURGEON'S OFFICE,
Kelantan 6th March, 1909.

A. G. H. SMART,
State Surgeon, Kelantan.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of February, 1909.

192

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, K. Lumpur	29.878	141.0	80.2	89.3	71.7	17.6	76.1	0.823	73.4	80	S.W	12.09	3.15
Pudoh Gaol "	21.29	2.73
District Hospital "	9.37	2.30
" Klang	88.5	71.1	17.4	...	...	...	...	...	14.18	1.91
" Kuala Langat	87.6	74.6	13.0	...	...	...	...	...	7.60	1.50
" Kajang	86.4	74.9	11.5	...	...	...	...	...	6.92	1.70
" Kuala Selangor	88.2	77.3	10.9	...	...	...	...	...	11.65	3.27
" Kuala Kubu	90.8	70.0	20.8	...	...	...	...	...	9.80	1.70
" Serendah	91.7	70.5	21.2	...	...	...	...	...	6.06	1.72
" Rawang	90.0	71.0	19.0	...	...	...	...	...	8.47	1.91
Beri-beri Hospital, Jeran	11.85	3.75
Sabak Bernam	9.02	3.00

OFFICE OF SENIOR MEDICAL OFFICER,
Kuala Lumpur, 16th March, 1909.

W. D. DAUR,
Senior Medical Officer, Selangor.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of January, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.		Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
				Mean Dry Bulb.	Maximum.	Minimum.	Mean Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis	77.7	92	66	17.0	72.3	...	...	...	...	11.59	3.29
Raub	80.5	90	66	19.2	73.8	...	...	...	...	21.25	4.30
Bukit Fraser	17.57	2.90
Bentong	79.0	91	69	16.8	74.9	...	...	...	...	22.12	3.08
Temerloh	95	72	15.3	...	...	...	...	...	5.44	2.50
Pekan	80.0	88	69	12.9	76.0	...	...	...	...	32.33	6.32
Kuantan	81.1	89	70	13.5	75.9	...	...	...	...	21.60	5.56

OFFICE OF THE MEDICAL OFFICER, PAHANG.

Kuala Lipis, 10th March, 1909.

S. C. G. FOX,

Medical Officer, in Charge, Pahang.

Seremban.

Table Showing the Daily Results of the Reading of Meteorological Observations taken at the General Hospital, Seremban, for the month of February, 1909.

DATE.	TEMPERATURE OF RADIATION.					TEMP. OF RADIATION.		WIND DIRECTION.		TEMP. OF EVAPORATION.			COMPUTED VAPOUR TENSION.			RELATIVE HUMIDITY.			CLOUDS 0 TO 10.			WEATHER INITIALS.			RAIN Inch	
	9 H.	15 H.	Mean.	Maximum.	Minimum.	Range.	Sun.	Difference Sun & Shade.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.			
1	78	87	82.5	84	69	15	150	66	N	W	74.6	78.8	76.7	857	985	921	89	77	83	3	3	3	S	S	N	7.8
2	77	88	82.5	89	70	19	148	59	N	W	74.6	78.8	76.7	857	985	921	89	77	83	3	3	3	S	S	S	
3	77	87	82	88	71	17	147	59	N	W	72.9	77.1	75.5	927	933	930	95	90	92.5	5	5	5	S	S	S	.20
4	78	81	79	83	79	13	149	66	N	W	72.5	77.5	75.3	810	847	828.5	100	84	85.5	6	6	6	C	C	C	
5	77	81	79	86	68	18	130	48	N	E	73.0	74.5	74	829	849	839	89	80	84.5	7	7	7	C	C	N	.14
6	76	80	78	82	71	11	130	48	N	W	72.3	76.6	75.4	848	875	862	94	90	92	7	7	7	C	C	S	
7	79	80	79.5	82	69	13	140	69	N	W	72.3	71.6	71.5	793	775	784	80	75	77.5	8	8	8	C	C	S	.19
8	78	80	79.5	81	70	11	150	69	N	W	73.6	73.3	71.4	829	724	771	89	77	77.5	1	1	1	S	S	S	
9	77	83	80.5	85	69	15	148	63	N	E	73.6	78.7	76.9	963	884	776.5	89	69	82	2	2	2	S	S	S	
10	80	87	83.5	89	69	15	148	63	N	W	69.5	75.5	72.9	722	978	850	75	90	87.5	6	6	6	C	C	S	
11	77	82	80	85	70	10	145	60	N	W	72.3	78.3	73.9	793	963	878	95	90	82	2	2	2	C	C	S	
12	79	80	79.5	82	70	15	140	57	N	W	72.9	75.1	75	810	933	871	84	80	87.5	1	1	1	C	C	S	
13	78	87	82.5	88	70	18	145	57	N	W	72.6	75.1	73.5	793	933	837	80	72	80.5	2	2	2	C	C	S	
14	76	85	80.5	86	71	15	149	62	N	W	72.3	78.3	73.9	793	933	837	80	72	80.5	2	2	2	C	C	S	
15	79	86	82.5	87	70	17	145	59	N	W	72.3	78.3	73.9	793	933	837	80	72	80.5	2	2	2	C	C	S	
16	78	86	82.5	88	70	17	149	62	N	W	72.3	78.3	73.9	793	933	837	80	72	80.5	2	2	2	C	C	S	
17	79	86	82.5	88	70	19	145	59	N	W	72.3	78.3	73.9	793	933	837	80	72	80.5	2	2	2	C	C	S	
18	79	86	82.5	88	70	19	145	59	N	W	72.3	78.3	73.9	793	933	837	80	72	80.5	2	2	2	C	C	S	
19	79	86	82.5	88	70	19	145	59	N	W	72.3	78.3	73.9	793	933	837	80	72	80.5	2	2	2	C	C	S	.15
20	79	86	82.5	88	70	19	145	59	N	W	72.3	78.3	73.9	793	933	837	80	72	80.5	2	2	2	C	C	S	
21	79	86	82.5	88	70	19	145	59	N	W	72.3	78.3	73.9	793	933	837	80	72	80.5	2	2	2	C	C	S	
22	79	86	82.5	88	70	19	145	59	N	W	72.3	78.3	73.9	793	933	837	80	72	80.5	2	2	2	C	C	S	
23	79	86	82.5	88	70	19	145	59	N	W	72.3	78.3	73.9	793	933	837	80	72	80.5	2	2	2	C	C	S	.10
24	79	86	82.5	88	70	19	145	59	N	W	72.3	78.3	73.9	793	933	837	80	72	80.5	2	2	2	C	C	S	
25	75	86	80.5	88	69	19	130	60	N	W	73.6	74.9	74.2	850	867	851	89	76	78.5	4	4	4	C	C	S	.20
26	76	86	84	84	71	15	147	59	N	W	71.6	77.9	74.7	750	933	844	79	65	77	1	1	1	C	C	S	
27	70	82	80	84	69	18	147	60	N	W	70.9	80.3	74.6	756	933	864	84	73	78.5	3	3	3	C	C	S	
28	77	83	80	86	69	17	146	62	N	W	71.3	77.4	73.0	756	933	864	84	73	78.5	3	3	3	C	C	S	.30
Total	77.27	83.92	80.74	86.03	70.03	16	144.57	58.53			73.4	74.2	73.8	808.9	847.8	288.3	85.9	72.4	79.1	3	4	5	S	C	C	.62

S. M. O's Office Seremban, 12-3-1909.

S. LUCY,
M. O. & C. M. Officer.

AGRICULTURAL BULLETIN

OF THE

STRAITS

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[VOL. VIII

THE LAND LAWS AND LAND ADMINISTRATION OF THE FEDERATED MALAY STATES.

BY R. G. WATSON,

Commissioner of Lands and Surveys, F. M. S.

GOVERNMENT AND ADMINISTRATION.

The Federated Malay States consists of four Independent Native States—viz., Perak, Selangor and Negri Sembilan on the West Coast, and Pahang on the East Coast of the Malay Peninsula. Since 1896 the Administration of these States has been settled in the following form: subject to the directions of His Majesty's Principal Secretary of State for the Colonies, the Governor of the Straits Settlements is also High Commissioner of the Federated Malay States. The Principal Civil Officer resident in the States is the Resident-General, in whom is invested the control of affairs for the whole Federation. He is assisted by a staff of Federal Officers, to whom is entrusted the supervision of the principal departments of the four States: of these officers it may be sufficient here to mention the Commissioner of Lands and Surveys, the Senior Warden of Mines, and the Director of Agriculture, whose titles indicate the departments with which they deal.

Subject to the direction of the Resident-General, each State of the Federation is separately administered on behalf of the Native Ruler by a British Resident, assisted by the usual staff of Government officers.

The head-quarters of the Federal Government are at Kuala Lumpur, which is also the capital of the State of Selangor. It is distant from Penang by rail 12 hours, while the sea journey from Singapore or Pahang varies from 15 to 24 hours.

SITUATION.

The Federated Malay States occupy the central and broadest part of the Malay Peninsula, washed by the Straits of Malacca on the west and the China Sea on the east, and lying between North Latitude 2.24 and 6.10 and East Longitude 100.23 to 103.60.

The area included in the four States is estimated at 26,380 square miles, or 17,000,000 acres, of which a very considerable proportion, especially in Pahang, is still unexplored.

CLIMATE.

The following note is taken from the official "Manual of Statistics relating to the Federated Malay States for 1906:"

"The climate of the Federated Malay States is very uniform, and can be described in general terms as hot and moist. The annual rainfall, except in places close to the mountain ranges, is about 90 ins. In towns such as Taiping, Tapah, Selama, etc., close to high mountains, upwards of 50 per cent. more is registered, the average of ten years at the first-named being 164 ins. There is no well-marked dry season. Generally speaking, July is the driest month, but has seldom anywhere a less rainfall than 3½ ins. The wettest season is from October to December, and there is another wet season of slightly less degree during March and April. Rain rarely falls before 11 a.m., so that six hours of out-door work can generally be depended upon all the year round.

"The average maximum temperature occurring between noon and 3 p.m. is in low country under 90°, and the average minimum occurring just before sunrise is just over 70°. The general noon temperature is just about 80°. There is very little change in the mean monthly temperature during the year, the average of ten years' reading in Taiping exhibiting a difference of only 3° between the mean of May, the hottest, and December, the coldest month of the year. The variation of temperature with altitude may be taken roughly as a decrease of 3° for every 1,000 ft. increase of altitude."

LANDS AND SURVEYS.

The control of the Land and Revenue Survey Departments rests with the Resident of each State, who, subject in certain cases to the approval of the Resident-General, directs all business connected with the sale, leasing and disposal of State lands, and all public surveys undertaken by the Revenue Survey Department.

To facilitate administration, each State is divided into districts. In each district there are one or more Land Offices, under the charge of the District Officer; and in most districts a Survey Office, under the management of a District Surveyor.

The business of the Land and Survey Departments is carried on under "The Land Enactment, 1903;" "The Mining Code, 1904;" the "Registration of Titles Regulation, 1891;" and the "Registration of Titles Enactment, 1897."

According to the Malay theory of land tenure, all property in land is vested in the Royal authority; the subjects of the King are permitted to clear and use such portions of waste land as they may require, subject to the payment of a tax more or less regularly collected, and of a somewhat indefinite character, and the performance of certain feudal duties.

This principle—the State ownership of all lands—has been embodied in the Land Laws of the Federation. There is consequently no such thing as freehold property in land in the Native States: all land belongs to the State, and is granted to individuals for their use for certain purposes and under certain conditions. What these conditions generally are will be set out later in detail; it will be enough to point out here that a breach of any of the conditions renders the land liable to resumption. Whether land is alienated on payment of premium or by sale at auction, it is so alienated subject to conditions, some of which are implied by the Enactment, and others expressed in the document of title, and it is only subject to the payment of dues and compliance with conditions that any land is secured to the use of a grantee in perpetuity.

THE LAND LAWS OF THE FEDERATION.

ABSTRACT OF "THE LAND ENACTMENT, 1903."

State land is defined to mean all lands which have not been or may not hereafter be reserved for a public purpose,

or which are not or may not be leased or granted to any person; and includes land which is or may be forfeited or surrendered to the State.

Rules for carrying out the purposes and provisions of the Enactment may be made by the Resident, with the approval of the Resident-General; such Rules are published in the *Gazette*, and from the date of such publication have the force of law.

CLASSIFICATION OF LANDS (SECTION 3, LAND ENACTMENT, 1903).

State land is divided into three classes:

- (a) Town and village lands;
- (b) Country lands of 100 acres in area and under;
- (c) Country lands exceeding 100 acres in area.

Lands in class (b) are further sub-divided into 1st, 2nd and 3rd class lands.

RESERVES FOR PUBLIC PURPOSES (SECTION 8, LAND ENACTMENT, 1903).

The Resident may from time to time reserve, by notification in the *Gazette*, any State lands which in his opinion are required for a residential reserve, or for any of the following public purposes:

- (i) Quarries, brickfields, quays, landing places, tramways, railways and railway stations;
- (ii) Roads, canals, reservoirs, irrigation works, aqueducts or water-courses;
- (iii) Markets, abattoirs, public baths or wash-houses;
- (iv) Government buildings, schools, gardens, places of public worship or instruction, recreation or convenience;
- (v) Reformatories, libraries, museums, hospitals and asylums;
- (vi) Experimental farms, forest reserves, or places for the cremation or interment of the dead;
- (vii) Any other purpose which the Resident may declare in the *Gazette* to be a public purpose.

Land so reserved may not be sold or alienated until the reservation has been revoked, and any disposition of land so reserved except for the purpose of the reservation is void.

The entire property in, and control of, all rivers, streams and water-courses is vested solely in the Ruler of

the State, and no land within 50 yards of the bank of any navigable river, stream or creek or the sea-shore can be alienated without the express permission of the Resident-General, except for the sole purpose of the cultivation of the nipah palm. (Land Enactment, Sections 6 and 7.)

Every title to land is deemed to convey only a surface right in the land, and conveys no right to remove beyond the boundaries of the land any timber or other jungle produce, gravel and certain other materials or any articles manufactured therefrom. (Land Enactment, Section 10.)

No right to mine any land alienated for agricultural purposes under permanent title can be granted, except with the sanction of the Ruler of the State in Council. (Land Enactment, Section 11.)

All lands alienated for other than mining purposes are liable to be resumed for mining purposes by the Ruler of the state in Council on payment to the grantee of compensation for such interest in the land as is conveyed by his title, and for the improvements, if any, thereon. (Mining Enactment, Section 127.)

APPLICATION FOR, AND SELECTION OF, LAND (LAND RULES,
SECTIONS 2 AND 3).

The alienation of land in Class (a)—*i.e.*, lands situated within the boundaries of a town or village—is always by auction. The date, place and hour of any auction, together with the conditions of sale, are advertised in the *Government Gazette* and by notice at the local Land Office, and on all public notice boards of the district within which the land is situated. A plan, showing the lands to be sold and adjoining lands, is prepared for the information of intending purchasers.

The reserve price is the lowest price for which the Government is prepared to alienate the land, together with a sum sufficient to cover survey and all other fees incidental to the issue of a title.

The purchaser at an auction is required to pay immediately after the sale a deposit of 25 per cent. of the purchase money; the balance being payable within fourteen days of the sale. In default of the payment of the deposit of 25 per cent., the property may at once be again put up to auction; in default of the payment of the balance of the purchase money, the deposit is forfeited and the land may be resold. In either case the original purchaser is

liable to the Government for any deficiency of price arising from the second sale.

Possession is given on the completion of the sale, and a title to the land is registered free of cost as soon as the necessary formalities have been complied with.

AGRICULTURAL LAND.

The alienation of the State lands for agricultural purposes may be by auction or otherwise as the Resident may from time to time generally or in particular cases direct (Land Enactment, Section 28). Auction in the case of country lands exceeding 100 acres is very rarely resorted to: the usual procedure is by way of application for the land selected to the local Land Office when, if available, the land is alienated on payment of the prescribed fees.

Application from persons other than Asiatics must always be in writing: printed forms for making applications can be obtained from any Land Office. (Land Rules, Section 4.)

The form of tenure may be by grant or by entry in the mukim register: the latter is generally regarded as the more suitable for native land-holders, and is not applicable to areas which exceed 100 acres; the advantages given by the former are in almost all cases preferred by European applicants.

The application should set out the area required, the title under which the land is to be held, the purpose for which the land is to be used, the name and address of the person who can point out the land, and the postal address to which any communications concerning the land can be sent.

Care should be taken that the situation of the land applied for is defined as clearly as possible, and attention should be given to the instructions which are printed on the back of the application form. Whenever possible a tracing of the locality, showing adjoining alienated lots, which can be obtained on payment of a small fee from the local Survey Office, should be attached to the application, the boundaries of the land applied for being entered approximately on it.

The application form duly filled in should be forwarded to the Collector of Land Revenue of the district within which the land is situated; if the information given in the application is not such as will enable the Collector to iden-

tify the land beyond reasonable probability of doubt, the applicant will be called upon for further details: it is therefore advisable in order to prevent delay that the fullest possible information should be given in the application.

When the land is reported by the proper officer to be available, the application is submitted to the Resident for consideration.

It is now pretty well known that in deciding an application, the Residents, besides the recommendations of the local officer, are guided by certain considerations of policy which will be briefly indicated.

In the first place it is necessary to satisfy the Resident that the intentions of the applicant are not merely speculative but that *bona fide* development is intended; land will not be granted to speculators whose intention is solely to hold the land for a rise in value. It is well for applicants, who are not known to the officers of Government, to be able to refer to local men to whom they are known or with whom they may be acting. The *bona fide* applicant who proposes to occupy his land, and cultivate it with his own capital, will meet with few difficulties: the speculator who acquires land with the intention of floating a company to take it off his hands at a profit is not greatly welcomed.

A statement is generally asked for of the capital which an applicant can command, the Residents being desirous, before recommending land for alienation, of satisfying themselves that the applicants are financially capable of carrying out their engagement with the Government which the approval of an application implies. A precise statement of the amount at command is not necessary; a reference to some person of position known to the Government will generally suffice.

As soon as the necessary sanction for alienation has been obtained the applicant will be informed by letter, and will be asked to notify his acceptance of the terms of alienation, and to deposit fees for survey within a given time. When the fees required by law have been deposited, a requisition for survey is forwarded to the Survey Office; and this requisition is complied with, with as little delay as possible.

On the completion of the survey, grants in duplicate are endorsed with the title plan of the land and forwarded to the Registrar of Titles' office where they are engrossed, and submitted to the Resident for signature. When signed,

the grants are returned to the Registrar's office, where they are numbered and registered, one copy being forwarded to the applicant, while the other is filed with the register of grants.

The applicant will be notified of any fees which may remain outstanding, such as premium and rent for the current year or the balance of survey fees; and these fees must be settled in full before the grant can be submitted to the Resident for signature.

Where a grant is not ready for issue until after the 1st October, no rent is demanded in respect of that year, unless the land has been occupied prior to that date.

In cases where it appears likely that there may be some considerable delay between the date of the requisition for survey and the issue of the grant, an applicant, if desirous of entering into immediate occupation pending the issue of the grant, may obtain permission to do so on the following terms:

- (a) That the boundaries of the land approved are cut and cleared;
- (b) That the occupant takes all risk of going beyond the boundaries of the land granted;
- (c) That premium and quit-rent for the current year are paid, and the rent for the succeeding years will be paid as it falls due;
- (d) That the conditions as to cultivation, drainage, assessment, and so forth commence to have effect as from the date of such occupation.

The rates of premium and quit-rent, which may be charged on the alienation of State land, are prescribed by Rules made by the Resident of each State, with the sanction of the Resident-General. The rates set out in the Rules may be varied under special circumstances with the sanction above stated, wherever it shall appear to the Resident that the interests of the State may so require; the rates at present in force are as follows:

A.—TOWN AND VILLAGE LOTS AND LANDS.

(i) The premium is ordinarily the price paid at auction by the successful bidder. In the case of lots and lands not sold by auction, the premium in each case is fixed by the Resident.

(ii) The annual rent is 1 per cent. of the premium, subject to the following minima—

	\$	s.	d.
Building lots in towns, 2,400 sq. ft. and under, per lot	2	(4)	8)
Building lots in villages, 2,400 sq. ft. and under, per lot	1	(2)	4)
Town lands, per acre	5	(11)	8)
Village lands, per acre	2	(4)	8)

The above applies to all the States.

B.—AGRICULTURAL LANDS.

The premium on agricultural lands exceeding 10 acres in extent is:

(a) In the three Western States (Perak, Selangor and Negri Sembilan)—

	\$	s.	d.
For lands having a road frontage, per acre	3	(7)	0)
For lands having no road frontage, per acre	2	(4)	8)

The annual rent on such lands is \$1 (2s. 4d.) per acre, rising on the expiration of six years to \$4 (9s. 4d.) in the case of first quality lands, and to \$3 (7s.) in the case of second quality lands.

All land is rated as first quality, subject to any representation which may be made by the applicant prior to accepting the terms offered; any case where the quality of the land is in dispute is referred for the decision of the Director of Agriculture.

(b) In Pahang, the amount of premium, if any, is fixed by the Resident—as a matter of practice, it is very rarely charged—and the quit-rent is 50 cents (1s. 2d.) per acre, rising to \$2 (4s. 8d.) per acre after the first six years.

In the three Western States, where it can be shown that land alienated under the rates above mentioned is planted with coconuts, fruit trees or padi (rice), a rebate may be attained on the rates payable at the end of six years of \$2 (4s. 8d.) for each acre planted with coconuts, and of \$3 (7s.) for each acre cultivated in fruit trees or padi: no similar rebate has at present been declared for Pahang.

Agricultural lands not exceeding 10 acres in area are divided into three classes according to fertility, accessibility, proximity to markets and other advantages.

The premium is \$1 (2s. 4d.) for lands of the first class: no premium is payable on lands of the other classes.

The rates of quit-rents are:

	\$	c.	s.	d.	to	\$	c.	s.	d.
For the first class, per acre	1	20	(2	10)		3	20	(7	5)
„ second „ „		80	(1	10)					
„ third „ „		60	(1	5)					

The rates above mentioned applied to virgin soil or to land on which the jungle has once been felled, but which has grown up again in “bluker” or secondary jungle. There is one general exception to the prevailing rates—namely, “lalang land.” Certain parts of the country, particularly in Negri Sembilan, have in the past been the scene of cultivation of tapioca and similar other products on a large scale by the Chinese: from one cause and another, exhaustion of the soil following on reckless husbandry, or a fall in prices, the fields were abandoned, quickly becoming a wilderness of lalang, while the Chinaman passed on to devastate another tract of virgin land. Lalang is a most pernicious weed, spreading very rapidly and exhausting the soil, quickly becoming an eyesore to the country, and a possible danger to surrounding cultivation. Being desirous of encouraging the re-cultivation of these lalang wastes, the Government is prepared to grant concessions of such land on the following terms:

- (a) No premium;
- (b) Seven years at a nominal rent of \$1 per every 100 acres or part thereof, and thereafter rent at \$1 per acre;
- (c) Ordinary charges for survey fees;
- (d) Payment of the usual export duty in force for the time being;
- (e) Should jungle land be taken up together with an area of lalang waste, the rates of premium and quit-rent in force at the time will be charged for the jungle land.

These special terms are only applicable to the three Western States, and are on offer for a limited number of years only.

SURVEY AND DEMARCATION FEES (LAND RULE 13, TABLE III).

For the laying out of agricultural lands there are two classes of survey:

- (a) A theodolite and chain survey of a high degree of accuracy used for the marking out of all town and village lots, and of agricultural areas held under grant—this is known as a second class survey;
- (b) A theodolite and chain survey of a slightly lower degree of accuracy, or a plane table and chain survey. This is generally called "demarcation," and is used only for the marking of lands to be held by natives by entry in the mukim register. It is always open to any person holding under the latter form of title to exchange such title for a grant on payment of the survey and other prescribed fees. [Land Enactment, Section 29 (ii).]

The following are the rates prescribed for the different classes of land: the charge is inclusive of the cost of plan and tracing:

A.—TOWN AND VILLAGE LOTS AND LANDS.

	\$	c.	£	s.	d.
On lots not exceeding 2,400 sq. ft. (if adjoining surveyed land)	5	00	(	11	8)
On lots not exceeding 2,400 sq. ft. (if adjoining land not surveyed)	10	00	(	1	3 4)

On lands exceeding 2,400 ft. survey fees at the rates prescribed for agricultural lands.

B.—AGRICULTURAL LANDS.

	\$	c.	£	s.	d.
5 acres and under	15	00	(	1	15 0)
For each additional acre up to 10 acres	2	00	(	4	8)
10 acres	25	00	(	2	18 4)
For each additional acre up to 25 acres	1	50	(	3	6)
25 acres	47	50	(	5	10 10)
For each additional acre up to 50 acres	1	50	(	3	6)
50 acres	85	00	(	9	18 4)
For each additional acre up to 100 acres	1	00	(	2	4)

100 acres	135 00 (15 15 0)
For each additional acre up to 300 acres ..	90 (2 1)
300 acres	315 00 (36 15 0)
For each additional acre up to 500 acres ..	80 (1 10)
500 acres	475 00 (55 8 4)
For each additional acre up to 1,000 acres ..	70 (1 8)
1,000 acres	825 00 (96 5 0)
For each additional acre up to 2,000 acres ..	60 (1 5)
2,000 acres	1,425 00 (166 5 0)
For each additional acre up to 4,000 acres ..	50 (1 2)
4,000 acres	2,425 00 (282 18 4)
For each additional acre up to 6,000 acres ..	40 (11)
6,000 acres	3,225 00 (376 5 0)
For each additional acre up to 10,000 acres ..	30 (8)
10,000 acres	4,425 00 (516 5 0)
Every additional acre above 10,000 acres ..	20 (6)

In addition to the fees set out above a fee of 60 cents will be chargeable for every boundary mark inserted.

The initial outlay on an area of 640 acres, the area for which application is most usually made, would be:

	\$
Premium	1,920
Rent	640
Survey fees, including 5 boundary marks, say	580
	<hr/>
Total ..	3,140

Equivalent to £366 6s. 8d.

C.—DEMARCATIION FEES.

These fees apply solely to lands held by entry in the mukim register and include cost of boundary marks:

	\$ c. £ s. d.
3 acres and under ..	3 00 (7 0)

For each additional acre up to 10 acres	1 00 (2 4)
10 acres	10 00 (1 3 4)
For each additional acre up to 25 acres	75 (1 9)
25 acres	21 25 (2 9 7)
For each additional acre up to 50 acres	1 00 (2 4)
50 acres	46 25 (5 7 11)
For each additional acre above 50 acres	1 25 (2 11)

D.—FEES FOR RE-DRAFTING PLANS.

	\$	c.	£	s.	d.
On grants or leases 100 acres and under	2	00	(0	4	8)
On grants or leases over 100 acres and under 1,000 acres	5	00	(0	11	8)
On grants or leases over 1,000 acres	10	00	(1	3	4)

If the sub-division of any block of surveyed or demarcated land is desired, and further survey or demarcation work is necessary, the actual cost of the work done must be paid in addition to the fees prescribed for re-drafting the plans.

When an applicant is notified of the approval of his application, a request will be made at the same time for a deposit of an amount calculated from the above tables to cover the cost of survey. After survey an account will be rendered: should any further sum be due, it must be paid together with the fee of \$3 (7s.) for the preparation and registration of the grant before the latter can be proceeded with.

CONDITIONS AND OBLIGATIONS IMPLIED IN DOCUMENTS
OF TITLE.

There are certain conditions of tenure and obligations which are implied in every document of title issued under the Land Enactment, whether such document be a grant in perpetuity or an entry in the mukim register.

CONDITIONS (LAND ENACTMENT, SECTION 25).

These, which are three in number and are applicable to all documents of title, are to the effect that in the absence of any express provision to the contrary:

- (i) The rent due in respect of the land shall be a first charge on the land;
- (ii) There shall be reserved the right of carrying out on the land certain works of public utility—*e.g.*, laying drains, or putting up survey stations and telegraph lines, and that the officers of the State, their contractors and workmen shall have free access for the purpose of carrying out and maintaining such works—provided that where the works interfere with improvements, buildings or cultivation, there shall be payable due compensation for disturbance or damage, in the manner provided in the Enactment;
- (iii) The Collector of the district and his officers shall have free access to the land.

There is a further condition now generally expressed in the document of title, but to be embodied in any future amendment to the Land Enactment: it is known as the "right of way" condition, and applies to all lands other than those situated within the boundaries of a township or village. Under this condition, the Collector of the district is empowered, in the event of a claim by any adjacent owner for a right of way over alienated land to facilitate access to the nearest public road, to mark out a road which can then be used by the claimant without hindrance from the owner of the land. Full compensation for any damage to growing crops or permanent improvements must be paid by the claimant; the owners of lands using the road must bear all expenses of making and maintaining the road, any dispute being referred to the Collector for decision.

OBLIGATIONS (LAND ENACTMENT, SECTION 24).

The obligations on the part of the grantee implied in every document of title, in the absence of any express provision to the contrary, are:

- (i) That the grantee will duly pay the rent specified in the grant;
- (ii) That all the marks defining the boundaries of the land will be duly maintained;
- (iii) That no portion of the land shall be used for the burial of a human body without the written authority of the Resident.

These obligations run with the land, and are binding on owners for the time being in the same manner as on the original grantee.

OTHER CONDITIONS.

A.—IN TITLES FOR COUNTRY LANDS NOT EXCEEDING 100 ACRES
(LAND ENACTMENT, PART III).

Lands not exceeding 100 acres in area, and not included in any township or village, may be held either under grant or by entry in the mukim register. "Mukim" is the name given to a sub-division of a district, and the register of each mukim contains particulars of all alienated lands in that mukim other than land held under grant or certificate of title [Land Enactment, Section 31 (i)]. The entry in the mukim register gives to the person recorded as owner a permanent transmissible and transferable right, interest and occupancy in his land (Land Enactment, Section 33). Such right, however, is subject to review by the Collector on the complaint of any person who claims to be entitled to be registered as the owner. (Section 35.)

Land held under Part III of the Enactment, whether by grant or entry, is subject to the implied condition that it is liable to forfeiture if it is abandoned for three consecutive years. (Section 34.)

By "abandonment" is meant "the failure to use the land for the purpose for which it was alienated;" in the absence of any special condition denoting the purpose, land will be deemed to have been alienated for cultivation, and be regarded as abandoned if it is not kept under cultivation to the extent of one-fourth of its area.

B.—LANDS EXCEEDING 100 ACRES IN AREA.

These lands must all be held under grant, and are subject to the same implied conditions and obligations as have been mentioned before (p. 11).

In the case of lands not exceeding 640 acres in extent, the following additional conditions are implied: that (i) a *bona fide* commencement of cultivation will be made within twelve months from the date of the grant, and (ii) one-fourth of the land will be cultivated within five years from such date. The penalty for failure to observe these conditions is re-entry on the land by Government and the resumption of the portions not then cultivated: the grantee may be allowed to retain such belts of jungle or plots of land as may be necessary to protect existing cultivation, and may also retain two acres in respect of each acre then under cultivation. Where a grantee has duly fulfilled the condition of cultivating one-fourth of the area, he is entitled to an endorsement on his grant to the effect that the

condition has been fulfilled and that no further liability in that respect attaches to the land.

There do not appear to be any implied conditions attaching to land exceeding 640 acres other than those already mentioned, which are prescribed by Section 25 of the Land Enactment.

It is probable that in the next amendments to the Enactment provision will be made for a new condition, applicable to all lands exceeding 100 acres in extent, to the effect that "no portion of the land granted shall be used for the cultivation of tapioca, or of any other product the cultivation whereof may from time to time be prohibited by rule;" any rights derived under grants issued before the promulgation of such rule being reserved.

All other conditions must be expressed in special clauses, accepted by the grantee and endorsed on the grant before this is signed by the Resident.

These special conditions may relate to cultivation, rent, forfeiture or otherwise as the Resident, with the approval of the Resident-General, may direct in each case.

Generally speaking, the special clause in a town grant will be a building clause requiring a house of approved type and specified value to be put up within a given time; in agricultural grants, the special clauses will deal with right of way and the prohibition of tapioca cultivation; and in grants for areas exceeding 640 acres there will be a cultivation clause, which will require, as a rule, the cultivation of one-twentieth of the area granted in each year for a period of five years. In Selangor, in respect of the coast districts, there will be a clause providing for the payment of a drainage assessment by estates affected by any system of drainage carried out by the Government. The penalty provided by law for failure to comply with any conditions, whether expressed in the grants or implied by the Enactment, is re-entry by the Collector, and the forfeiture of the land to the Ruler of the State. (Section 5.)

No re-entry can be made on the ground of any breach of, or default in, the observance of any condition that may be capable of being repaired or made good, until after notice has been given to the defaulting party to repair or make good such breach or default within the time stated in the notice. If the notice is not complied with, the Collector may then re-enter. Such resumption, however, rarely takes place except in cases of abandonment, or aggravated cases of non-compliance with conditions.

The penalty for non-fulfilment of the obligations are less severe. (Land Enactment, Section 71, and Land Rules 14, 15).

(i) *Quit-rent*.—This is due on 1st January in each year, and should be paid to the Collector at the Land Office of the district in which the land is situated. If it is not paid by the 1st May, a notice of demand is served on the owner; if this is without effect, a warrant of attachment is executed against the personal property of the defaulter, or against any goods or crops which may be found on the land. Only in the last resort is the land itself sold for the recovery of quit-rent.

(ii) *Preservation of Boundary Marks* (Land Enactment, Section 62).—When a grant is issued, a notice is served on the grantee placing under his charge the boundary marks erected on his land and specified in the notice, and requiring him to give immediate information if any such marks are injured or removed. The penalty for non-compliance with such notice is a fine.

(iii) *Burials*.—Under the Burial Grounds Enactment licenses can be obtained to use a specified portion of land as a burying ground; in every district there are several public burying grounds.

ACQUISITION OF LAND FOR PUBLIC PURPOSES.

Land may be acquired at any time by the Government for any public purpose as defined by the Enactment on payment of compensation to the owner.

The procedure is as follows:

When the notices required by law have been promulgated, and the extent of the land to be acquired has been decided, the Collector holds an enquiry into the value of the land, notifying all parties interested to be present. At the conclusion of the enquiry, an offer of the amount of compensation determined by him is made to the parties in writing. If this is not accepted, the parties interested are called upon to state what sum they claim as compensation and to appoint an arbitrator, while a second arbitrator is nominated on behalf of the Government. If the arbitrators agree as to amount of compensation to be paid, their award is final. In the event of disagreement a joint report is sent by them to the Collector, who submits it to the Court of the Judicial Commissioner for final decision.

THE FOUR STATES.

PERAK.

Perak is the most northerly of the three Western States, as it is the largest. It is bounded on the north by the Trans-Krian district of Province Wellesley, by Kedah and Reman; on the west by the Straits of Malacca; on the east by Pahang; and on the south by Selangor.

For administrative purposes it is divided into six districts: (a) Larut and Krian; (b) Upper Perak; (c) Kuala Kangsar; (d) Kinta; (e) Batang Padang; (f) Lower Perak. The official head-quarters of the State are at Taiping in the Larut-district, which is about 2½ hours by rail from Penang: here are the offices and residences of the principal Government officers, including the Resident; the Secretary to the Resident; the State Engineer; the District Officer, Larut and Krian; and the Superintendent of Revenue Surveys.

The area of the State is estimated at 6,580 square miles, equivalent to 4,211,200 acres: of this 534,799 acres have been alienated, 385,483 acres being for agriculture.

COMMUNICATIONS.

The main line of the Federated Malay States Railway, after leaving Province Wellesley, enters Perak at Parit Buntar in the north, traversing the whole length of the State to Tanjong Malim on the Perak Selangor boundary. There are stations at almost all the principal towns on the route, and branch lines connect Port Weld (8 miles)—once a flourishing port with a considerable trade with Penang—with Taiping; and Tapah Road to Telok Anson (17 miles)—the chief port of the State; while another line is in course of construction from Ipoh—the centre of the Kinta tin-mining industry—to Tronoh.

The main trunk road connects with the colonial system at Parit Buntar, following much the same route as the railway to Tanjong Malim.

STEAMERS.

Port Weld, in the Matang sub-district, is connected by steamer three times a week with Penang; but most of the goods and passengers are now carried by the railway. Telok Anson, in Lower Perak, is the principal port of the State. There is a daily service of steamers to and from Penang, and three times a week by the vessels of the Straits Steamship Company to Port Swettenham. There is a

service of steam launches from Penang to Nibong Tebal in Province Wellesley (Colonial Territory), a few miles from Parit Buntar, and to Kuala Kurau and Bagan Serai in the Krian district.

LARUT AND KRIAN.

This district is divided into four sub-districts: (i) Krian; (ii) Selama; (iii) Larut; (iv) Matang.

The head-quarters are at Taiping, where are stationed the District Officer, an Assistant District Officer, the Superintendent of Revenue Surveys and the District Surveyor.

(i) KRIAN.

Bordering on Province Wellesley and Kedah, the chief town is Parit Buntar, situated in the north-west corner of the district. An Assistant District Officer is stationed here with a Second Assistant in charge of the Land Office; the surveys are controlled by the District Surveyor at Taiping. Other towns comprise Kuala Kurau at the mouth of the Kurau river, and Bagan Serai on the main road and the railway, 9 miles from Parit Buntar and 23 miles from Taiping. Krian is essentially a padi-planting district, and outside the irrigation area there is very little high land left suitable for other forms of cultivation. There is a small area lying on the north of the Bagan Serai-Selama road in the east corner of the district, the nearest railway station is Alor Pongsu, 5 miles distant. Behind the swamp lands, which border the main road between the 9th and 11th miles from Taiping, there is a good extent of jungle land, as yet untouched. Access would be difficult, as the land lies at the back of a mile of padi land: the nearest station is Krian Road, 5 miles distant.

(ii) SELAMA.

In charge—the Malay Magistrate.

The road from Taiping to Selama touches the railway line at Pondok Tanjong Station and again at Krian Road. In this sub-district, as in Larut, with the exception, perhaps, of the Batu Kurau mukim, which lies off the main road and is somewhat difficult of access, there are no large areas suitable for planting.

(iii) LARUT.

There is no great extent of land available for planting on a large scale in this sub-district.

(iv) MATANG.

The main trunk road at Simpang Ampat, out of Taiping turns south and then east towards Kuala Kangsar, the west branch continues to Matang, while the northern branch returns by way of Kampong Dew to join the main trunk road at Sungei Gedong, a few miles south of Bagan Serai. At Changkat Jering, 6 miles from Taiping, the main road continues due east to Kuala Kangsar, a branch returning south to Trong and the Bruas, where the Dindings system is met. A road runs from the 5th mile on the Matang road to Trong, and at Bruas the road is continued due east till it reaches the Perak river, a little north of Parit. The only towns are Matang, 6 miles from Taiping, where the Assistant District Officer in charge of the sub-district is stationed, and Port Weld.

In this sub-district there is some considerable area available between the 10th and the 16th miles on the Bruas road and again between the 15th and the 25th miles: the latter is rather high and undulating; the former is lower and would require some drainage.

UPPER PERAK.

After Changkat Jering the main road crosses the Larut range between the 12th and 14th miles through Padang Rengas at the foot of the hills to Kuala Kangsar on the Perak river—the head-quarters of the district of that name, and the residence of the Sultan of Perak. At the 19th mile from Taiping (about 4 miles from Padang Rengas), the road turns north through Kota Tampan and Lenggong to Grit—the chief town of the Upper Perak district. The District Officer resides at Grit, with a Malay Magistrate, who is also a Collector, at Lenggong; there is also an Assistant Surveyor under supervision of the District Surveyor at Kuala Kangsar.

Between the 37th and 41st miles there is valuable land within a few hundred yards of the main road, and between the 52nd and 64th miles there is good undulating land on both sides of the road: it is mostly high and little or no drainage will be necessary. In the mukims of Grit and Kenering further north the land is probably too steep, while the mukim of Temengor lies away from the road and is only reached by bridle paths and elephant tracks.

The nearest railway stations are Padang Rengas and Kuala Kangsar.

KUALA KANGSAR.

The chief villages in this district are Padang Rengas at the foot of the Taiping Hills; Sungei Siput, about half way between Kuala Kangsar and Ipoh; and Parit on the Perak river, about two days by boat from Kuala Kangsar, and 14 or 15 miles by road from Batu Gajah.

From Kuala Kangsar the road, after crossing the Perak river, turns south through Sungei Siput, Plang, and Chemor to Ipoh. The railway follows much the same line, but makes a *détour* from Chemor through Tanjong Rambutan before reaching Ipoh.

At Kuala Kangsar there is the District Officer with an Assistant District Officer in the Land Office, and another Assistant at Parit; there is also a District Surveyor with the usual subordinate staff. From Sungei Siput a new road has been made up the valley of the Plus river: in this direction there is good land available, but not much of it has road frontage, while that towards the Upper Perak road is somewhat hilly; near Kati, on the latter road, there is good land with road frontage, and still more land to be obtained on the east side of the road, but at some distance from it.

Across the river from Kuala Kangsar going down the east bank, there is plenty of good land, but only water transport is available as there are no roads, except one from Parit to a point opposite to the Bruas road. A bridge at Kuala Kangsar and a road down the east bank to Parit are under consideration.

In the sub-district of Bruas, which is under the Assistant district Officer at Parit, the road, already mentioned, from the Perak river, through Bruas to the Dindings territory, opens up a large extent of good land, undulating and carrying fine timber; a road from the Bruas to Sitiawan in the Lower Perak district is under construction: it is said to go through good planting country. There are several flourishing estates near the Bruas, but the chief objection of this district would seem to be the distance from the railway. Taiping, the easiest to reach, is 34 miles away; and Batu Gajah, the official centre of the Kinta district, is 30 miles distant.

Parit itself, on the east bank of the Perak river, is 15 miles from Batu Gajah by road.

South of Parit there is land but no roads at present, and only a path joins the down river mukims with Tronoh,

a small town in Kinta, shortly to be connected with the railway system.

KINTA.

The official head-quarters are at Batu Gajah, but Ipoh is the commercial centre of the district, if not of the Federation. The trunk road at Ipoh leaves the railway and goes westward to Gopeng, throwing off a branch to Tambun and Tanjong Rambutan and then south to Kampar. Other roads run to Batu Gajah through Menglembu, Lahat and Papan, and via Selibin to Chemor; from Batu Gajah there are roads to Gopeng, Tronoh, and Tanjong Toh Allang.

The Land Office is at Batu Gajah under charge of the Chief Assistant District Officer, and a branch office has recently been opened in Ipoh. The surveys are in charge of a District Surveyor, stationed at Batu Gajah, who is assisted by a considerable staff of European Surveyors at the principal towns of the district. Kinta is almost entirely given over to tin mining, and of the towns mentioned above there is hardly one that is not intimately connected with this industry, but on the Ipoh-Kuala Kangsar road, and the Batu Gajah-Tanjong Toh Allang road, suitable land for planting may still be obtained, which is probably not stanniferous.

BATANG PADANG.

The railway from Ipoh runs through Batu Gajah and Kampar to Tapah Road, which is connected by a road (6 miles) with Tapah—the chief town of the Batang Padang district. From Tapah Road a branch line goes to Telok Anson (17 miles)—the chief port of the State; and the main line continues through some 50 miles of jungle to Tanjong Malim on the Bernam river—the boundary between Perak and Selangor. At Tapah is the District Officer with an Assistant District Officer in the Land Office and a District Surveyor; the sub-district of Tanjong Malim is in charge of an Assistant District Officer.

The most suitable land will probably be found in the country lying between the Bidor Railway Station, the railway line to Telok Anson and the Lower Perak boundary; the new road from Bidor to Changkat Jong and Telok Anson intersects this area; the portion lying nearest Bidor would require some draining. North of the Batang Padang river towards Chenderiang, a small area is still available, and towards Tanjong Malim, though a considerable portion of the State land is liable to inundation owing

to the railway embankment damming back the water, some 5,000-6,000 acres could still be selected: this part fronts on the main trunk road.

LOWER PERAK.

Telok Anson is the only town of any size in this district. It is the chief port of the district, about 30 miles from the mouth of the Perak river, and has daily steam communication with Penang. The District Officer, an Assistant District Officer in charge of the Land Office and the District Surveyor are stationed here. The district is entirely an agricultural one, and the soil will grow both coconuts and rubber. The area between the Bernam and Perak is being opened up by a new road, some 19 miles long, and land along it a mile in depth will be available—the distance from Telok Anson by road would be between 20 and 30 miles. Perhaps the best coconut land would be found in the area along the sea coast, north from the mouth of the Perak river, there is an agricultural path right through this district from Kota Stia on the Perak river to Sitiawan. From 10,000 acres upwards is said to be available.

For rubber all the available open road frontage has been taken up, but new roads are now under construction. The one from Parit and the Bruas to Sitiawan has already been mentioned, 13 miles of which will lie in Lower Perak. The soil is very good and from 20,000 acres upwards is available, and a still larger area if applicants are content to take land some distance back from the road; it is easily drained and not hilly. There is communication by local steamer to Penang, one steamer calling regularly at Lumut, a few miles from Sitiawan; while most of the Penang-Telok Anson steamers call at Pangkor, near the mouth of the Lumut river. A steam launch also runs from Telok Anson, calling at Bagan Datoh at the mouth of the Perak river, and a Government launch from the same place once a fortnight maintains, in addition, a regular service. The road above mentioned will give communication both to Taiping and Batu Gajah. The other new road is a continuation of the Telok Anson-Changkat Jong road to join the Batang Padang system from Bidor: this is the road referred to in the previous section on Batang Padang. All the frontage on the present road has been taken up and the extension will add nearly 20 miles in all. The soil is good, and the drainage will be less heavy than on the coast: some 20,000 acres would be available for selection. Most of the land carries useful timber, and the distance from Telok Anson

will be 10-20 miles, or the same to Bidor; along the railway line from Telok Anson, between the Perak river and the railway, and on the opposite bank of the river from Telok Anson, behind Rubana Estate, there is land available with a soil resembling that of the Selangor coast districts: the country is broken up by old river beds and channels, and is at present accessible only by path; drainage would be a considerable item, but the soil gives good results to which the condition of estates like Cicely, Selaba and Rubana will testify. This district would probably repay the inquiries of the planting investor better than any other in Perak.

There are large areas available up river from Telok Anson, and these will be more accessible when bridle paths connect Telok Anson with the up-river agricultural paths, and the path from Kampong Gajah to Tanjong Toh Allang is ready: a small estate has already been opened in this direction.

SELANGOR.

Selangor is the second in importance of the four States. It is bounded on the north by Perak; east and south-east by Pahang and Negri Sembilan; west and south-west by the Straits of Malacca. It is divided into six districts: inland, Ulu Selangor, Kuala Lumpur and Ulu Langat; and on the coast, Kuala Selangor, Klang and Kuala Langat, occupying the coast line from the Bernam river on the north to the Sepang river—the Selangor-Negri Sembilan boundary—on the south-east. Except by a branch line from Kuala Lumpur to Klang, the main lines of railway and road do not touch the coast districts. The latter are entirely given up to agriculture, while tin forms a considerable element in the revenue of the other three.

Kuala Lumpur is the capital of the State, and the head-quarters of the Federation. It is the largest town in the Federation, and in commercial importance is only rivalled by Ipoh. It is the place of residence of the Resident-General, the Resident, the Federal Heads of Departments, and the principal officers of the State.

Port Swettenham, at the mouth of the Klang river, is the principal port of the Federation, and is connected with Kuala Lumpur by a branch railway line through Klang, 26 miles in length. There is daily communication with Singapore by the vessels of the Straits Steamship Co., and with Penang by the Straits Steamship Co., the British

India Steam Navigation Co., and smaller local boats; the mail steamers of the British India Steam Navigation Co., from Madras to Singapore, call every alternate Friday, and other ocean-going steamers at uncertain intervals.

The area of the State is estimated at 3,200 square miles, or 2,048,000 acres. At the end of 1907, 414,342 acres were held under permanent titles, of which 338,805 acres had been alienated for planting.

ULU SELANGOR.

This is the most northerly of the inland districts, having Kuala Selangor on the west, the main mountain range on the east, and the Kuala Lumpur district on the south. The railway and the road follow the same line through this district: leaving Tanjong Malim, they pass through Kuala Kubu, the head-quarters of the district, and the starting point of the Pahang trunk road; thence by way of Rasa and Serendah to Rawang; here the railway turns to the west, through Kuang and Kepong, to avoid the hills, meeting the road again at Kuala Lumpur. The principal towns are those already mentioned; at Kuala Kubu—the head-quarters—are the Land Office and the District Survey Office. Though tin has hitherto been the principal asset of the district, and is responsible for the rise of such towns as Serendah and Rawang, there is still room for planters, and some 100,000 acres of land is said to be available; most of this will be found on the west of the road, as the land on the east, especially north of the Pahang road, is much broken up by hills, and in the valleys between those considerable mining is carried on. Near Batang Kali, on that side of the road, a fair amount of land might be found, and one or two estates have already been started in this neighbourhood. Near Serendah and Ulu Yam, access can be obtained without much difficulty to the main road, and a part of this land is also intersected by the road from Rawang to Kuala Selangor, which gives access to some promising sites. A new road is projected from Rantau Panjang on the Rawang-Kuala Selangor road to Kerling—a station on the railway, a few miles north of Kuala Kubu—this will open up a very considerable area. All this land is said to be fairly high and to require very little drainage.

KUALA LUMPUR.

The Land Office is in charge of the Collector of Land Revenue, who is also registrar of Titles for the State; the Superintendent of Revenue Surveys has his head office

in Kuala Lumpur, and the surveys of the district are in the hands of a District Surveyor.

The main trunk road turns west and south through Cheras and Kajang, the chief town of Ulu Langat; a branch of this road turns off 2 or 3 miles out of Kuala Lumpur to the flourishing mining town of Sungei Besi. To the south a road runs through Kuchai and Puchong, turning off to the west to Klang, keeping on the south of the river, and to the east through Ayer Itam and Kajang. To the north-east, over the Ginting-Bidai Pass, a road joining Kuala Lumpur with Bentong in Pahang is on the verge of completion. There is a second road to Klang, keeping, after Batu Tiga, on the north bank of the river, and joining the Klang-Kuala Selangor road opposite Klang town. In a north-westerly direction a road goes through Kepong, to be carried on to Kuang, while another is being traced from Kepong to Damansara. Both the roads to Klang and the branch railway line to Port Swettenham run through rubber estates for a considerable distance.

There is no large amount of land available in this district, possibly 10,000 acres in all; on the Damansara road to Klang, 6th and 8th miles, there is about 1,000 acres, and the Kepong-Damansara trace will open up 4,000 acres, between the 10th and 11th miles; on the Rawang road, about 1,500 acres, and on the Pahang road, from the 8th mile, about 2,000 acres may be found: this is in the main high land.

ULU LANGAT.

Ulu Langat is the last of the inland districts of Selangor, bordering on the Negri Sembilan. Kajang—the principal town—is on the main trunk road and railway, with a Land Office under charge of the District Officer, with whom is an Assistant District Officer, and a District Survey Office. The railway from Kuala Lumpur passes through Sungei Besi and Serdang to Kajang, thence south towards Seremban; the main road from Kuala Lumpur passes through the mining village of Cheras; after Kajang, the road takes a more easterly route than the railway, passing through Semenyih and crossing the State boundary at Beranang. In addition to this road there is the road from Kajang through Ayer Itam to Kuala Lumpur already mentioned, and another to the mining village of Rekok. There is considerable activity in planting in this district.

Available land, some 2,000 acres, is to be found between the 25th and 26th miles, on the main road between Semenyih

and Beranang; this has natural drainage, and is about 6 or 7 miles from Batang Benar—a station on the railway, some miles south of Kajang.

In the south-west end of the district, between the Kuala Langat district and the State boundary, there is a considerable tract of land; but it is unexplored at present. The land lying along the Bukit Salak-Bangi road on both sides is undulating and well drained, but towards the Langat river probably swampy. On the Ayer Hitam road most of the north frontage has been taken up, but behind these alienated blocks the land is said to be much the same as that in the Klang district. It is possible that a road may be put through this tract from the Ayer Hitam road to Tanjong Duablas in the Kuala Langat district.

KUALA SELANGOR.

This district is bounded on the north by the Bernam river; east, Ulu Selangor; south, Klang; and west by the Straits of Malacca. The head-quarters are at Kuala Selangor, at the mouth of the river of that name. There is a Land Office managed by the District Officer and a District Survey Office. It is some 28 miles from Klang by road. There is a motor service to and from Klang, twice daily; and the Government launch from Port Swettenham calls once a week.

The Klang-Kuala Selangor road, which runs along the coast, is the principal road. The road from Rawang (47 miles) meets the Klang road 1 mile from Kuala Selangor town. At the 24th mile on the coast road is the Bukit Rotan road, which, with its extensions, going nearly due east joins the coast road with the eastern district boundary; there are also a short road parallel to the Rawang road, between the 25th and 26th miles, and the Bukit Panjang road near the 18th mile. A new road is proposed from Batang Berjuntai, near the 36th mile on the Rawang road, south, to meet the Klang road at about the 8th mile. North of the Selangor river, little is known of the country towards the Bernam: it is said to be swampy, but nothing in way of road or drain construction is likely to be done there at present.

Of any land now available in this district, it may be premised that it will require considerable outlay on drainage as it is almost all low-lying. Between the Rawang road and the Selangor river there is 1,500 acres available, a tap drain is being run through this block at the 46th mile.

Behind the blocks which front on the south side of the same road there is about 18,000 acres on the proposed extension of the Bukit Rotan road. Between this road, the protective belt reserve and the eastern boundary there is another tract of some 15,000 acres, omitting the part next to the Jeram river, which is subject to floods. South of the protected belt there are some 10,000 acres available for selection. The last-mentioned two acres will be served by the proposed Batang Berjuntai road: at present access to the eastern portions would be a matter of some difficulty.

KLANG.

So far as rubber is concerned there is very little available land that is worth considering. Near the Bukit Rajah Estate, a few hundred acres of hilly land might be found, and careful selection might reveal 2,000 acres along the Klang river; but the latter would require much drainage: neither locality has easy access though it is not far from road or railway. At Klang there is a Land Office, of which the District Officer is in charge, and a District Survey Office.

KUALA LANGAT.

Jugra—the head-quarters of the district and the seat of residence of the Sultan—is 19 miles by road from Klang, the Langat river having to be crossed by a ferry which will carry a good-sized motor car; the Government launch runs once a week between Port Swettenham and Jugra.

At Telok Panglima Garang, a branch of the road turns to the east to Tanjong Duablas—a point on the Langat river—whence traces have been made for roads to Bangi, on the railway line, and Ayer Itam in the Ulu Langat district. To the south the Batu Coast road, Morib to Sepang, may be extended. At Morib, on the sea coast, some miles south of Jugra, is a Government Sanatorium: it can be reached by launch from Port Swettenham. Apart from Jugra, the only village of any importance is Sepang, on the river, which forms part of the boundary between Kuala Langat and the Coast district of the Negri Sembilan.

In the Labu division, some 10,000 acres of undulating land, towards the Negri Sembilan boundary, might be obtained: this would be difficult to access. In Batu, a coast division, south of Morib, there would be about 25,000 acres, with access from the coast road at Sepang; the country is as yet unexplored, and it is difficult to say what area would be available—it is estimated at 30,000 acres—this part of the

district is at present only served by bridal paths. At Tanjung Duablas there might be found between 20,000 and 30,000 acres, with frontage on one or other of the proposed roads to Ayer Itam and Bangi. All the land mentioned in this district is low-lying and would require drainage, except possibly that towards Labu.

NEGRI SEMBILAN.

This, the most southerly of the west coast States, is a confederation of nine small States. It is bounded north and north-west by Selangor and Pahang; on the east by the independent State of Johore; and on the south by the Settlement of Malacca; in the south-west the coast district from the Sepang to the Linggi has a frontage on the Straits of Malacca of some 30 miles.

The capital of the State is Seremban, about 46 miles by rail from Kuala Lumpur, and a little more by road. The railway has road after leaving Kajang cross the State boundary, the former between Bangi and Batang Benar Railway Stations, the latter more to be east at Beranang. The railway keeps west of Bukit Gali through Labu, while the road runs through Mantin and the Setul Pass, joining the railway at Seremban. A line owned by a private company and shortly to be taken over by Government, 24 miles in length, joins Seremban with Port Dickson—the chief port of the State.

Seremban is the seat of the Resident of the State, and most of the principal officers, including the State Superintendent of Revenue Surveys and the Collector of Land Revenue for the Seremban district.

The area of the State is 1,664,00 square acres; 257,520 acres have been alienated on permanent title, of which 225,979 acres are for agriculture. From Seremban the main trunk road goes through Rembau and Tampin, 25 miles, to the Malacca boundary; other roads connect Seremban with Jelebu, 25 miles; with Kuala Pilah, 25 miles; and with Port Dickson, via Linggi, 48 miles; a second road at Port Dickson, in course of construction, goes by way of Membau and Lukut—the distance is 25 miles. The State is divided into five administrative districts: (a) Seremban; (b) the Coast; (c) Jelebu; (d) Kuala Pilah; (e) Tampin.

In each district, except Seremban, there is a District Officer in charge; but for the present there are no District

Surveyors in separate charge of the survey work of each district, all such work being concentrated in the Seremban and Coast districts. It is expected that the surveys will very shortly be sufficiently advanced to admit of District Offices being opened at Kuala Pilah and Tampin. Port Dickson, in the Coast district, is the port of the State: steamers call almost every day from Singapore, and on Tuesdays, Fridays and Sundays from Port Swettenham for Malacca and Singapore.

SEREMBAN.

Seremban is bounded on the west by Selangor; north by Jelevu; south by the Coast district; and east by Kuala Pilah and Tampin. The land work of this district is in the hands of the Collector and Assistant Collector of Land Revenue, who are, respectively, Registrar and Deputy Registrar of Titles for the whole State; the head office of the Revenue Survey Department is at Seremban.

North of Seremban, lying on either side of the Seremban-Broga road, there are 6,000 acres of undulating or hilly land: this is probably the only part where any road frontage could be obtained.

In the Setul-Labu divisions, served by the main trunk road and railway, lying at some little distance from either, 13,000 acres of similar land could be selected. Eastward, near Seremban-Kuala Pilah road, the land is of a somewhat hilly character, but 3,000 acres of good land could be found, and further areas to the south, not far from the Seremban-Port Dickson railway, will be brought within reach by the new Membau-Lukut road.

In this district some 12,000 acres are being planted up with rubber, and applications for 10,000 acres more are in course of survey.

JELEBU.

This, a small district, is bounded on the south and west by the Seremban district; north by Pahang; west by Ulu Langat district of Selangor; and south and east by the Kuala Pilah district. Kuala Klawang—the head-quarters, where the District Officer is stationed—is about 25 miles from Seremban, the road crossing the hill range at Bukit Tangga at a height of about 300 ft. A short road runs northwards to Titi and the Kenaboi mine, and the Seremban road is continued in an easterly direction through Peratang till it joins the new road from Kuala Pilah to Bentong

in Pahang: of the latter road, the length from the 42nd to the 64th mile lies in this district, the direction of the road being nearly due north and south.

It is in this direction, east of the town of Kuala Klawang, that most of the available land, some 50,000 acres, will be found, either fronting on or within easy reach of either the Pertang or the Pahang roads. A good proportion of this land will be found to lie to the east of the Pahang road, but the long distance from the railway—Seremban, some 40 or 50 miles distant, being the nearest point on the open line—will continue to handicap this locality unless the line under construction from Gemas on the Negri Sembilan-Johore boundary to Kuala Semantan on the Pahang river, which follows a route somewhat to the east of the Pahang road, should make railway communication a good deal more accessible. Being well inland, this part of the country would require very little drainage except near the banks of the Triang. This river, which raises in the Seremban range, passes through Kuala Klawang in a north-easterly direction, receiving the Jerang river near the point where the Pahang road crosses the boundary, and ultimately falls into the Pahang river, south of Kuala Semantan; it is said to be navigable for native boats of considerable size as far up as its junction with the Jerang.

Between the foot of the hills on the Seremban boundary and Kuala Klawang, some 4,000 acres could be found on either side of the Seremban road; this land is somewhat hilly, and on one side is separated from the road by a continuous strip of swampy padi land. West of Kuala Klawang, in the Ulu Triang division, 5,000 acres, fairly flat, are to be had on the banks of the Triang river; on the other side, between the Pertang road and the hills towards Kuala Pilah, there are again 5,000 acres of undulating country with access at several points on the Pertang road.

COAST.

This district lies between Seremban and Tampin on the east and south; Kuala Langat on the north; and the Straits of Malacca on the west; the Linggi river—the southern boundary of the district—is the northern boundary of the Colonial Settlement of Malacca.

Port Dickson is the only town of any size, and is the head-quarters of the district: here are stationed the District Officer and a District Surveyor.

A road runs from Port Dickson south along the coast, turning northwards near the Linggi river and returning to Seremban, a distance of 48 miles; another road is now being constructed from Membau—a station on the Sungei Ujong railway—through Lukut, which will bring Port Dickson within 25 miles of the State capital. Land can be found in the following places:

(i) At the 5th-7th miles on the railway there is 1,000 acres under heavy forest;

(ii) Fronting on the Sepang river—the boundary with the Kuala Langat district—are 3,000-4,000 acres, said to be very fertile. There is no road, and the land would require considerable drainage;

(iii) In the same division, near the head of the valley, some 2,000-4,000 acres, heavy forest, high land and somewhat hilly: the nearest Government road is 6 miles distant; a road passing up the valley between Lukut and Labu is contemplated;

(iv) Four thousand acres on the Membau road, between the 12th and 15th miles from Port Dickson, and near the railway;

(v) On the Coast road, 1,000 acres, a mile inland from the 4th mile; 5,000 acres with frontage, between the 7th and 8th miles; and 5,000 acres at the 15th mile. The greater part of this land is hilly or undulating with some 400 or 500 acres of swamp;

(vi) About 3,000 acres between the 21st and 23rd miles with frontage on the Seremban-Linggi road, undulating with a few hills; and 3,000 acres of forest near Suak Bentong Tapioca Estate. Some 5 miles from the Government road, a private cart-road to Linggi runs within a mile of block: in this division, Linggi, are several flourishing tapioca estates, and two blocks of lalang land, 2,000 acres each, have been taken up. On the Sungei Ujong Railway, a mile or two from Port Dickson, the land on either side of the line now planted with rubber has been recently reclaimed from lalang.

TAMPIN.

Lying between the Coast district and Kuala Pilah, with Seremban on the west and Johore on the east, is the district of Tampin, with which is included Rembau. The railway traverses the whole length of the district to Tampin, the head-quarters: here one branch turns away to Malacca, the

main line continuing through Ayer Kuning and Gemas into the territory of Johore. From Gemas Station, a line has been surveyed and is under construction, which will pass some miles east of Kuala Pilah, with a terminus as at present projected at Kuala Semantan on the Pahang river.

The main trunk road from Seremban to Tampin passes through Kampong Batu at the 20th mile—the centre of the Rembau division—while another road over the Senaling Pass connects Tampin with Kuala Pilah, 25 miles; the Colony's road from Tampin Station joins that town with Malacca.

Practically the only jungle land now available for planting on a large scale lies in the Ayer Kuning and Gemenchih mukims towards the Johore boundary; roughly speaking, there would be about 60,000 acres to select from. A road from Batang Malaka Station goes 6 miles into Gemenchih, mostly through lalang land, almost as far the forest; in Ayer Kuning there are the Ayer Kuning and Gemas Railway Stations, but there are no roads at present on this side of the district; the land is mostly undulating and little drainage would be required. A very considerable portion of the district is taken up with large areas of lalang waste land, the scene of abandoned tapioca cultivation.

KUALA PILAH.

This is by far the largest district in the State, occupying approximately one half of the area.

The principal town and head-quarters of the district is Kuala Pilah, 25 miles by road, east of Seremban. Other villages include the mining village of Parit Tinggi, 5 miles from Pilah; and the agricultural settlement of Johol, about 10 miles from Kuala Pilah, on the Tampin road. A new road has just been completed, running northward to meet the road from Bentong at the boundary between Pahang and Jelebu. This road, together with the railway which will follow a line through the district a little to the east of the Pahang road, should open up the very promising land which lies on the east side of the district towards the Johore and Pahang boundaries. There are about 100 miles of road, and the same mileage of good bridle-paths in the district.

Along all the main roads are large areas with frontage suitable for any kind of cultivation, the land being bluker (secondary jungle), lalang and jungle.

Special attention should be given to the land on the Jelai road, which branches off the Pilah-Tampin road near the 38th mile: this land is about 3 or 4 miles from the new railway; the nearest station would probably be Rompin.

The area available between the Pahang road and the eastern boundary cannot easily be estimated, as the country is more or less unexplored; but roughly it may be put down at 250,000 acres.

This land lies mainly in the Serting valley; it is flat land and would require some draining; it is intersected by the new railway line; the nearest station sites being at Ayer Hitam and Bahau, the latter of which is already connected with the Pahang road by a metalled road, 6 miles in length.

Apart from padi, the principal native cultivation is coconuts: but little attention has yet been given to this district by rubber planters, and this will continue to be the case until the railway makes the land as conveniently accessible as that in other parts of the State.

PAHANG.

This State lies on the east side of the main range of mountains, and is bounded north by Kelantan and Tringganu; east by the China Sea; west and south by the Western States of the Federation and Johore.

The area of the State is estimated at 14,000 square miles, or 8,960,000 square acres: hardly one per cent. of this area is at present occupied. Communication from the western States is maintained by a metalled road from Kuala Kubu on the Federated Malay States Railway line to Raub, a distance of 42 miles; this road crosses the main range at Gunong Semangko at a height of about 3,000 ft. A motor car service connected with the railway is maintained once each way daily carrying mails and 1st class passengers; a motor bus for goods and 3rd class passengers runs three times a week. The journey from Kuala Kubu to Raub can also be made by gharry, the cost being \$12 for the trip; while heavy goods are generally forwarded by bullock cart at a cost of 20 cents per mile.

Communication with the east coast is by steamer from Singapore; in the south-west monsoon a steamer of sorts runs almost every day to Kuantan, stopping for a brief space off Kuala Pahang—the port of Pekan; but in the north-east monsoon communication is less frequent, and it

is often impossible to land at Kuala Pahang on account of the heavy seas.

From Raub the main road continues on to Kuala Lipis—the capital of the State—at the junction of the Lipis and Jelei rivers: here are stationed the British Resident, the District Officer of the Kuala Lipis district, and the State Superintendent of Revenue Surveys. At Benta, 19 miles on the main road from Kuala Lipis, a new road is in course of construction across the State to Kuantan.

For administrative purposes the State is divided into five districts: Raub, Kuala Lipis and Temerloh on the western side, with Pekan and Kuantan on the east coast.

RAUB.

Though not the largest, this is the most important of the five districts, and is the centre of the gold and tin mining industries. It is administered by a District Officer stationed at Raub, on the main road, where also is the principal Land Office, and an Assistant District Officer at Bentong: the latter is a mining town of some importance, some 30 miles from Raub, with which it is connected by a good metalled road; a daily motor service is maintained by the railway administration between these places. South of Bentong the road turns westwards to Kuala Lumpur over the Ginting Bidai pass; this road is nearing completion and will bring Bentong 40 miles nearer to Kuala Lumpur than at present. South from Bentong the road is being extended to meet the road from Kuala Pilah at the Jelebu-Pahang boundary. Both these roads open up almost unlimited tracts of virgin jungle, containing every variety of land. In the valley of the river Klau, 8 miles from Bentong, 50,000 acres could be easily obtained. Communication with Bentong would be by river, and the land is somewhat low-lying.

On the road from Raub to Batu Talam (6 miles metalled, 10 miles unmetalled) a further area of 50,000 acres could be obtained; and in the Gali division, near the Raub-Kuala Lipis road, at least 30,000 acres are available.

KUALA LIPIS.

This is the largest of the districts, covering nearly the whole of the northern boundary, with an area not much less than that of the State of Selangor. The only roads in the district are the main road from Raub and that from Benta to Kuantan.

The only other means of communication are the rivers. Very little is known of the country in this district, and the serious difficulties of access are likely for some time to deter investors so long as more accessible land near the lines of communication from Bentong and Raub is available.

TEMERLOH.

This district lies south of Kuala Lipis in the centre of the State, traversed by the Pahang, Triang and Semantan rivers, which form practically the only present means of communication with the outer world. The District Officer lives in solitary dignity at Temerloh—a small village at the junction of the Semantan river with the Pahang—and the present proposed site of the terminus of the railway from Kuala Gemas.

The district is entirely roadless at present. The natives grow coconut and fruit trees with considerable success, and it is anticipated that the completion of the railway will open up a considerable area of valuable land, which will be suitable for rubber or coconuts.

KUANTAN.

This district, together with Pekan on the south, occupies the whole coast line of the State. The only town is Kuantan at the mouth of the river of the same name, where the District Officer is stationed. The surveys are in the charge of a District Surveyor whose head-quarters are at Kuantan. There are very few roads in the district: one is in course of construction from Kuantan to Blat, and this will be extended to meet the road from Benta; another cart-road partly metalled goes from Kuala Kuantan in the direction of Besserah.

About 5 miles from Kuantan there is an area of some 3,000 acres, undulating, above flood level, with an unmetalled cart-road within one mile: the soil is said to be suitable for any kind of planting.

On the right bank of the Kuantan, above the Riau, there are at least 10,000 acres easily reached by river. This land is partly swampy with higher ground further from the river. Light draught steamers can get as far up as the inlet of the Riau.

In the direction of Besserah, 7 miles from Kuantan and 3 miles from the sea, there are 5,000 or 6,000 acres to be obtained; a cart-road runs to within a mile, and a

metalled road with probably shortly join Besserah, 2½ miles distant, with Kuantan. This land is said to be of first class quality, high and well drained.

Along the line of the Blat-Kuantan road there are at least 10,000 acres available, but the land is swampy and would require considerable drainage. The possibility of the vast areas of virgin jungle in this and other districts in Pahang is only limited by the difficulties of access and communication.

Communication by sea with Singapore is maintained by an almost daily service of steamers in the south-west monsoon; in the north-east monsoon—say, from October to March—communication is much less regular, and is frequently interrupted.

PEKAN.

The head-quarters of the district—which is also the seat of the residence of His Highness the Sultan—is Pekan, a few miles from the mouth of the Pahang river. The bar has silted up so much in recent years that steamers have to lie off a considerable distance from the shore; passengers and goods are conveyed ashore in surf boats, a proceeding fraught with both difficulty and danger in the north-east monsoon. The District Officer and an Assistant are stationed at Pekan.

Communication at present is entirely by water and jungle path, the district being practically roadless except where the line of the Benta-Kuantan road crosses the northern part. Little is known of the country away from the rivers, and it will be a considerable time yet before the district can offer any attractions to the planter.

CONCLUSION.

It may be said in brief that there are hundreds of thousands of acres in the Malay States yet available for agriculture. In the foregoing paragraphs only a small percentage, which is fairly easy of access, and may reasonably be expected to return good results, has been dealt with. What great possibilities lie buried in the immense tracts of virgin forest which still occupy a great portion of the Peninsula only time and the advance of the Federation will reveal; but it is a fact not entirely devoid of significance that wherever the Government has pushed forwards its

roads, there always, a little in advance of the furthest limit of construction, the ubiquitous and necessary Chinaman discloses himself.

The progress of the Federated Malay States, particularly during the past few years, has been extremely rapid, and there is no immediate reason for anticipating that the rate of progress will be appreciably diminished in the near future. Finally, the climate of the Peninsula, not being subject to the vicissitudes which obtain in other tropical countries, gives to the States great advantages for rapid vegetative growth; though the soil is not specially rich, the equable high temperature and regular and constant succession of rain and sunshine enable trees such as rubber to grow more vigorously and rapidly than is the case in other tropical countries which are subject to comparatively long periods of drought and heavy rain.

APPENDIX A.

PARA RUBBER CULTIVATION F. M. S.

ESTIMATE FOR 1,000 ACRE ESTATE; 250 ACRES TO BE OPENED EACH YEAR.

1ST YEAR.

	\$
Premium	3,000
Survey fees	1,000
Rent	1,000
Clearing, felling and burning 250 acres (\$15 per acre)	3,750
Lining, holing and planting 250 acres (\$6 per acre)	1,500
Plants	800
Road and drains (\$6 per acre)	1,500
Bungalow	2,000
Lines	1,500
Medical—Hospital, medicines, etc. ..	2,000
Labour—Advances, immigration fees, etc.	1,500
Superintendence	3,600
Tools and sundries	1,000
Total ..	24,150

2ND YEAR.

Rent	1,000
Clearing, felling and burning 250 acres	3,750
Lining, holing and planting 250 acres ..	1,500
Plants	800
Roads and drains	1,500
Medical	1,000
Labour	1,000
Superintendence	4,000
Tools and sundries	750
Weeding 250 acres	2,500
Supplying	100
Total ..	<u>17,900</u>

3RD YEAR.

Rent	1,000
Clearing, felling and burning 250 acres	3,750
Lining, holing and planting 250 acres ..	1,500
Plants	800
Lines	1,500
Roads and drains	1,500
Medical	1,000
Labour	1,000
Superintendence	4,000
Tools and sundries	1,000
Weeding 500 acres	6,000
Supplying	100
Total ..	<u>23,150</u>

4TH YEAR.

Rent	1,000
Clearing, felling and burning 250 acres	3,750
Lining, holing and planting 250 acres ..	1,500
Plants	800
Roads and drains	1,500
Medical	1,000
Labour	1,000

4TH YEAR.

Superintendence	4,000
Tools and sundries	1,000
Weeding 750 acres	12,000
Supplying	100
Total ..	<u>27,650</u>

5TH YEAR.

Rent	1,000
Roads and drains	800
Medical	1,000
Labour	1,000
Superintendence	4,000
Tools and sundries	1,000
Weeding 1,000 acres	15,000
Total ..	<u>23,800</u>

6TH YEAR.

Rent	1,000
Roads and drains	800
Labour	1,000
Medical	1,000
Superintendence	4,000
Tools and sundries	1,000
Weeding 1,000 acres	17,000
Total ..	<u>25,800</u>

7TH YEAR.

Rent	4,000
Roads and drains	800
Medical	1,000
Labour	1,000
Superintendence	4,000
Tools and sundries	1,000
Weeding 1,000 acres	17,000
Total ..	<u>28,800</u>

8th and following years as 7th Year .. 28,800

With the exception that the cost of weeding gradually decreases till in the 11th or 12th year it is practically nil.

PROFITS.

7TH YEAR.

	\$
250 acres, planted 150 trees per acre, at 1 lb. rubber per tree, sold at 3s. per lb. . .	48,214
250 acres, planted 150 trees per acre, at 1½ lbs. rubber per tree	72,321
Total . .	<u>120,535</u>
Less cost of production, shipping, etc., of 93,750 lbs. at 1s. 6d. per lb.	60,268
Net profit . .	<u>60,267</u>

8TH YEAR.

250 acres at 1 lb. per tree and 3s. per lb.	48,214
250 acres at 1½ lbs. per tree and 3s. per lb.	72,321
250 acres at 2 lbs. per tree and 3s. per lb.	96,428
Total . .	<u>216,963</u>
Less cost of production, etc., 253,125 lbs. at 1s. 6d. per lb.	108,482
Net profit . .	<u>108,481</u>

9TH YEAR.

250 acres at 1 lb. per tree and 3s. per lb.	48,214
250 acres at 1½ lbs. per tree and 3s. per lb.	72,321
500 acres at 2 lbs. per tree and 3s. per lb.	192,856
Total . .	<u>313,391</u>
Cost of production, etc., 243,750 lbs. at 1s. 6d. per lb.	156,696
Net profit . .	<u>156,695</u>

10TH YEAR.

250 acres at 1½ lbs. per tree and 3s. per lb.	72,321
750 acres at 2 lbs. per tree and 3s. per lb.	289,280
Total . .	<u>361,601</u>

Less cost of production, etc., 262,500 lbs. at 1s. 6d. per lb.	180,800
Net profit	<u>180,801</u>

11TH YEAR.

1,000 acres at 2 lbs. per tree and 3s. per lb.	385,710
Cost of production, etc., of 300,000 lbs. at 1s. 6d. per lb.	<u>192,857</u>
Net profit	<u>192,853</u>

And so on each year, annual profit \$192,853, with a probability of still increased yield.

ABSTRACT OF PROFIT AND LOSS.

	Expenditure.	Profit on rubber.	Net profit on estate.
	\$	\$	\$
1st Year	24,150		
2nd „	17,900		
3rd „	23,150		
4th „	27,650		
5th „	23,800		
6th „	25,800		
7th „	28,800	60,267	31,467
8th „	28,800	108,481	79,681
9th „	28,800	156,695	127,895
10th „	28,800	180,801	152,000
11th „	28,800	192,853	164,053
12th „	28,800	192,853	164,053

Expenditure with interest at 5 per cent. up to end of 6th Year . . . \$168,670 (£20,000)

Net profit on estate after deducting 5 per cent. interest on capital:

		\$	
Expended	{	7th Year	22,967 or 13 per cent.
		8th „	71,181 or 42 „
		9th „	119,395 or 70 „
		10th „	143,500 or 84 „
		11th „	156,553 or 92 „

And so in future years with a probability of increased yields.

	\$	£	s.	d.
Capital expended ..	168,670	(19,678	3	4)
	{ 22,967	(2,679	9	8)
	{ 71,181	(8,304	9	0)
Profit	{ 119,395	(13,929	8	4)
	{ 143,500	(16,741	13	4)
	{ 156,355	(18,241	8	4)

APPENDIX B.

COCONUT CULTIVATION, F. M. S.

ESTIMATE FOR OPENING UP AND BRINGING INTO BEARING
500 Acres.

1ST YEAR.

	\$	£	s.	d.
Felling and clearing at \$10 per acre	5,000	(583	6	8)
Draining at \$12 per acre ..	6,000	(700	0	0)
Cost of seed (40,000 seeds at 8 cents each)	3,200	(373	6	8)
Fencing at \$2 per acre ..	1,000	(116	13	4)
Lining and planting at \$2 per acre	1,000	(116	13	4)
Cooly lines	250	(29	3	4)
Tools	250	(29	3	4)
Bungalow	1,200	(140	0	0)
Stationery and postage ..	50	(5	16	8)
Medical	50	(5	16	8)
Premium at \$3 per acre ..	1,500	(175	0	0)
Quit-rent at \$1 per acre ..	500	(58	6	8)
Weeding, 1st six months at \$1 per acre per month ..	3,000	(350	0	0)
Contingencies	500	(58	6	8)
Superintendence	3,000	(350	0	0)
Total ..	26,500	(3,091	13	4)

2ND YEAR.

Quit-rent	500	(58	6	8)
Weeding	6,000	(700	0	0)
Superintendence	3,000	(350	0	0)
Total ..	9,500	(1,108	6	8)

3RD YEAR.

Quit-rent	500	(	58	6	8)
Weeding	4,200	(	490	0	0)
Superintendence	3,000	(	350	0	0)
Supplying	300	(	35	0	0)
Total ..	8,000	(	933	6	8)

4TH YEAR.

Quit-rent.	500	(	58	6	8)
Weeding	3,500	(	408	6	8)
Superintendence	3,000	(	350	0	0)
Total ..	7,000	(	816	13	4)

5th year, \$7,000 (£816 13s. 4d.); 6th year, \$7,000 (£816 13s. 4d.); 7th year, \$7,500 (£875); 8th year, \$7,500 (£875).

ESTIMATED RETURNS.

6th year, 10 nuts per tree; 7th year, 30 nuts per tree; 8th year and afterwards, 50 nuts per tree.

Value of nuts, \$20 (£2 6s. 8d.) per 1,000 nuts; 60 trees to the acre.

PROFIT AND LOSS.

Expenditure.	Value of nuts.			Profit on each year.			
	\$	£	s. d.	\$	£	\$	£
1st year	26,500	(3,091	13 4)				
2nd ..	9,500	(1,108	6 8)				
3rd ..	8,000	(933	6 8)				
4th ..	7,000	(816	13 4)				
5th ..	7,000	(816	13 4)				
6th ..	7,000	(816	13 4)	6,000	(700)		
7th ..	7,500	(875	0 0)	18,000	(2,100)	10,500	(1,225)
8th ..	7,500	(875	0 0)	30,000	(3,500)	22,500	(2,625)
9th ..	7,500	(875	0 0)	30,000	(3,500)	22,500	(2,625)
10th ..	7,500	(875	0 0)	30,000	(3,500)	22,500	(2,625)
						\$	£ s. d.
Total expenditure in ten years ..	95,000	(11,083	6 8)				
Gross value of produce	114,000	(13,300	0 0)				

Percentage of annual profit to capital expended:

7th year	..	..	..	..	..	17.79
8th	..	..	..	..	..	38.12
9th	..	..	..	..	..	38.12
10th	..	..	..	..	..	38.12

APPENDIX C.

SUGAR CANE CULTIVATION, F. M. S.

ESTIMATE FOR OPENING UP AND PLANTING 1,000 ACRES
OF JUNGLE LAND.

	\$	£	s.	d.
Felling, 1,000 acres at \$10 per acre	10,000	(1,166	13	4)
Cutting second growth at \$6 per acre	6,000	(700	0	0)
Burning and clearing at \$6 per acre	6,000	(700	0	0)
Changkolling before plant- ing at \$5 per acre	5,000	(583	6	8)
Draining before planting at \$26 per acre	26,000	(3,033	6	8)
Canals for transport at \$21 per acre	21,000	(2,450	0	0)
Lining and planting at \$2.50 per acre	2,500	(291	13	4)
Housing accommodation on the basis of two labourers for every 3 acres in cul- tivation	4,500	(525	0	0)
Management charges	10,000	(1,166	13	4)
Total ..	91,000	(10,616	13	4)

(This handbook is reprinted here by permission of the author, as so many questions answered by it are constantly enquiring about by correspondents not only at home but also in the peninsula. Ed.)

PLANTING OF TREES.

It has been the custom among planters of fruit trees in England, to plant these trees in a somewhat elaborate way. A large wide hole, not deep was dug and the roots carefully spread out, and arranged near the surface and the soil

filled in with many precautions small quantities of fine soil are worked in between the fine roots, hollow places between the stouter roots filled in, the rest of the soil filled in and trodden down. Experiments made in England by Mr. Pickering show that this process is all wrong. The proper way to plant a tree is to make a small hole double up the roots anyhow and stick the tree in, throw in the soil and ram it down as hard as if one were fixing a gate post. This is really much the way that a cooly here does plant a tree, excepting that he seldom does the ramming hard. The experiments showed 59 per cent of the sets in favour of ramming, 27 per cent showed no difference, and only 14 per cent were against ramming. Examination of the trees showed that ramming led to a copious development of fibrous roots, and direct experiments showed that the fibrous roots produced in the Nursery before lifting played no important part as roots during the life of the tree. The important thing is to induce fresh root formation and ramming induced this more rapidly than the orthodox method. The photograph showed this clearly. The rammed plants show a much more extensive root system than the unrammed one.

The experiment would be worth trying here with rubber trees. It is probable that in many cases the coolies in planting large quantities of plants out would not press the soil firmly enough about the roots. It is an understood thing that the soil should be stamped down on either side of the tree before leaving it, but is this usually done at least hard enough? The bending of the tap-root, so much deprecated by the Editor in a recent paper, need not take place, as it can be straightened easily as described, and curiously the Photographs given (in nature from the 9th report of the Woburn experimental fruit farm by the Duke of Bedford and Mr. S. W. Pickering) show in one case either the tap-root or main-root from the tap-root in an unrammed plant bent worse than in the figures of the rammed plants.

ED.

TRANG PEPPER.

About ten years ago when in Perak* I went on a trip to Trang for the purpose of obtaining cuttings of the Trang variety of pepper for experimental cultivation in the government gardens of Perak at Kwala Kangsar.

*Before the publication of the new series of the Agricultural-Bulletin.

At that time the late Sir Greame Elphinstone and Mr. Donald Mackay of Gapis estate, Perak, had obtained a small handmill—a model of the mills used on the Thames—for milling white pepper. (*As is generally known, black pepper is the fruits or berries of Piper nigrum after having been dried when ripe. White pepper is prepared by macerating the ripe fruits of the same plant in running water for about by washing, and after having been sun-dried and bleached the resulting pepper is known as ordinary white pepper of which the value depends on grade, colour, and aroma.*) The process consists of a rotating stone enclosed in a wire covered circular box, and as the pepper is driven off the stone on to the wire covering and back to the stone, the testa, or so-called parchment, is gradually worn off by friction, which gives the seed a fine polished and good marketable appearance, so much preferred by sausage makers who are the largest consumers of white pepper. In their trials at Gapis estate native pepper proved too brittle, many of the seeds splitting and much going to pieces; and apart from this drawback, native pepper is too large for the purpose referred to. It was known that Trang pepper stood the milling process in London, and always obtained the highest market price, and as native pepper had failed to respond to the same treatment it was agreed to experiment with the Trang variety with a view of testing if such pepper when locally grown could be milled on the spot—hence the trip.

Trang is the most southern of the Siamese States on the West Coast of the Peninsula and about twenty hours steam, in a small boat, from Penang. The Settlement or Kongsis is some distance up the Trang river and the pepper gardens still farther away. Thanks to the assistance of the Siamese Consul in Penang my trip was made as interesting as possible; the Commissioner's nephew (Chinese) took me to the gardens by road as far as possible, and afterwards by elephants, thus being able to cross some wet padi fields and visit the remarkable caves (larger than those in Kedah) and we completed the journey, in part by a rowing boat, and afterwards a conveyance, to a busy little market on the outskirts of the gardens. We return by rowing boat to the main river and thence in the State yacht and so obtained some idea of a fair extent of country. This however proved disappointing from a botanical point of view, as most of the country at the back of the coast line had been cleared, and to reach the hills would have required more time (and pre-arrangement) than was at my disposal. I can only remember obtaining a fine flowering species of *Curcuma*; a

species of *Leea*, of which the fruits coloured well when ripe; and a *Mussaenda* with an exceptionally large white sepal.

Down the river towards the Kwala a thriving business was being done in salting fish, for which it was claimed that the best salt fish from the West Coast comes from Trang. Higher up the river there is a fair trade in pigs and poultry which largely supplies the Penang market. The area of padi land is not extensive but is well stocked with native cattle between the seasons; hardy, rather wild, powerful little beasts, which make excellent draft cattle for which there is a demand.

The pepper gardens were a surprise. These were worked in allotments by Chinese and were in a sound state of cultivation. Most of the coast land—and some distance in land too—the soil consists of a stiff sandy clay with intersecting patches of laterite which at the site of the gardens had become a large deposit of laterite gravel and ferruginous clay and it was remarkable to see healthy pepper vines growing on some patches of little else than laterite gravel. Starting with the nurseries; stock plants were planted in shallow trenches, by this means the adventitious rhizome (what Malays call the chaching i.e., the worm-like underground root-stem) is not buried deeply and the growing point is uncovered and layered towards the edge of the trench where a stake is fixed for its reception—as owing to the wide spacing of the nodes of the rhizome a distance of about two feet is necessary. As soon as this root-stem is well attached to its stake the young plant is removed and is then ready for permanently planting. No other cutting is used in Trang and I do not think that stem cuttings grow so symmetrically, or fruit so freely, as the basal or underground stem.

Trang pepper differs from all other varieties in its shorter or more decided fruiting season. At the time of my visit (April) I did not see a solitary catkin of flowers or fruit. Like Arabian coffee the periodicities are pronounced and the crop must be gathered when ripe, or lost. As however the crop ripens during the dry season—and I was so informed—there is little loss from rain damage. (*Growers of local pepper will be aware that there is frequently a considerable loss as a consequence of heavy rains, by direct damage at the time of pollination; and fungus on the catkins and fruits during exceptionally wet seasons.*) This pepper further differs from other varieties in being the smallest fruited of all—the catkins are about 3 inches

long—but the fruit possesses the fullest and most pungent aroma of all commercial peppers.

Under cultivation the gardens were planted closely to compensate for the smaller crop per acre as compared with the larger fruited varieties (I believe about 7' x 7') and on the older allotments, dadap (*Erythrina umbrosa*) had been planted for shade but as a result of continuous pruning the trees had become gnarled and stunted. Except that this tree grows quickly it is not a good shade tree, as a matter of fact it is much too large and the free development of roots is too exhausting on the soil for the successful growth of the vines. On all the younger allotments dadap had been superseded by munkudu (*Morinda tinctoria*) a much smaller tree and affording better shade at a minimum expansion of root development. Between alternate rows of munkudu a row of posts had been run, and in the rows—whether trees or posts—an additional posts or posts had been added wherever a good offshoot could be obtained, so that while the shade was efficient the allotment was cropped as closely as feasible. The munkudu trees were topped above the second whorl of branches and as a consequence the branches spread in a moderate horizontal direction. (*Munkudu is the most ideal shade tree I have yet seen for pepper.*)

At the time of my visit the shade trees were being pruned; where necessary the spreading branches were shortened and all superfluous growths—what a coffee planter would call gourmandizers—removed. This was the season of ploughing and padi-planting, or as will be inferred, the commencement of the rainy season, and as the catkins, or flowers, are borne in the axils of new growths the vines would not be overshadowed during the growing season.

Throughout the allotments there was a system of tanks for the reception of manure which was applied in the form of liquid, and over the whole undertaking the vines bore evidence of being well manured, and carefully tended, and the gardens were clean of weeds.

I was not able to obtain figures showing the yield per acre, but from some Trang pepper I have since seen I should estimate the average crop as less than that of native pepper.

I brought back (I believe) 500 cuttings, of these a part were sent to Gapis estate, and the balance planted at Kwala Kangsar garden, from where it may be possible to obtain later information.

R. DELRY.

VARIATION IN THE FLOWER OF THE BLACK PEPPER.

The flowers of the black pepper (*Piper nigrum*) are of very simple structure. They consist normally of a subglobose pistil enclosed in a short fleshy bract. On either side of the pistil are one or two simple stamens. The pistil is crowned by a stigma of from 3 to 5 recurved lobes, occasionally only two and sometimes as many as seven. In examining some spikes of the plant in flower I find it is not very rare to see two pistils in some of the bracts, owing to pressure the pistils are unequal and flattened on the appressed side, I have seen none of these double flowered bracts producing fruit and suspect they always abort. In the case of this modification, I find the stamens either reduced to a single one or quite absent. There are forms of the pepper in which the stamens are normally absent from the female flower but in the pepper under observation the stamens occur regularly.

ED.

DYERA COSTULATÆ (Gutta jelutong).

This tree and rubber has been referred to in the Agricultural Bulletin P. 95, vol. II (1903) and P. 48 and 91 vol. III (1904) and more recently in the report on the International Rubber Exhibition February number of the current volume. In the latter notice it was mentioned that "its cultivation would not attract private enterprise" although the rubber and existing trees were worthy of attention.

As may be seen from the account given by the Scientific Department of the Imperial Institute (P. 48, vol. III,) the coagulants used are gypsum and kerosine-oil, (although not mentioned alum is used also) and as may be expected from such crude treatment the resulting rubber is of very low grade.

The enormous and growing demand for this rubber will—it may safely be predicted—introduce other methods of coagulation, and a system of tapping without destroying the trees for which there is no reason whatever. At the present time the two large sources of supply are Borneo and Sumatra, but scattered over the forests of the Malay Peninsula and Colony there must be many thousands of trees fit for exploiting. It may be of interest to record the

periodicities of this tree in the Peninsula *. The leaf-fall is usually complete, the tree entirely defoliating itself in a remarkable short space of time and is immediately followed by young leaves and flowers (about the end of March). The fruits ripen during the following February. The flat membranous seeds take from 35 to 40 days to germinate under cultivation.

Gutta Pulai (*Alstonia scholaris*) conforms to the same seasons but is slightly earlier.

R. DERRY.

A NEW TAPPING KNIFE.

Mr. Leslie Radclyffe in conjunction with Mr. Holman Hunt has brought out a new rubber tapping knife, the "Quicksure." It seems from the advertisement to be somewhat on the lines of the ordinary tapping knife, farrier's knife modified, but instead of having only one cutting edge, it has a double one on each side making four cutting edges. The price is 5 shillings apiece or 52 shillings a dozen. They can be procured at L. Radclyffe & Co., 35 Queen Victoria Street, London or C. Holman Hunt c/o Chartered Bank Kwala Lumpur.

ED.

CARBON BISULPHIDE.

Apropos of his article on *Brachytrupes* in a recent number of the Bulletin Mr. Pratt writes that it may be useful to planters to know that Carbon Bisulphide can be procured at the George-town Dispensary at Ipoh.

ED.

PACKING PARA RUBBER SEEDS FOR EXPORT.

In the *Agricultural Bulletin* for November 1908 (Vol. VII. No. 11), in which the method of packing Para Rubber seeds for export is full described, mention will be found of a consignment of 52,000 seeds which was sent to the Botanic Gardens British Guiana from the Botanic Gardens Singapore and on the seeds being sown they gave a germination of approximately 80 p.c. this after a journey of over 53 days duration.

*A general description of the trees is given by Mr. Ridley, p. 95, vol. II.

Since then a further lot of 50,600 seeds of *Hevea brasiliensis* were despatched to British Guiana packed as described in the November number of the Bulletin and we have to report the much more satisfactory germination of 86.3 p. c. The following communication on the subject has been received from the Hon'ble The Colonial Secretary Straits Settlements by The Director of Gardens Straits Settlements.

Government Secretary's Office,
George town, Demerara,
British Guiana.
25th January, 1909.

No. 412

SIR,—With reference to your letter C. Agents 3752/1908 of the 23rd September last, I am directed by the Governor to enclose, for the information of the Director of Gardens, Singapore an extract from a letter from the Director of Science and Agriculture showing the results of the cultivation of the *Hevea brasiliensis* seeds obtained from your Government.

Extract from a letter from the Director of Science and Agriculture, to The Government Secretary, dated 19th January, 1909.

I have the honour to state that 50,600 seeds of *Hevea brasiliensis* have been received from Singapore, of these 43,690 equivalent to of 86.3 p. c. germinated and 41,483 plants or a rate of 81.9 per cent have been raised from them.

I believe that the proportion of seeds which germinated is a record for large packages of seeds of the Para Rubber which have been several weeks in transit.

I have the honour to be,

Sir,

Your most obedient servant,

Sd. CHARLES T. COX.

The Quarterly Journal of The Board of Agriculture of British Guiana Vol. 11 No. 3 January 1909 publishes the following extracts from the West Indian Bulletin Vol. IX No. 3 1908.

“Professor Harrison (British Guiana) said that they”
 “had given up the importation of rubber seeds from”
 “Ceylon and they now got them direct from Singapore.”
 “Within the last few months he had imported 62,000 seeds”
 “and had got nearly 82% germinating. These seeds cost”
 “on arrival about 1,2c. each. They were packed in dry”
 “charcoal in seed boxes and were sent by parcel post to”
 “ensure quickest delivery. The plants when ready for”
 “delivery had cost altogether 2.58c. each. The last con-”
 “signment of *Hevea brasiliensis* seeds from Singapore”
 “had already given a proportion of very nearly 86%”
 “germinating in a total of about 50,000 seeds.”

These figures speak for themselves and go to show that proper packing and careful planting at the end of the journey is all that is necessary to ensure the entirely satisfactory export of Para Rubber seeds to other Tropical Colonies.

T. WILSON MAIN.

CORRESPONDENCE.

Sungei Gadut.

The Editor,

Agricultural Bulletin,

Singapore.

DEAR SIR,

I have read with interest Mr. Zernichow's article on *Tephrosia purpurea*. Permit me to ask one question, and that is, has any one planted *Tephrosia* over say 200 or 300 acres and left it growing for 5 years, lopping it twice a year. If so, may I ask what the cost has been to cut it out and cart away. My experience is that all such plants including *Crotalaria* do very nicely for a year or two but in the long run, over large areas, cause endless trouble and expense. Planted closely in rows on hill sides, instead of contour drains, might be more advisable, as the saving in surface soil should more than compensate for cost of eventual removal. Two rows between the lines of Rubber Trees are sufficient. I have found *Crotalaria* planted in this manner quite satisfactory, weeding expenses being only slightly increased. So far as flats are concerned I believe in absolute clean weeding.

Yours faithfully,

X.

(I hardly think it likely that any one in this country has had as long an experience of the cultivation of *Tephrosia* as a green-soiling plant, as it has only been used here I believe for a year or so, but it has been utilised largely in Java I believe and perhaps some of our readers there might be able to give some account of its behaviour.

But why does X want to cut it down and cart it away? It is more advantageous to the rubber to leave it as it is, occasionally cutting it over and mulching the rubber trees with it. Carting it off the ground would be a blunder as it means the removal of a large quantity of foodstuff in the foliage and boughs which nutriment is intended for the rubber trees.

In all probability X would find in a few years the *Tephrosia* would be quite shaded out by the rubber trees, but if it still holds on so much the better for the rubber. I should doubt that *Crotalaria* or *Tephrosia* could get their work in supplying nitrates to the soil fully done in less than three or four years.

X speaks of his experience of *Crotalaria* as quite satisfactory. Does this imply that he has had his soil analysed before planting the *Crotalaria*, and after? and if so one would very much like a report as to the results.

Ed.

Teluk Anson,

20th April, 1909.

The Editor of "Agricultural Bulletin,"

Singapore.

DEAR SIR,

On reading my article on *Tephrosia* in the April issue of your paper, I find that same contains several errors. To have them all corrected is hardly necessary, only it is desirable to point out one.

At the bottom of page 133 stands:

TEPHROSIA.

Cost of establishing <i>Tephrosia</i>	\$ 4 00
Weeding expenses for 5 years per acre	\$100 00
This should be:	

CLEAN WEEDING.

Weeding expenses for 5 years per acre	\$100 00
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Yours faithfully,

F. ZERNICHOW.

JOHN HADDON & CO. SPECIAL PRODUCE LETTER.

London, March 12th, 1909.

STRAITS REPORT.

- BEESWAX** A good demand exists for all yellow descriptions which are commanding full prices.
- CAPSICUMS** Market firm, fine bright Natal's value 55/- per cwt. This week a parcel mixed with yellow's and rather perished was bought in at 50/-, also 5 Cases of Java consisting of very thin bright shrivelled beans on stalk at 20/- per cwt. Planters should not send the beans on stalk.
- CHILLIES** In good request, fine bright Japans selling at 37/6 c.i.f. and Mombassa's and Zanzibars spot at 42/6 per cwt.
- COPRA** A large business has been done, prices after declining about 20/- per ton now show a partial recovery with a firm market, parcels afloat and early shipment still offer at a discount but May/June find ready buyers.
- GUM BENJAMIN** The trade has remained very dull prices consequently have favoured buyers. To-days' value-Sumatra, marbled, good to fine second £7 to £8, common to fair £3.5.0 to £6.5.0. per cwt, pale and Bang, common to fair part almondy 30/- to 34/-, Siam, bold to fine bold almonds £8 to £7 per cwt.
- GUM COPAL** The trade demand has been quite of a retail character. To-day's values:—Manila & Macassar, fair dark brown to fine pale scraped 50/- to 70/-, mid to fair half hard 32/6 to 47/6, Nuts ordinary to hard 18/6 to 35/-, Chips 18/- to 35/-, Soft blocky sorts 19/- to 24/-. Pontianac dark to pale scraped hard 55/- to 65/-, Unsorted to half scraped 35/- to 45/-, Nuts, small to bold 26/- to 40/-, Chips 23/- to 29/.
- GUM DAMAR** Market steady. A fair business has been done. Batavia, fair to fine we quote at 65/- to 80/-, Singapore specky to clean 26/- to 27/- per cwt. A few small parcels of Borneo have sold, black, fair clean at 12/6 small 11/-, rough coated and dusty 8/6 to 9/- per cwt. This Gum if well scraped and sorted should realise remunerative rates.
- GAMBIER** A moderate business has been put through but generally speaking a quiet demand. On the spot whole bales offered at 24/6. For arrival Feb/March shipment 22/4½d to 22/6 March/April 22/1½d to 22/6 closing buyers at the latter price c.i.f. delivered weights.

PEPPER

Has fluctuated. A fair business has been done for arrival closing at $2\frac{7}{8}$ d c.i.f. delivered weights for any position from March to August.

With Pepper:—has been in sympathy closing Jan/March shipment at 4 9-16d, April/June $4\frac{1}{2}$ d c.i.f. delivered weights.

RUBBER

The market has been firm, and a good business has been done in Plantation kinds some Estates selling the whole of their output for the season at prices ranging from 5/- to $5\frac{3}{4}$ d per lb c.i.f. Recently the spot market has been quiet but we quote values as follows:—Sheet, good to fine pale at $5\frac{1}{4}$ d to $5\frac{5}{8}$ d. Crepe, good to very fine pale at $5\frac{1}{6}$ to $5\frac{7}{8}$ d, fair to good palish at $5\frac{1}{4}$ d to $5\frac{5}{8}$ d, palish mottled at $5\frac{1}{8}$ d to $5\frac{1}{4}$ d, clean dark brown at $4\frac{11}{16}$ d to $5\frac{1}{8}$ d, dark and specky at $4\frac{7}{8}$ d to $4\frac{11}{16}$ d. Scrap, fair to fine clean at $4\frac{6}{16}$ d to $4\frac{7}{16}$ d, mixed part inferior at $4\frac{1}{4}$ d. Virgin pieces at $4\frac{6}{16}$ d to $4\frac{7}{16}$ d.

SAGO

Market has been steady with a firmer tendency. A moderate business has been done to arrive closing sellers of small at $10\frac{3}{8}$ d to $10\frac{6}{8}$ per cwt c.i.f.

TAPIOCA

A fair business on c.i.f. terms, and of late prices have favoured sellers closing Feb/April at $1\frac{3}{8}$ d to 1 7-16d March/May 1 7-16d to 1 15-32d c.i.f.

PEARL:—rather quiet closing buyers of medium, March/April shipment London &/or New York at 12/9d to 13/- and fair Penang at 11/9 to 12/- per cwt c.i.f.

FLOUR:—A moderate business has been transacted at prices ranging from 7/- to $10\frac{6}{8}$ per cwt c.i.f. London or Liverpool.

SHELL

M. O. P. The second series of Sales were well attended and prices for the various descriptions ruled firm to an occasional advance.

Manila-432 packages offered and 270 sold. Averaged about 10/- per cwt advance. Bold and medium £6 to £9. 5. medium and chicken £5.15.0. to £6.2.6; pickings £3.17.6. to £6.12.6. ; pieces £3.10. to £4.7.6.

AROE—Island Sorted: 490 packages offered, and all were withdrawn.

MERGUI—91 packages offered at and 24 sold at about 10/- per cwt advance. Bold and medium £7. 10.; medium and chicken £6.2.6. to £6.10.; pickings £5.10. to £6.17.6.

GREEN SNAIL—: 819 packages offered and 460 sold at firm prices. Singapore and Penang; Small to bold 28/- to 47/-; defective 18/6. Mergui; Chicken to bold 31/6 to 46/-; defective 20/- to 26/6d.

VANILLOES

The second series of Sales contained only 270 tins, fine beans were barely represented but brought high prices, medium and good beans sold at full rates but common foxey and shrivelled were rather easier.

Seychelles—Of 180 tins 164 tins sold. Fair to good, 8 to 8½ inch at 13/-, 7 to 8 inch at 8/9 to 11/- (1 lot subject 12/6) 3 to 7½ inch at 6/9 to 10/6; good splits 6½ to 8 inch at 7/9; common &c., 2½ to 7½ inch at 5/- to 7/-; various 5/9 to 6/9; slightly mouldy 2/3 to 2/9d.

Mauritius—Of 45 tins 40 tins sold. Common, 3½ to 7 inch at 6/9 to 7/6.

Fiji—32 tins offered and sold. Fair, 8 to 8½ inch at 7/6, 4½ to 7½ at 6/3d to 7-, common &c. 5/6 to 5/9d; slightly mouldy 2/3d.

Bourbon—Of 6 tins 3 sold 4½ to 6½ inch at 7/- to 7/6.

All descriptions of Produce sold to the best possible advantage.

JOHN HADDON & Co. Salisbury Square. E. C

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

For the month of March, 15th & 31st.

			Tons.	
			15th.	31st.
Tin	Str. S'pore. & Penang to	U. Kingdom & or	965	625
do.	" do.	U. S. A.	654	561
do.	" do.	Continent	285	290
Gambier	" Singapore	Glasgow	...	...
do.	" do.	London	...	100
do.	" do.	Liverpool	75	...
do.	" do.	U.K. & or Continent	...	200
Cube Gambier	" do.	United Kingdom	300	...
Black Pepper	" do.	do.	15	10
do.	" Penang	do.	...	190
White Pepper	" Singapore	do.	90	90
do.	" Penang	do.	...	...
Pearl Sago	" Singapore	do.	45	35
Sago Flour	" do.	London	50	240
do.	" do.	Liverpool	1,300	420
do.	" do.	Glasgow	25	...
Tapioca Flake	" do.	United Kingdom	150	130
T. Pearl & Bullet	" do.	do.	100	230
Tapioca Flour	" Penang	do.	250	625
Gutta Percha	" Singapore	do.	15	20
Buffalo Hides	" do.	do.	140	...
Pineapples	" do.	do.	30,000	9,750 cases
Gambier	" do.	U. S. A.	100	500
Cube Gambier	" do.	do.	...	75
Black Pepper	" do.	do.	310	300
do.	" Penang	do.	..	370
White Pepper	" Singapore	do.	35	50
do.	" Penang	do.	...	60

				Tons.	
				15th.	31st.
Tapioca Pearl	"	Singapore	do.	140	50
Nutmegs	"	S'pore., Penang	do.	36	42
Sago Flour	"	Singapore	do.	625	525
Pineapples	"	do.	do.	5,500	1,750 cases
do.	"	do.	Continent	1,250	900
Gambier	"	do.	South Continent	75	50
do.	"	do.	North Continent	175	125
Cube Gambier	"	do.	Continent	40	40
Black Pepper	"	do.	South Continent	180	15
do.	"	do.	North do.	270	180
do.	"	Penang	South do.	35	5
do.	"	do.	North do.	..	..
White Pepper	"	Singapore	South do.	..	10
do.	"	do.	North do.	70	130
do.	"	Penang	South do.	20	..
do.	"	do.	North do.	5	20
Copra	"	S'pore., Penang	Marseilles	260	150
do.	"	do.	Odessa	150	..
do.	"	do.	Other S. Continent	490	..
do.	"	do.	North Continent	1,575	300
Sago Flour	"	Singapore	Continent	850	625
Tapioca Flake	"	do.	do.	85	75
do. Pearl	"	do.	do.	35	10
do. Flake	"	do.	U. S. A.	5	..
do. do.	"	Penang	U. K.	40	90
do. Pearl & Bullet	"	do.	do.	70	110
do. Flake	"	do.	U. S. A.	25	..
do. Pearl	"	do.	do.	140	100
do. Flake	"	do.	Continent	75	..
do. Pearl	"	do.	Continent	325	..
Copra	Str.	S'pore., Penang	England	200	50
Gambier	"	do.	U. S. A.	..	..
Cube Gambier	"	do.	do.	..	..
T. Flake & Pearl	"	do.	do.	..	..
Sago Flour	"	do.	do.	..	..
Gambier	"	do.	South Continent	..	..
Copra	"	do.	Marseilles	..	..
Black Pepper	"	do.	South Continent	..	..
White Pepper	"	do.	do.	..	..
do.	"	do.	U. S. A.	..	..
Pineapples	"	do.	do.	..	..
Nutmegs	"	do.	do.	..	..
Black Pepper	"	do.	do.	..	..
do.	"	Penang	do.	..	..
White Pepper	"	do.	do.	..	..
T. Flake & Pearl	"	do.	do.	..	..
Nutmegs	"	do.	do.	..	..
Tons Gambier				770	800
Tons Black Pepper				700	1,200

Wired on 16th November & 1st December.

Penang.

Abstract of Meteorological Readings in Criminal Prison Observatory for the month of March, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory	29.914	155.9	85.5	91.9	75.4	16.5	79.6	77.9	75.8	73	N.W.	3.32	1.02

CRIMINAL PRISON PENANG, "

19th April, 1909.

A. H. KENN,

Senior Medical Officer, Penang.

10/5/19

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of March, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, K. Lumpor	29.873	143.2	80.6	90.0	52.0	18.0	76.3	0.826	73.4	79	S.S.W.	14.03	2.64
Pudoh Gaol "	9.32	2.66
District Hospital "	12.14	1.60
" Klang	89.7	71.5	18.2	...	...	...	...	...	2.92	0.80
" Kuala Langat	88.9	75.2	13.4	...	...	...	...	...	2.40	0.90
" Kajang	87.3	75.2	12.1	...	...	...	...	...	13.49	3.60
" Kuala Selangor	88.0	77.7	10.3	...	...	...	...	...	3.12	0.97
" Kuala Kubu	92.4	71.1	21.3	...	...	...	...	...	6.41	1.80
" Serendah	92.2	70.5	21.7	...	...	...	...	...	16.05	3.30
" Rawang	90.8	71.6	19.2	...	...	...	...	...	13.86	2.28
Beri-beri Hospital, Jeram	4.10	2.90
Sabak Bernam	2.62	0.85

OFFICE OF THE SENIOR MEDICAL OFFICER,
Kuala Lumpur, 24th April, 1909.

W. D. DAUR,
Senior Medical Officer, Selangor.

Negri Sembilan.

Abstract of Meteorological Readings in Negri Sembilan Hospitals for the month of March, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum	Minimum	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Seremban	...	144.5	81.5	88.7	70.4	18.3	77.5	829	73.3	75.4	N.W.	8.68	1.20
Mantin	11.35	2.16
Ayer Kuning	5.18	1.75
Tampin	6.24	1.20
Kuala Pillah	8.74	1.68
Jelebu	10.21	2.48
Port Dickson Town	3.66	1.82
Port Dickson Beri-Beri Hospital	3.84	1.78

S. M. O's. OFFICE,

Seremban, April, 1909.

S. LUCY,

W. O. I. C. Negri Sembilan.

Kelantan.

Abstract of Meteorological Readings in Kelantan for the month of March, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
				Mean F	Mean F	Mean F						Inches	Inches
Kuala Lebir	89.35	73.16	16.19	...	...	...	...	...	54	11
Kuala Kelantan	83.00	72.35	10.64	...	...	...	...	...	1.78	46
Kuala Pergau	1.47	81
Taku Plantation	1.43	62

STATE SURGEON'S OFFICE,
Kuala Lebir, 8th April, 1909.

A. G. H. SMART,
State Surgeon, Kelantan.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of February, 1909.

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DISTRICT.	Mean Barometrical Pressure at 32° Fah.		Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
				Mean Dry Bulb.	Maximum.	Minimum.	Mean Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis	76.8	93	63	17.5	74.4	...	...	...	...	11.57	4.61
Raub	76.4	90	63	19.8	73.3	...	...	...	...	9.89	4.60
Bukit Fraser	11.75	2.60
Bentong	78.3	91	70	15.6	74.6	...	...	...	...	9.12	1.97
Temerloh	90	71	15.6	...	...	...	...	...	5.82	1.20
Pekan	79.0	88	69	11.5	76	...	...	...	...	23.67	6.76
Kuantan	81.6	88	70	16.4	76.2	...	...	...	...	18.90	6.62
Sungei Lembing	85	66	...	...	...	...	...	...	23.79	3.90

OFFICE OF THE MEDICAL OFFICER, PAHANG.

Kuala Lipis, 24th March, 1909.

S. C. G. FOX,

Medical Officer, in Charge, Pahang

Seremban.

Table Showing the Daily Results of the Reading of Meteorological Observation taken at the General Hospital, Seremban, for the month of March, 1909.

DATE.	TEMPERATURE OF RADIATION.						TEMPT. OF RADIATION.		WIND DIRECTION.		TEMPT. OF EVAPORATION.			COMPUTED VAPOUR TENSION.			RELATIVE HUMIDITY.			CLOUDS 0 TO 10.			WEATHER INITIALS.			RAIN		
	9 H.	15 H.	Mean.	Maxi- mum.	Mini- mum.	Range.	Sun.	Differ- ance Sun & Shade.	9 H.	15 H.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	21 H.	Inch		
1	77	85	81	87	69	18	135	48	N	W	70.2	75	72.6	739	873	806	79	72	75.5	2	7	5	S	C	C			
2	77	84	80.5	85	69	16	140	55	N	W	68.5	74	71.2	697	840	768	75	72	73.5	2	9	3	S	C	C		.50	
3	75	85	80	87	69	18	140	53	N	W	68.1	78.8	69.9	690	781	735	79	74	71.5	2	7	2	S	C	C			
4	75	87	81	88	69	19	145	57	N	W	64.7	73.9	69.3	612	837	724	70	65	67.5	8	5	4	S	C	C			
5	75	88	81.5	89	70	19	146	57	N	W	66.4	71.6	69	650	775	712	74	68	66	3	10	6	S	C	C		.10	
6	74	85	79.5	86	69	17	130	44	N	W	65.3	71.8	68.5	625	781	703	74	64	69	7	7	8	C	C	C			
7	73	84	78.5	86	69	17	130	44	N	W	66	70.7	68.3	641	751	696	79	64	69	7	10	8	C	C	C		.00	
8	73	86	79.5	88	69	19	140	52	N	W	65.3	74.2	70.1	641	855	748	79	68	73.5	5	5	5	C	C	C		.10	
9	75	87	81	89	69	20	145	56	N	W	64.7	73.9	69.3	612	837	724	70	65	67.5	2	10	10	C	C	C			
10	74	87	80.5	88	69	19	147	59	N	W	65.3	75.5	70.4	625	884	754	74	69	71.5	9	10	10	C	C	C		.20	
11	76	87	82.5	89	69	20	150	61	N	W	65.7	75.5	70.6	633	884	758	71	69	71.5	2	10	10	C	C	C		.10	
12	77	88	82.5	89	70	19	154	65	N	W	66.8	76.5	71.6	658	913	785	71	69	70	3	4	0	S	C	C			
13	80	89	84.5	90	68	22	150	60	N	W	76.6	76	76.3	916	895	905	90	65	77.5	2	4	6	S	C	C		.02	
14	79	88	83.5	89	67	22	153	64	N	W	72.2	74.9	75.2	883	895	874	90	65	77.5	2	4	3	S	C	C			
15	82	89	85.5	90	68	22	145	55	N	E	70.3	72.7	71.5	742	801	793	72	58	65	3	3	4	S	C	C			
16	82	89	85.5	91	68	23	146	55	N	W	74.3	75	74.6	849	873	861	80	72	76	0	10	8	S	C	C			
17	81	85	83	82.5	70	20	143	53	N	W	73.3	81.9	77.6	820	1092	956	94	77	85.5	7	3	5	S	C	C		.14	
18	75	80	78	80	65	15	141	56	N	W	73.3	75	74.1	820	867	843	80	85	82.5	5	10	5	S	C	C		.32	
19	80	80	81	85	71	14	145	60	N	W	75.3	76.6	75.9	877	916	856	80	90	85	3	7	5	S	C	C		.76	
20	82	80	82.5	85	72	18	147	57	N	W	78.3	76.7	77.5	922	942	95	76	85.5	5	10	5	S	C	C		.70		
21	80	85	82.5	85	69	16	153	68	N	E	77	74.7	75.8	926	856	891	85	76	80.5	7	3	3	C	C	C		.00	
22	82	83	82.5	85	69	16	139	49	N	W	69.1	73.4	71.2	710	826	768	60	64	2	8	6	S	C	C				
23	84	85	84.5	90	71	19	152	62	N	W	67.9	77.3	72.6	681	937	805	55	75	8	7	5	S	C	C				
24	86	79	82.5	90	74	16	139	49	N	W	71.3	76.7	74	766	922	844	68	72	2	4	4	S	C	C				
25	83	85	84	93	73	20	145	52	N	W	78.7	76.5	77.6	978	913	945	90	69	79.5	5	3	2	C	C	C			
26	82	88	85	91	73	18	147	56	N	W	75	80.3	77.6	867	1036	951	85	73	79	6	2	3	C	C	C			
27	80	90	85	89	73	16	144	55	N	W	76.7	78.4	77.5	894	973	933	85	80	82.5	1	7	3	C	C	C		.01	
28	81	85	83	94	75	19	142	48	N	W	77.3	77.4	77.3	977	938	937	95	80	87.5	2	8	3	C	C	C			
29	79	84	81.5	90	75	15	150	60	N	W	80.3	78.3	79.3	933	963	998	99	95	95	3	6	6	S	C	C		.15	
30	82	80	81	88	73	15	142	54	N	W	74.6	77.1	75.8	857	933	890	89	75	81	4	7	2	S	C	C		.46	
31	78	87	82.5	89	73	16	144	55	N	E										1	2	2	S	C	C		.01	
Total	78.6	85.6	82.1	88.7	70.4	18.3	144.5	55.8	N	W	71.4	75.3	73.3	778	881	829	79	71.9	75.4								8	.68

Highest Temperature 94. Lowest Temperature 67. Greatest Rainfall in 24 hours 1.20.

S. LUCY,
M. O. & C. M. Officer.

SINGAPORE MARKET REPORT.

For March, 1909.

Articles.	Quantity sold.	Highest price.	Lowest price.
	Tons.	\$	\$
Coffee Palembang ...	...	26.00	...
Bali ...	10	28.00	23.50
Liberian ...	194	25.00	24.50
Copra ...	2,870	7.90	7.25
Gambier Bale ...	1,415	9.20	8.45
Gambier Cube, Nos. 1 & 2 ...	151	14.20	12.37½
Gutta Percha, 1st quality ...	...	300.00	240.00
Medium ...	...	240.00	120.00
Lower ...	...	80.00	12.70
Gutta Jelotong ...	...	10.00	7.25
Nutmegs, 110s ...	...	20.00	18.00
80s ...	...	24.50	23.00
Mace, Banda ...	...	76.00	74.00
Amboina ...	...	65.00	63.00
Black Pepper ...	1,605	12.75	10.75
White Pepper (Sarawak) ...	531	20.75	17.75
Pearl Sago, Small ...	150	3.80	3.70
Medium ...	...	...	...
Large ...	...	...	...
Sago Flour, No. 1 ...	5,395	3.05	2.90
No. 2 ...	495	1.35	1.15
Tapioca Flake, Small ...	505	5.15	5.00
Medium ...	...	...	...
Pearl, Small ...	336	5.20	4.12½
Medium ...	672	5.25	4.95
Bullet ...	11	8.00	7.70
Tin ...	2,540	67.45	65.40

SINGAPORE MARKET REPORT

February, 1909.

Articles.	Quantity sold.		Highest price.	Lowest price.
		Tons.	\$	\$
Coffee Palembang
Bali	24.00	23.50
Liberian	...	123	25.50	25.00
Copra	...	2,327	8.25	7.25
Gambier Bale	...	456	10.10	9.60
Cube, Nos. 1 & 2	...	218	13.90	12.25
Gutta Percha, 1st quality	300.00	240.00
Medium	240.00	120.00
Lower	80.00	12.00
Gutta Jelotong	11.25	7.75
Nutmegs, 110's	19.00	...
80's	24.50	24.00
Mace, Banda	74.00	...
Amboina	64.00	...
Black Pepper	...	807	12.50	11.37½
White Pepper (Sarawak)	...	304	19.25	18.12½
Pearl Sago, Small	...	95	3.80	3.70
Medium
Large
Sago Flour, No. 1	...	4,095	3.07	2.85
No. 2	...	270	1.55	1.40
Tapioca Flake, Small	...	209	5.15	5.10
Medium	...	17	...	...
Pearl, Small	...	133	8.12½	4.65
Medium	...	365	5.60	5.40
Bullet
Tin	...	1,530	66.62½	63.87½

Perak.

Abstract of Meteorological Readings in Perak for the month of March, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Stan.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taipeng	...	151	82.27	92	71	21	77.73	889	...	81	...	29.28	5.35
Kuala Kangsar	81.46	93	71	22	76.36	842	...	78	...	10.65	1.90
Batu Gajah	...	163	81.22	93	72	21	76.83	865	...	81	...	10.18	2.70
Gopeng	80.54	92	63	29	75.47	816	...	78	...	12.61	2.14
Ipoh	81.69	93	70	23	77.48	888	...	82	...	12.03	3.66
Kampar	80.25	93	70	23	76.48	864	...	84	...	16.88	4.35
Teluk Anson	81.76	93	69	24	77.20	874	...	81	...	8.14	1.46
Tapah	80.65	93	68	25	75.98	834	...	79	...	11.24	2.22
Parit Buntar	82.66	91	71	20	77.75	883	...	79	...	12.34	2.54
Bagan Serai	82.73	91	72	19	77.80	886	...	79	...	7.70	2.07
Selama	82.01	93	72	21	77.06	865	...	79	...	14.42	2.83

STATE SURGEON'S OFFICE,
Taipeng, 15th April, 1909.

M. J. WRIGHT,
State Surgeon, Perak.

OLDHAM HALL.

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AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

No. 6.]

JUNE, 1909.

[VOL. VIII

THE CULTIVATION OF PASSIFLORA FOETIDA AND MIKANIA SCANDENS:

TO KEEP DOWN OTHER WEEDS.

BY M. KELWAY BAMBER.

The former plant, which grows luxuriantly in the dry and wet zones of Ceylon and the rich alluvial soils of the Federated Malay States, was recommended to be grown on estates badly infested with lalang, in order to choke out the grass and other jungle growths, and provide a dense covering of organic matter over the whole surface of the soil. Its use was first suggested in the Federated Malay States about a year ago, when it was noticed how the plant was completely over-running the abandoned Malay campongs, and choking out every form of weed in them, including the much-dreaded lalang.

The cost of digging out the latter to completely eradicate it was proving prohibitive, often as much as \$65 or R113, per acre; and many estates could not afford this enormous unremunerative outlay. Ordinary weeding also was proving in many cases very expensive, and a heavy drain on the reserve capital for bringing the planted areas into bearing; and it became necessary to find some means of reducing expenditure without injuring or delaying the growth of the rubber. From the climbing habit of the plant it spreads more rapidly over strong growing lalang

or small jungle than over a bare soil, as its tendrils run over the tops of plants, gradually smothering and bearing them down as the weight of leafy matter increases. It is therefore unnecessary to cut the grass before planting the *Passiflora* [better known as Passion Flower.—ED., C. O.]

In all estates it is customary to keep the rows of rubber for 3 ft. on either side free from weeds, and to utilise the plant it is best planted up the borders of the clean rows, and induced to grow outwards over the intervening weeds.

For lalang, a Selangor planter suggests a method adopted by a native tribe of tying large double-handful of the growing grass together with a few blades of the grass itself. This completely prevents growth, and the rain in the tied bundle soon rots the growing points. By planting cuttings or seed of the *Passiflora* between the bundles, the whole field will be over-run in a few weeks or months and the lalang entirely destroyed.

When the growth has attained its maximum, and before the plants die down, the whole mass of material, usually 12 in. to 18 in. deep, can be rolled up like a huge carpet, leaving the surface soil in a perfect loamy condition, and quite clean and free from weeds. Such material is best mulched in large rings round each rubber tree, so that there is no continuous line of dry material running through the field, though the chance of damage from fire of such material is very remote.

Unlike *Crotalaria*, this plant is not leguminous, and consequently does not increase the total nitrogen in the soil. But from its dense low habit of growth, which entirely covers the soil, keeping it constantly moist, and the large amount of organic matter resulting from the fall and decay of the leaves, &c., the beneficial effect is very marked. This is especially so on soils poor in organic matter as are many of our Ceylon soils, and for products, such as Para Rubber, which require a humid atmosphere and an ample supply of moisture in the soil.

The composition of the plant is shown by the following analysis of the various parts made by the Acting Chemist, the whole plant when sun-dried losing on an average 70 per cent. of moisture:—

MECHANICAL ANALYSIS.

	Per Cent.		Per Cent.
Roots	5.0	Green stems	42.0
Leaves and fruits ..	42.0	Woody stems	11.0

CHEMICAL ANALYSIS.

	Roots and Woody Stems.	Leaves, Tendrils, and Fruits.	Green Stems.	Whole Plant air-dried
	16	42	42	
	per cent	per cent	per cent	per cent
Moisture at 100° C ..	12.00	0.80	12.00	11.07
Organic matter ..	84.36	80.14	84.20	82.71
Ash	3.64	10.06	3.80	6.39
Nitrogen	0.78	3.81	1.04	2.16
The ash contains—				
Lime	36.00	30.80	29.60	31.13
Magnesia	8.37	13.10	14.46	12.91
Potash	15.24	13.84	20.84	17.00
Phosphoric acid ..	2.20	4.22	4.61	4.06
Sulphuric acid ..	3.06	8.02	6.46	6.57
Chlorine	2.80	6.03	3.21	4.32
Soluble silicates ..	8.50	5.00	1.36	4.03
Sand	0.45	6.48	0.24	2.89

The proportion of nitrogen is very similar to that in some of the leguminous plants, but in this case it has been entirely derived from the soil. The chief ash constituents are lime, potash, and magnesia, with a small amount of phosphoric and sulphuric acids.

The plant appears to have the power of readily decomposing silicates. All the nitrogen and mineral matter is, of course, returned to the soil on the decay of the plant, and left in a readily available condition for the other product.

An average growth of the plant 10 in. deep yields about 26,100 lb. of fresh green material per acre, or, allowing 70 per cent. of moisture lost on air drying, equals 7,830 lb. of air dried material. This amount of matter would contain the following quantities of the chief constituents per acre:—

169 lb. nitrogen	500 lb. ash
the latter containing—	
155.6 lb. lime	32.8 lb. sulphuric acid
64.5 lb. magnesia	21.6 lb. chlorine
85.0 lb. potash	21.5 lb. soluble silicates
20.3 lb. phosphoric acid	

Another plant of somewhat similar growth, which during the last few years has spread enormously in Ceylon, is the *Mikania scandens*, belonging to the natural order *Compositæ*. It can be seen covering the scrub jungle and trees along the Colombo line from Peradeniya, and has spread down the Mahaweli-ganga to Trincomalee. Under suitable

conditions of soil and climate, it should be as useful as *Passiflora fœtida* in smothering other more harmful weeds, especially coarse grasses. The following analysis shows its chemical composition:—

	Per Cent.
Moisture lost on air drying	85.56
Organic matter, ash, &c.	14.44

COMPOSITION OF AIR-DRIED PLANTS.

	Per Cent.
Moisture	11.00
Organic matter*	81.44
Ash	7.56
	100.00

*Containing nitrogen 2.35 per cent.

The ash contains of the more important constituents:—

	Per Cent.		Per Cent.
Lime	8.20	Soda	5.03
Magnesia	7.04	Phosphoric acid	4.60
Potash	42.77		

Mikania scandens thus differs considerably from the *Passiflora fœtida* in containing only about one-fourth of the lime, and two and a half times as much potash. It would, therefore, while growing tend to compete more with the rubber, which also requires much potash, but this would be returned to the soil as the plant decayed. In rubber it should not be planted within 4 feet of the stems, and care should be taken that it spreads over the intervening space, and not be allowed to climb the trees themselves.

The weight of green material per acre is variable, but is very similar to that of *Passiflora fœtida*, and would represent the following amounts of plant food removed from the soil per acre, but returned again on the decay of the plants:—

88.93 lb. nitrogen
286.10 lb. ash
containing—
23.46 lb. lime
20.14 lb. magnesia
132.36 lb. potash
14.32 lb. soda
13.10 lb. phosphoric acid

But, besides the actual weight of material that can be obtained for weighing at any one time, there is continuous fall of leaf from the trailing stems, as the lower ones are smothered by the new growth. This increases steadily with the age of plant, so that after a year's growth the above figures could be at least doubled, and the humus gained would amount to 8,000 to 10,000 lb. per acre.

The plant dies down after flowering and seeding, when the land should be cleaned and another crop grown if desirable. Although it is suggested to grow these crops to increase the humus and water-holding capacity of the soil, and at the same time to smother other weeds, and protect the soil from sun and rain, they are not invariably applicable, since, *unless they are known to grow faster than other weeds in the district*, they will be useless for the prevention of the growth of stronger grasses, and may themselves be smothered out.

M. KELWAY BAMBER.

February, 1909.

NOTE.—We reprint this excellent article from the Supplement to the Tropical Agriculturist, April 1909, p. 393, as it will be of interest to planters. I fear the F. M. S. planters cannot claim as original the employment of the *Passiflora* as a Lalang strangler. It was utilized very many years ago by the Dutch and seeds were sent to German New Guinea for this purpose about 1898, from the Botanic Gardens, Singapore. Its adoption as a weed killer here came much later. The plant is a native of Brazil, but seems to have been introduced probably as an ornamental plant to England in 1731, and thence to the East Indies. It is now common all over the East.

One of its advantages as a weed killer is that it does not climb up the trees as so many other climbing plants such as the Ribu-Ribu fern *Lygodium* does. *Mikania scandens*, not an uncommon plant here is not, (here at least) so strong a grower. It is a stouter plant, and I should say does not possess so many advantages as the Passion flower.

Some of the common Convolvuluses might be used. I have seen one in particular growing over Lalang and scrub along the line between Klang and Kwala Lumpur, which seems to do its work of strangling the grass and weeds well. It is *Ipomea sepearia*.

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**MINUTES OF MEETING OF THE PLANTERS'
ASSOCIATION OF MALAYA.**

Held at the Masonic Hall, Kuala Lumpur, at 10 a.m.

On April 25th, 1909.

Present:—For the Perak Planters' Association: Mr. C. Alma Baker, Mr. W. Duncan. For the Kuala Lumpur District Planters' Association: Mr. E. B. Skinner, Mr. A. J. Fox, Mr. C. Burn-Murdoch, Mr. H. C. E. Zacharias. For the Kuala Selangor District Planters' Association: Mr. J. A. Hunter, Mr. Edgar Smith. For the Kapar District Planters' Association: Mr. H. W. Bailey. For the Klang District Planters' Association: Mr. E. B. Prior, Mr. R. W. Harrison, Mr. J. Gibson, Mr. A. B. Lake. For the Kuala Langat District Planters' Association: Mr. E. Macfadyen. For the Batu Tiga District Planters' Association: Mr. H. F. Browell, Mr. P. W. Parkinson, Mr. S. E. Douglas. For the Negri Sembilan Planters' Association: Mr. W. Hingston, Mr. J. le P. Power, Mr. N. S. Mansergh, by their proxy Mr. W. Hingston. For the Johore Planters' Association: Mr. W. N. Gawler. Visitors: Messrs. F. Maus, C. Henly, G. H. Day. Chairman: Mr. R. W. Harrison. Secretary: Mr. H. C. E. Zacharias.

I. The notice convening the Meeting having been read, the Minutes of the Meeting of February 28th are taken as read and confirmed.

II. The Minutes of the Emergency Meeting of April 12th are read and confirmed.

III. The following letters from Mr. H. C. Pratt are read:

Kuala Lumpur,

19th April, 1909.

G. E. No. 33/1909.

DEAR SIR,—I shall be much obliged to you if you will inform the Chairman of the Planters' Association of Malaya, that I have decided to stay on in the Federated Malay States; thus their minutes regarding my departure need not be considered. I have several reasons for staying here, chief among which being that I cannot possibly finish my work before September, and it would be a great dis-

advantage from my own point of view I was obliged to discontinue the investigations that have been commenced.

I have, etc.,

(Sgd.) H. C. PRATT,

Govt. Entomologist.

To The Secretary,

The Planters' Association of Malaya,
Kuala Lumpur.

Kuala Lumpur,

22nd April, 1909.

DEAR SIR,—At the forthcoming Meeting of the Planters' Association of Malaya: I would ask you to express my gratitude to the Planters for their appreciation of the small services which I may have up to the present time done for them. I am extremely sorry this was omitted in my last letter.

Yours faithfully,

(Sgd.) H. C. PRATT.

To The Secretary,

The Planters' Association of Malaya,
Kuala Lumpur.

The Secretary is instructed to write to Mr. Pratt and express to him the satisfaction felt by this Association at his decision to continue in his present post.

IV. WHITE ANT REWARD: The Secretary reads the following correspondence which is noted:

5th March, 1909.

The Federal Secretary, F. M. S.,

Kuala Lumpur.

SIR,—I have the honour to enclose an application for the White Ant Reward, received by me from Mr. J. W. Ryan of Mergui.

In connection with the above and in reply to your letter No. 3995 of the 1st ultimo I am instructed to submit to you the name of our Chairman, for the time being, as the nominee of this Association on the Committee of three to consider claims in connection with the White Ant Reward.

I have, etc.,

(Sgd.) H. C. E. ZACARIAS,

Secretary.

Kuala Lumpur,
12th March, 1909.

No. 3995/1908.

SIR,—I am directed to acknowledge the receipt of your letter dated the 5th March 1909, informing me that the Chairman for the time being has been nominated as the representative of the Planters' Association of Malaya on the Committee to consider claims in connection with the offer of a reward for the discovery of white ant remedy.

I have, etc.,
(Sgd.) R. G. WATSON,
Federal Secretary.

To The Secretary,
The Planters' Association of Malaya,
Kuala Lumpur.

6th March, 1909.

The Federal Secretary, F. M. S.,
Kuala Lumpur.

WHITE ANT REWARD.

SIR,—I have the honour to enclose herewith for your file application for the above from Mr. A. le Lorrain of Kwala.

I have, etc.,
(Sgd.) H. C. E. ZACHARIAS,
Secretary.

Kuala Lumpur,
18th March, 1909.

No. 3995/1908.

SIR,—I am directed to acknowledge the receipt of your letter dated the 6th March, 1909, forwarding a letter from Mr. A. Lorrian on the subject of the White Ant Reward. The letter has been forwarded to the Director of Agriculture for consideration by the Committee.

I have, etc.,
(Sgd.) R. G. WATSON,
Federal Secretary.

To The Secretary,
The Planters' Association of Malaya,
Kuala Lumpur.

V. LONDON RUBBER EXHIBITION. The Secretary reads the following correspondence, which is noted:

Kuala Lumpur,

16th March, 1909.

No. 4014/1908.

SIR,—With reference to your letter of the 6th January last forwarding a statement, to date, of your accounts in connection with the Rubber Exhibition I am directed to point out to you that there is missing from your accounts any mention of the \$500—which it was understood had been voted from the general funds of the Planters' Association of Malaya for the purposes of the Exhibition.

The nett deficit therefore would appear to be \$309-34.

I have, etc.,

(Sgd.) R. G. WATSON,

Federal Secretary.

To The Secretary,

The Planters' Association of Malaya,

Kuala Lumpur.

17th March, 1909.

The Federal Secretary, F. M. S.,

Kuala Lumpur.

SIR,—I have the honour to acknowledge receipt of your letter No. 4014 dated yesterday.

The \$500 were originally voted by us, so as to provide funds to start with, until such time, as subscriptions, &c., began to come in: and it was hoped that the total of donations and Government contributions would be more than sufficient, to defray the whole cost of the Exhibition, without having to make a more than merely temporary call on the already very slender resources of this Association.

However, whatever your final decision may eventually be, I would take it as a favour, if it could be communicated to me before the end of this month. Our financial year closes on the 31st instant and I am naturally anxious to submit to our Members a complete statement of accounts of this Exhibition.

I have, etc.,

(Sgd.) H. C. E. ZACHARIAS,

Secretary.

No. 4014/1908.

Kuala Lumpur,

23rd March, 1909.

SIR,—With reference to your letter dated the 17th March, 1909, I am directed to inform you that arrangements are being made for the payment of your Association of the sum of \$309.34 in adjustment of the accounts in connection with the Rubber Exhibition.

I have, etc.,

(Sgd.) R. G. WATSON,

Federal Secretary.

To The Secretary,

The Planters' Association of Malaya,

Kuala Lumpur,

VI. M. S. V. R. The Secretary reports having written to the Commandant as follows:

12th March, 1909.

Major Hubback,

Commandant, M. S. V. R.,

Kuala Lumpur.

SIR,—With further reference to my letter of the 10th ultimo I have the honour to inform you, that your letter of the 9th ultimo has been before the last Meeting of this Association, when the following resolution was passed un-animously.

“That this Association is in sympathy with the Volunteer movement and would urge Managers of Estates to encourage assistants to join and grant them facilities to attend camps and parades.

I have, etc.,

(Sgd.) H. C. E. ZACHARIAS,

Secretary.

VII. INDIAN IMMIGRATION COMMITTEE. The Secretary reads the following correspondence:

12th March, 1909.

The Federal Secretary, F. M. S.,

Kuala Lumpur.

INDIAN IMMIGRATION COMMITTEE.

SIR,—I have the honour to draw your attention to a Rule, which the I. I. Committee have recently issued in *re* Recruiting Allowance.

The opinion, as to the good effect or otherwise of this new Rule, seems to be somewhat divided, but I would mention that at the last Meeting of this Association a motion was carried by 10 votes to 6 (there being 5 abstentions), viz., “that the Recruiting Allowance is against the interests of the Planting community.”

However, as regards the method of deciding upon this Rule, the Meeting was unanimously and emphatically of opinion, that drastic financial changes of such far-reaching consequences ought never to have been made, without inviting first an expression of this Association’s opinion thereon.

The Chairman of the I. I. Committee, who has been appealed to in this matter, refers us to the Tamil Immigration Fund Enactment, which indeed would seem to confer upon the Immigration Committee well nigh unlimited powers, and he assures us that the views of this Association will be carefully considered.

The members of my Association however feel very strongly, that such consideration would be of considerably greater usefulness, if extended to the opinions of the Planting Industry before and not only after any new Rules are issued.

The whole position of the Immigration Committee, as at present constituted, seems all the more anomalous, as the Planting Community have no say whatever in its composition, and although there are three seats on the Committee filled by planters, the selection of the individuals is entirely outside the control of the Planting Community, who have no guarantee that the three gentlemen selected represent the opinions of the majority of planters in the Peninsula.

I have therefore been instructed to submit to you a resolution, which was carried unanimously at the last Meeting of this Association, held on the 28th ultimo, viz.

“That with a view to securing a representative opinion of planters, the Government be asked, that the Planting

Members on the Immigration Committee be elected by this Association.”

I have, etc.,
(Sgd.) H. C. E. ZACHARIAS,
Secretary.
Kuala Lumpur.

25th March, 1909.

No. 1397/1909.

SIR,—I am directed to acknowledge the receipt of your letter dated the 12th March, 1909, and to say that the Rule as to Recruiting Allowance was made by the Indian Immigration Committee at the instance of His Excellency the High Commissioner and appears to have been in accordance with the views of at least one of the local Associations.

2. The Resident-General is quite sure that the Indian Immigration Committee would not adopt or frame any rule that they would think or could suppose to be opposed to the interests of the Planting Community. He is in entire agreement with the Indian Immigration Committee in their effort to encourage the bringing in of labourers free of debt at the time of joining the Estates on which they are to be employed.

3. With regard to the constitution of the Committee, I am to point out that the Enactment vests in the High Commissioner the appointment of the members of the Committee, and while the Resident-General is sure that His Excellency will give full consideration to the views and recommendations of the Planters' Association of Malaya, he has no reason to suppose that His Excellency would be prepared to delegate to this Association his duties in this respect.

4. I am to say, however, that as the action of the Association appears to challenge the qualification of the Planting Members of the Committee and as the Resident-General is responsible for the nomination of those members hitherto appointed from the Federated Malay States, he would be glad to learn in what respect any of the selected Members fails as a representative Planter. The Resident-General was under the impression that those Planters whose names he submitted to His Excellency the High Commissioner were undoubtedly the leading and most experienced members of the Planting Community.

I have, etc.,
(Sgd.) R. G. WATSON,
Federal Secretary.

Mr. Lake considers that the point at issue had been evaded. What they did ask, was to be consulted on the way their money was to be spent.

Mr. Parkinson points out, that however excellent men and planters the Government nominees in question may be, it does not follow that they represent the opinions of the majority of planters.

Mr. Gibson maintains that the whole question is one of principle, and that there should be no taxation without representation.

The Secretary is instructed to reply that the matter is still under consideration, and Mr. Lake undertakes to formulate a Resolution to be placed on the Agenda of the next Meeting.

VIII. REPORTS AND ACCOUNTS. The Annual report having been taken as read, the Secretary explains the Accounts.

Mr. Harrison, in proposing the adoption of the Report, thinks they may congratulate themselves on the results achieved during the year. The establishment of a Federal Council for these States would remove one of the grievances which had been so frequently raised, namely that they had practically no opportunity of criticising any Enactments that concerned them before they became law. The particulars as regards the constitution of the Council were awaited with interest, and it was to be hoped that it would have full powers as regards all internal legislation.

The actual results of the working of certain estate hospitals since they were opened amply justified the complaint they made as to the unjust incidence of the 5% minimum rate. The following figures from Estate hospitals in the healthy districts of Selangor were of interest and from them it would appear that even now many estates were being taxed far higher than they should be. Taking the figures of 5 district hospitals which serve 9,733 coolies, 266 beds had been provided, the average number of beds occupied daily amounts to 109.2 and the maximum in any one day was 169. Under the 5% rule 479 beds would have to have been supplied.

The Association had been somewhat severely criticised in some quarters of its action in having voted a comparatively large sum of money as a reward for the discovery of a cheap and effective means of eradicating white ants, but their critics could hardly realise what their annual expenditure on trying to get rid of white ants now amounted to, nor what an infinitesimal sum per estate the reward would

amount to, when split up among the various estates in the Peninsula. If by their action they were successful in discovering a real cure, they should have got off cheaply if the promised reward had been 10 times as large as it was.

The Association should continue to press Government for a definite statement as to their land policy. It would be interesting to know how much land had been taken up during the last two years and also how many thousands of pounds had been diverted to Sumatra and other countries that would have been invested here, had land been available at cheap rates. This however was looking at the question from a point of view that hardly concerned them, who had probably got all the land they wanted, but it might be taken for granted that this country would remain more or less stationary for many years to come from an agricultural point of view if the present rates of quit rent were enforced. In the case of new grants, there was not much use to ask for any reduction, but he thought that in all cases when the required cultivation clauses had been fulfilled that the quit rent on jungle should be reduced to a nominal figure, as long as it remained jungle. The advantages to the country in having reserves round estates were very great, the reserves would tend to check the spread of disease, they would prevent wash and silting up of drains and rivers and they would serve as windbelts; and, to the estates, they would be valuable as timber reserves; but no estate could afford to pay a rent of \$4 per acre for this purpose, and unless a reduction was made, either whole areas would be cleared of forest or a large amount of land would be surrendered to Government.

As regards the cultivation of products other than rubber, rents on land should be reduced to a minimum and every inducement offered to capital to invest and thus place the country in a far sounder position from an agricultural point of view than it could ever attain when its interests were almost entirely vested in one product.

A more generous policy on the part of Government during the past year would have prevented many places from getting into serious financial difficulties, but the thorough soundness of rubber as an investment was now being realised by the investing public and with the advent of several new investment companies the difficulties as regards finance in the future should be far less than they had been in the past.

The very slight hold they had over their labour was illustrated by the following figures which he had been able

to obtain regarding the number of desertions from estates in the State of Selangor during 1908.

The number of coolies on the estates during the year was 28,313 and the number of desertions was 6,114 or rather over 21% of the total. When it was remembered that Selangor was probably the most popular State in the Federation with the Tamil cooly he considered that this state of things was little less than scandalous and called for searching enquiry as to its cause.

His views as regards the immigration cess were well known, and the results of the first year's working were quite satisfactory, though the total number of arrivals was less than in 1907, but it must be remembered that a great many estates reduced their labour force during 1908, thus freeing labour for other estates that were not so well off, and in addition they stopped all recruiting for a time. The coolies recruited under licenses issued in 1909 were landed on estates free of all debt, and this, though no doubt excellent in theory, would, he has very much afraid, prove the reverse in practice. He firmly believed that the result would be to put the coolies more into the hands of their kanganies and headmen. In the past their debts were collected through the check-rolls by the superintendents with no charges for interest: now their debts would be private transactions between the coolies and the kanganies, and the result would be that the cooly would be swindled. He would like to have seen all the surplus in the hands of the Committee devoted towards free return passages to coolies after a given period of service under one employer, and he was convinced that if this was ever done one of their main grievances, namely bolting, would right itself.

A satisfactory arrangement had, he was glad to say, been arrived at between Government and a delegate appointed by the R. G. R. in the matter of the Kapar drainage assessment, which during the year was the subject of such discussion and correspondence with Government. Some estates had been rather hardly dealt with, far more so in fact than was ever contemplated when the matter was under discussion between Government and the local representatives of those interested.

The feeling was growing that representation at Association meetings should be more general, and the consideration of the advisability of reconstituting the Association would probably require a good deal of attention from their new chairman and delegates during the year. The general prospects ahead of them in rubber appeared to be thorough-

ly sound in every way. Yields generally were going to be larger and cost of production considerably lower than they had been in the habit of estimating hitherto, an estates that were capitalised at moderate cost would be able to pay large dividends on a profit of 6d. per lb. of rubber.

Mr. Browell seconds that the Annual Report be adopted. Carried unanimously.

Mr. Gibson then proposes, Mr. Hunter seconds and it is carried unanimously that the accounts be passed.

IX. ELECTIONS. Mr. Harrison thereupon vacates the Chair, which is occupied temporarily by Mr. E. B. Skinner.

The election for a Chairman and Secretary then takes place with the following result:

For Chairman:	Mr. M. C. Cumming	10 votes (elected)
	„ A. B. Lake	4 „
	„ B. W. Harrison	2 „
	„ Turner, Skinner, Duncan	1 „ each
		1 „ abstention
	Absent	1 „ (Mr. Macfadyen)
		<hr/> 21
For Secretary:	Mr. Zacharias	19 votes (elected)
		1 abstention
	Absent	1 (Mr. Macfadyen)
		<hr/> 21

Mr. Parkinson proposes a hearty vote of thanks to the retiring Chairman for the sterling work done by him on behalf of the Planting Community since his arrival in the country.

This proposition having been heartily endorsed by Mr. Skinner, is carried by acclamation.

X. ESTIMATES. The Estimates for 1909/10 are submitted as follows:

EXPENDITURE.		REVENUE.	
To. Agricultural Bulletin	\$1,000-	By Subscriptions at \$100 per delegate:	
„ Printing and Stationery	650-	„ Mal. Pen. Agr. Ass.	700-
„ Postages	150-	„ Perak Pl. Ass.	700-
„ Secretary	2,400-	„ K. L. D. P. A.	500-
„ General Charges	100-	„ N. Sembilan P. A.	400-
„ Exhibitions	150-	„ K. Selangor D. P. A.	400-
„ Reserve	350-	„ B. Tiga D. P. A.	400-
		„ Klang D. P. A.	400-
		„ Malacca P. A.	400-
		„ Johore P. A.	300-
		„ Raub D. P. A.	200-
		„ Kapar D. P. A.	200-
		„ K. Langat D. P. A.	200-
	<hr/> \$4,800-		<hr/> \$4,800-

Mr. Skinner considers it undesirable to work on so small a margin, and thinks the subscription per delegate might be raised from \$100 to \$112.50 or \$125.

Mr. Lake points out that some of the D. P. A's had already drawn up their own estimates on a \$100 per delegate basis.

General discussion on the inclusion of an item of \$1,000 for the Agricultural Bulletin then ensues.

Mr. Baker proposes that the Bulletin be subsidized as hitherto, but that the Constituent Associations be circularized and asked for donations.

This is seconded by Mr. Lake.

Mr. Skinner proposes as an amendment that the Estimates be adopted, as submitted to them.

This is seconded by Mr. Fox and carried.

XI. TRUCK BILL. The Secretary having read out the Memorandum of the Sub-Committee, Mr. Browell proposes and Mr. Fox seconds a vote of thanks to the Sub-Committee for the able and careful manner in which they have treated the subject. Carried nem. con.

The Memorandum is then passed with the following alterations:

- 1, pg. 3, line 4 substitute "advance" for "pay."
- 2, pg. 3, line 50 read "countries, where such system is in vogue, without interference by such laws, as are now contemplated here."
- 3, pg. 4, line 8 substitute "by way of profit" for "of interest &c."
- 4, pg. 6, margin to Section 7, substitute "by way of profit" for "of interest &c."

Mr. Skinner is requested to be good enough to take up this matter accordingly at the next Meeting of Council.

XII. ALTERATION OF RULES. Mr. Harrison reads the following report of the Sub-Committee:

REPORT OF SUB-COMMITTEE.

TO CONSIDER ALTERATION OF P. A. M. RULES.

Your Committee are of opinion that to make the Association thoroughly representative, more representation is desirable.

To the Association as at present constituted there are many serious objections, the chief one being that a delegate may at any time be called upon to advance certain views on account of his district, with which he may be entirely at variance and therefore he is unable to do justice to the interests of his Association.

To overcome all such possible anomalies we are of opinion that a radical change in the constitution of the Association is desirable, which would admit of business being conducted by a Committee, while at the same time all members of any affiliated Associations should have full rights of attendance and voting powers at all General Meetings.

To effect this object the following alterations to rules would be necessary:

(1) Rule 4 would read: "The Association shall consist of a Chairman and Secretary and all Members of affiliated Associations.

(New Rule). The Committee shall consist of the Chairman and Secretary of the P. A. M. and the Chairman and Secretary and 1 in 10 of all members of constituent Associations.

Further alteration to sundry rules in substituting the word "Committee" for "Association" would be necessary. Rule 13 would also require to be altered to meet the changed conditions.

As an alternative to this we would suggest:

- (1) That the following sub-sections be added to rule 4: that any Member of an affiliated Association bringing forward and carrying a resolution in a district association should have the right to conduct the same through all meetings of the P. A. M.
- (2) That all Members of affiliated Associations shall have the right to attend and vote at the Annual General Meeting in April, when office bearers for the year are elected.

J. A. HUNTER,

W. DUNCAN,

R. W. HARRISON.

Mr. Skinner proposes and Mr. Parkinson seconds, that this Memorandum be printed and circulated and brought up again before their next Meeting. Carried.

Mr. Lake proposes and Mr. Baker seconds that this Meeting be held in Kuala Lumpur. Carried.

XIII. Mr. Smith proposes the following motion, standing in the name of the Kuala Selangor District Planters' Association:

"That Government be asked to form a local board to include two planting members to regulate the expenditure of all public monies expended in connection with planting interests."

He suggests that these Boards consist of the D. O., the District Engineer and two resident planters.

Mr. Macfadyen considers it inopportune to bring up this question before the Federal Council is constituted.

Mr. Mr. W. Duncan thinks it was impossible to dictate to Government how to spend its own money.

Mr. Skinner appears of Mr. Macfadyen's suggestion to keep the matter for discussion in the Federal Council. He understands that the Federal Council will be formed about July. The estimates came up in August, and it would be a great mistake to bring this matter up before the formation of the Council.

Mr. Smith thereupon withdraws his motion.

XIV. LIMITATION OF COOLIES' CREDITS. Mr. Hunter proposes the following motion standing in the name of the Kuala Selangor District Planters' Association:

"That the P. A. M. be approached with a view to obtaining legislation by which the Estate Tamil Coolies' credit should be limited to \$10 recoverable at law."

If this suggestion became law, it would make it impossible for the Kangany to practice usury and it would stop the Kedai-Keeper getting control of thier labour. The Government had already restricted the coolies' credit towards his employer. Why should it not restrict it towards the Kedai-Keeper?

Mr. Lake Sympathizes, but thinks the motion was class legislation with a vengeance. The remedy was in the employers' hands. They could pay coolies weekly.

Mr. H. F. Browell supports the motion. He thinks if it was class legislation, so was the policy of the Government of bringing coolies over free.

Mr. E. B. Prior, does not see how the Government could limit the amount of liability which a cooly could contract. He was a free man.

Mr. Gibson is also in sympathy with the idea but considers it too crude in its present form to be submitted to Government.

Mr. Parkinson supports Mr. Hunter.

Mr. Harrison says that Mr. Hunter had hit the nail on the head. The non-recovery of recruiting debts was likely to land them in serious difficulties. It was an ill-advised action, betraying absolute ignorance of the Tamil cooly. He and Mr. Cumming would express their opinions strongly at the next Meeting of the Indian Immigration Committee. The recovery of debt would in future be a matter between cooly and kangany. They now had a good opening to re-

tialiate and it gave him great pleasure to support Mr. Hunter's motion.

Mr. Macfadyen though completely approving of the object of the motion, feels found to oppose it, as the method is wrong. It was not logical to argue that the Government action was absurd, illogical and unjust, and then say that similar action should be extended to the Kedai-Keeper. The resolution was impracticable. How many coolies were taken into a court of law by the Kedai-Keeper? What benefit was it to protect the cooly by limiting his credit to a single person? If the request were granted, they would fail to get the coolies out of debt. What were the changes of the Government listening to such a proposal? Absolutely nil. He felt the Association was wasting its ammunition. As a result of asking continually for so much, they did themselves damage when they really wanted something.

Mr. Hunter believes that Mr. Macfadyen is merely quibbling. He was not speaking as to the present state of affairs, but of the future, and how bad that could be, he and all those knew, who had experience of the Ceylon system.

Mr. Duncan says in Perak they had all Kedai-Keeper on their Estates and thus entirely under their control.

Mr. Skinner is also in sympathy with any step calculated to check the coolies' indebtedness, but considers the proposed method quite useless.

Mr. Hunter's proposition is then put to the Meeting and declared carried by 11 votes to 5, there being 5 abstentions.

XV. MEETINGS. The Chairman and Secretary are authorized to convene Meetings at their discretion and for their guidance the following schedule is adopted:

1909	June 27th	Kuala Lumpur
	August 29th	Penang
	October 31st	Kuala Lumpur
	December 26th	Seremban
1910	February 27th	Ipoh
	April 24th	Kuala Lumpur

XVI. The Secretary reports the formation of the "Association des Planteurs de Caoutchouc" at Antwerp.

XVII. A letter from Messrs. W. Mansfield & Co. Ltd. re Javanese labour and the third Annual Report of the Kapar D. Pl. Ass. are laid on the Table.

XVIII. Mr. Alma Baker suggests that particulars be obtained from Government regarding the total amount of

Revenue derived from Planters during the past three years by way of quit rent, premium and export duty.

Mr. Skinner would advise waiting with these requests for information, until the Federal Council had been constituted.

The matter is allowed to rest there.

The Meeting terminates at 12-45 p.m.

H. C. E. ZACHARIAS,
Secretary.

FERNS AND THEIR CULTIVATION.

For diversity of form as also for variation in the colour of their foliage and general usefulness in the garden no other family of plants can compare with Ferns; for it must be admitted that although these lowly representatives of the Vegetable Kingdom do not possess bright flowers they nevertheless are of the greatest value in the decoration of our gardens and possess attractions peculiar to themselves.

As may be expected in a country having a moist tropical climate the Malay Peninsula possesses a vast number of species of Ferns and they form a most conspicuous part of the vegetation. They abound in the moist shady forests as undergrowth and it is astonishing the number of kinds that are found growing together on the trees.

Almost 400 species are recorded as occurring in the Peninsula and this number will be greatly increased as it is certain that many new kinds still await discovery in the vast tracts of unexplored mountain forest.*

Among the most striking points in connection with Ferns is the extremely wide range of their distribution. From the tropics of the whole world where they exist in profusion to the arctic regions as far north as Greenland, Ferns are found in greater or less numbers some at altitudes of from 10,000 ft. to 12,000 ft. Even in Malaya the conditions under which they exist vary considerably. A knowledge of their habitats is essential if successful cultivation is desired. For example many grow deep in the

* A list of Ferns of the Malay Peninsula by H. N. Ridley, M.A., F.L.S., was published in the Journal of The Straits Branch Of The Royal Asiatic Society Vol. 50 p. 1, 1908.

shady forests closely surrounded by other forms of vegetation whilst others are only found growing on the bare stems of tall trees full exposed to wind and sun. Again many grow on cool dripping moss-covered rocks and others in running mountain streams. Several are found growing in the mud of swamps and tidal rivers and in the sand of the sea shores.

The richest localities for Ferns are the wet densely wooded hills at altitudes of from 1000 ft. to 5000 ft., but the damp rocky forests of the plains are also very rich. Epiphytic species are very abundant often entirely covering the stems and branches of trees, especially at high altitudes.

Ferns for the purposes of cultivation are generally divided into groups of sections as follows:—

(1) Tree Ferns, (2) Gigantic non-arborescent Ferns, (3) Small growing Ferns, (4) Ferns with tinted or coloured fronds, (5) Variegated and crested Ferns, (6) Gold and Silver Ferns, (7) Climbing and Trailing Ferns, (8) Filmy or Transparent Ferns, and (9) Viviparous or Bulbil-bearing Ferns. It will be impracticable to describe here the cultivation of every genus referred to in the attached list. The following general remarks on cultivation may, however, prove sufficiently suggestive for the treatment of all.

CULTIVATION.

Propagation.—There are several ways in which Ferns can be reproduced, by spores, by division of crowns, by dividing the rhizomes or creeping stems, or by the bulbils produced on the fronds of several species.

The most natural and therefore the commonest way of reproduction is by means of their spores. These are blown about by the wind and in this country young plants are found in great profusion growing in all sorts of unlikely places, on the walls and wood work of houses and even on the tiles of the roofs, and on trees and stones. Ferns are generally the first plants to make their appearance on newly cleared ground.

The details of propagation by spores nor the peculiar manner of fertilization need not be gone into here. Suffice it to say that in the tropics Ferns reproduce themselves by spores very readily and rapidly and all that is generally necessary to ensure a good crop of plants is to collect the spores and scatter them over a damp wall or tree trunk in some shady corner of the garden.

Some Ferns like the popular and handsome *Adiantum tenerum* var. "*Farleyense*," being sterile, do not produce



Davallia elegans on Oil Palm.

spores and have to be propagated by division of the crowns whilst many others are best propagated by division of the creeping rhizomes.

Propagation by division is the quickest and most general method and is particularly applicable amongst our native Ferns. Plants which form crowns generally possess two or three of these and by passing a knife between the crowns and pulling them apart two or more young plants, which only require to be potted separately to form independent subjects, are produced.

Ferns with creeping rhizomes can be propagated without any difficulty by merely cutting these organs into pieces of suitable length and pegging them down on tree stems or in baskets.

In the case of Ferns producing proliferous growths or "bulbils" on the fronds the mode of propagation is obviously by collecting the bulbils and potting them up singly in small pots. Ferns fronds of this nature can generally be made to produce a number of bulbils by pegging them down flat on sandy soil in a moist shady place.

Culture:—The nature of a Fern generally suggests whether it should be grown in a pot, on a tree stem, or in a basket.

Those kinds with creeping rhizomes do best in baskets as a rule whilst those which form crowns and fibrous roots are most suitable for pot culture. One of the most effective ways of growing many of our Ferns is on the stems of trees, palms, etc. (see illustration on opposite page).

Although it frequently happens that the conditions under which plants grow spontaneously cannot be artificially produced the knowledge of the positions in which they grow naturally materially aids in their successful cultivation. It may be safely stated that the majority of Ferns require shade and moisture. Most gardens possess one or more spots of this nature, under trees generally, and in those situations Ferns luxuriate if reasonable care be taken in their cultivation.

Ferns grown in pots require fresh potting more or less frequently according to their rate of growth; but it is advisable to avoid over-potting. These plants generally grow best whose roots are in contact with the inside of the pots. Care must be given to watering as Ferns resent overwatering as quickly as any other plant if the soil is in any way water logged or sour, on the other hand care must also be taken that the roots do not become too dry.

In the tropics Ferns may be repotted almost at any time without ill results. Pots should be clean and dry when used and new pots should be thoroughly soaked in water and then dried before using. The question of drainage is an important one, especially here where the rain-fall is so heavy. When potting Ferns it should be borne in mind that the majority of them grow naturally in partly decayed vegetable matter usually of a soft nature, they should therefore be made firm in their pots but on no account potted hard.

A compost of an open sandy nature should be used through which the water will pass readily, a mixture of two parts of sandy loam with one part of leafmould and one part of fibrous peat or Resam (*Gleichenia linearis*) root and one part of coarse sand will be found to suit most.

Basket Ferns should be planted in Resam root mixed with lumps of peat and pieces of sand-stone and charcoal. These composts may be given as possessing all the qualities required by the majority of Ferns usually cultivated in gardens. Many of the more delicate Ferns such as some *Adiantums* resent too much water over head. A position under a shady verandah suits these best. It is only by experience and constant observation that the best position can be found for the more fastidious Ferns. Very often a move of only a few yards makes all the difference between a good and a bad specimen. Windy positions should be avoided and care taken that no manure enters into the potting compost. An occasional application of liquid or artificial manure is beneficial when growth and root action is vigorous but heavy manuring of maidenhairs should be avoided. It is an error very often made here and is often the cause of the failure of a gardener to grow good pots of these Ferns. In most cases where an amateur complains that his maidenhairs are not in good condition, it is due to one or all of these errors, watering over head, allowing to stand in a windy or dusty place, or manuring.

In the Botanic Gardens, Singapore a large number of Ferns are raised on the wall of the green-houses. These walls are of coral limestone and form a good nest for the spores, specially of the Maidenhairs. Pans of broken brick and coral rock are very suitable for raising Fern spores. The pans should be kept damp and if moss or the minute algae which appear on damp spots are growing on the rock so much the better. The fruiting fronds should be taken before the spores are blown away, about the time that the sori become brown, and shaken or left lying on the pan

which is then covered with a glass plate. In Penang Gardens a Fern rockery has been made by collecting stones chiefly of sandstone or granite, the older and rougher the better, and arranging them under a small wood of trees. Here certain Ferns have done exceptionally well, and especially the stiff leaved Ferns such as *Humata* which requires a certain amount of dryness. The rare *Pteris Dalhousiac* is growing here finely. But limestone rock seems to suit the Ferns better than sandstone or granite.

Pests.—There are not many pests on Ferns. The most troublesome being a caterpillar which spins together the ends of the fronds and destroys them. It chiefly attacks the Nephrodiums and Angiopteris and should be destroyed as soon as it is seen. The Maidenhairs if neglected are liable to attacks of *Coccus* (white blight) and should be cleaned if necessary with tobacco water.

SOME EXCEPTIONAL FERNS.

A few Ferns which possess somewhat peculiar habits may be noted. The water Fern *Ceratopteris thalictroides* is a truly aquatic plant and is best grown in ponds or ditches, it is said to be biennial, whether this is so or not does not seem clear but it certainly has the habit of disappearing entirely from the ditches in these gardens and then after some months reappearing in abundance.

Ophioglossum pendulum the long pendent Adder's tongue Fern usually prefers to grow in a plant of the Elk's-horn Fern, *Platycerium*, where it pierces the large supporting fronds of this plant and hangs down below it. It appeared on one occasion on a Date-palm in the Gardens growing on the vegetable remains on the trunk and in soil brought up by Termites, and eventually it quite draped the trunk of the tree with its long green ribbon-like fronds.

The little Adder's tongue Fern, *Ophioglossum nudicaule* is not easy to cultivate but on occasions when specimens have been brought from other part of the Peninsula for the Herbarium, it has almost invariably turned up sporadically in the gravel paths, apparently from spores drifted away from the dried plant.

Davallia triphylla though by no means a rare plant in the Peninsula was for a long time very rare in collections of dried ferns and was not known in cultivation at all till it was sent from the Botanic Gardens, in Singapore. The reason for that was that it grows habitually on the topmost branches on the loftiest trees, where it was quite inaccessible. It is however to be obtained from fallen branches

and trees. When thus fallen in the forest it soon perishes but it is quite easily grown on fragments of tree Fern trunks and readily establishes itself if planted on a tree which is not too shady. It grows very well on the Oil-palm.

A difficult epiphytic Fern to grow is the very curious *Pleopeltis sinuosa*, the rhizome of which is hollow and tenanted by ants. Though it is often very abundant on old trees, it seems always to perish soon when removed even on a branch to the plant house. Indeed the natives say it will not grow on any but live trees.

Plate I. *Davallia elegans*, epiphytic on the oil Palm.

LIST OF FERNS CULTIVATED IN THE BOTANIC GARDENS, SINGAPORE.

GLEICHENIACEAE.

GLEICHENIA.

Gleichenia linearis, (Burn), *G. dichotoma*, Willd., Tropics.

CYATHEA.

Cyathea Brunonis, Wall., Malaya.

AMPHICOSMIA.

Amphicosmia alternans, Hook., Malaya.

ALSOPHILA.

Alsophila comosa, Hook., Indo-Malaya.

„ *Burbidgei*, Baker, Borneo.

„ *glabra*, Hook., Indo-Malaya, China.

„ *glauca*, J. Sm., Indo-Malaya.

„ *latebrosa*, Hook., Indo-Malaya.

„ *Ridleyi*, Baker, Singapore.

DICKSONIEAE.

CIBOTIUM.

Cibotium Barometz, Link., India, Malay Isles, China.

HYMENOPHYLLUM.

Hymenophyllum Neesii, Hook., Malay Isles, Fiji.

„ *polyanthos*, Sw., Indo-Malaya.

„ *Smithii*, Hook., Malay Isles.

„ *denticulatum*, Sw., Malaya.

„ *javanicum*, Spreng, India to Australia, etc.

TRICHOMANES.

Trichomanes javanicum, Bl., India, Malay Archipelago.

„ *rigidum*, Swartz, S. Africa, Ceylon, Malaya, Polynesia, S. America.

DAVALLIEAE.

HUMATA.

- Humata angustata*, Wall., Malaya.
 " *heterophylla*, Smith, Malay Isles, Polynesia.
 " *pedata*, Smith, Indo-Malaya, China, Japan etc.
 " *parallela*, Wall., Burmah to Polynesia.

LEUCOSTEGIA.

- Leucostegia parvula*, Sm., Malay Isles.
 " *affinis*, Hook., Indo-Malaya, Polynesia.
 " *parvula*, Wallich, Indo-Malaya.

PROSAPTIA.

- Prosaptia Emersoni*, Presl., India, Ceylon, Malay Isles.

DAVALLIA.

- Davallia bullata*, Wall., India, Malaya, Japan.
 " *divaricata*, Bl., Indo-Malaya.
 " *elegans*, Swartz, Indo-Malaya, Africa, Japan,
 China.
 " *Fijiensis*, Hooker, Fiji Islands.
 " *pallida*, Mett., Borneo.
 " *solida*, Swartz, Polynesia, Malay Isles.
 " *triphylla*, Hook., Singapore.

MICROLEPIA.

- Microlepia Speluncae*, Linn., Indo-Malaya, Ceylon, China,
 etc.
 " *var hirta*, India, Ceylon.
 " *strigosa*, Swartz, Indo-Malaya, Fiji.

STENOLOMA.

- Stenoloma chinensis*, Swartz, Indo-Malaya, China, Polynesia.

LINDSAYEAE.

LINDSAYA.

- Lindsaya divergens*, Wall., Malaya.
 " *Lancea*, L., Ceylon, Malaya, S. Africa.
 " *lanuginosa*, Wall., Africa, Malay Australia.

SCHIZOLOMA.

- Schizoloma lobata*, Poir., Indo-Malaya.
 " *davallioides*, Bl., Malay Isles.

PTERIDEAE.

ADIANTUM.

- Adiantum aethiopicum*, L., Almost cosmopolitan.
 „ *Bausei*, Garden Hybrid.
 „ *Bensonianum*, Garden origin.
 „ *Capillus-Veneris*, L., The Whole World.
 „ „ „ *var. Mariesii*, Garden origin.
 „ *caudatum*, L., Tropics.
 „ *Colpodes*, Moore, Trop-America.
 „ *Collisii*, Moore, Garden Hybrid.
 „ *concinnum*, Hooker, Trop-America.
 „ „ *goldianum*, Garden origin.
 „ „ *Flemingi*, Moore, Garden origin.
 „ „ *latum*, Moore, East Indies.
 „ *cuneatum*, Langff, Brazil.
 „ „ *variegatum*, Garden origin.
 „ „ *Lawsonianum*, Moore, Garden origin.
 „ „ *Pacotti*, Moore, Garden origin.
 „ *flabellulatum*, Linn., Trop-Asia.
 „ *Fergusonii*, Baker, Ceylon.
 „ *formosum*, R. Brown, Australia.
 „ *fragrantissimum*, Henderson, Garden origin.
 „ *glaucophyllum*, Hooker, Mexico, Guatemala.
 „ *hispidulum*, Sw., Malaya, Australia and New Zealand.
 „ *intermedium*, Sw., Trop-America.
 „ *Lathomii*, Moore, Garden Variety.
 „ *lunulatum*, Brown, Tropics.
 „ *macrophyllum*, Sw., Trop-America.
 „ „ *albo-striatum*, Sch., Garden origin.
 „ *pedatum*, Linn., N. Hindustan, United States, &c.
 „ *polyphyllum*, Will., Columbia and Peru.
 „ *pulverulentum*, Linn. West Indies, etc.
 „ *rhodophyllum*, Moore, Garden Hybrid.
 „ *Seemanni*, Hook., Central America.
 „ *stenochlamys*, Baker, B. N. Borneo, Pulo Gaya.
 „ *tenerum*, Sw., Tropics widely.
 „ „ *var. Farleyense*, Moore, Barbadoes.
 „ *tetr. cyllum*, Willd., Trop-America.
 „ „ *var. Hendersonii*, Garden origin.
 „ „ *var. acuminatum*, Moore, Garden origin.
 „ *trapeziforme*, Linn., West Indies.
 „ *Victoriae*, Moore, Garden origin.

” *Wagneri*, Mett., Peru.

” *Williamsii*, Moore, Peru.

The following hybrid *Adiantums* were raised in the Singapore Botanic Gardens. They have been named provisionally and as they are not yet known outside of these Gardens each one is roughly described:—

1. “*Beauty of Singapore.*” Stipe black shining 1 foot tall. Frond tripinnate 18" x 12" very lax, pinnae distant 1"-2" apart, pinnules 3"-4" long with rather long stalks nearly 1". Leaflets light, pale green 1" long oblique, one side quite straight and usually much longer than the other the two basal sides forming an obtuse angle, rest of outline ovate or rounded, triangular, shortly incised on the upper margin with oblong truncate rounded lobes. Lower leaflets smaller under $\frac{1}{4}$ " terminals ones $\frac{1}{2}$ " or more both ways. Sori 10-17 on each leaf it usually 2 to each lobe, all round the edge except the straight bases on the extreme edge on the underside. Probably *tenerum* hybrid.

2. “*Tanglin.*” Stipe black shining 1 foot tall or more, frond lax tripinnate 15" long 8" across, thin, about 10 pinnae, pinnules about 5" long about 6 leaflets fan-shaped oblique narrowed actually to the base, margin above irregularly lobed with oblong truncate short lobes usually $\frac{1}{2}$ " long or less dull bluish-green, sori black 5-15 on and beneath the upper edge often connate very irregular. Probably *Bausei-tenerum* hybrid.

3. “*Bidadari.*” Stipe 10" tall ebeneous, frond lax triangular in outline deep blue green tripinnate pinnae arched lax rachis slender, leaflets trapeziforme flabellate $\frac{3}{4}$ " x $\frac{3}{8}$ " narrowed for the most of its length to the base, terminal one broad fan-shaped, the others irregularly truncate lobed. Sori brown 5-13, short, usually linear, several run together. A very elegant dark green fern terminal leaflets often very deeply cut into linear and oblong lobes. Probably *tenerum-fragrantissimum* hybrid.

4. “*Mrs. Napier.*” Stipe ebeneous 1 foot tall, frond large broadly triangular 14" x 16" tripinnate bright light green. Leaflets obovate $\frac{1}{2}$ " or less oblique or regular sides straight apex broad mostly very shortly lobed. Sori 10-12 mostly separate occasionally run together. A handsome fern probably a cross between *tenerum* and *Mariesii*.

5. “*Shamrock.*” Stipe ebeneous, frond very lax branches remote and few 12" x 10" shortly tripinnate with few leaflets. Leaflets deep green bluish very irregular base absolutely straight slightly angled or retuse, cordate $\frac{1}{2}$ "

wide and shorter, entire or most irregularly cut into broad obtriangular truncate lobes, whole leaflets undulate. Sori nearly all continuous the whole length of a lobe. A most weird and curious fern probably *Fergusonii-Bausei* hybrid.

6. "Standard." Stipe ebeneous 10" tall rather stout frond quite erect narrow branches ascending 10" long 6" wide very lax tripinnate with few deep green leaflets very little branched, leaflets rhomboid, often with broad bases, triangular, ovate. Sori large for the size of the leaflets, continuous on two sides of the rhomb, dark brown. A very curious form resembling *Fergusonii* raised from a single plant found some years in one of the Garden planthouses.

CASSEBEERA.

Cassebeera triphylla, Kaulf., South Brazil.

CHEILANTHES.

Cheilanthes tenuifolia, Fee., Tropics, etc.

PTERIS.

- Pteris aquilina*, L., The Bracken, The Whole World.
 " *cretica*, L., Europe, Africa, Asia, America.
 " *ensiformis*, Burm., Indo-China, Australia.
 " " *var. Victoriae*, Bull., Garden origin.
 " *longifolia*, L., Whole World.
 " *pungens*, Willd., West Indies.
 " *quadriaurita*, Retz., Tropics.
 " " *var. argyrea*, Moore, Tropics.
 " *semipinnata*, L., Malay, China, Japan, etc.
 " " *var. gigantea*, Garden Form.
 " *serrulata*, L., China, Japan.
 " " *var. cristata*, Moore, Garden origin.
 " *wallichiana*, Agardh., Japan, Himalayas.

CAMPTERIA.

Campteria biaurita, Linn., Tropics Old World.

DORYOPTERIS.

- Doryopteris ludens*, Wall., Indo-Malaya.
 " *pedata*, Linn., W. Indies, Brazil.

LITOBROCHIA.

Litobrochia incisa, Thunb., All Tropics.

CERATOPTERIS.

Ceratopteris thalictroides, L., All Tropics.

BLECHNEAE.

BLECHNUM.

- Blechnum Finlaysonianum*, Wall., Malaya.
 " *orientale*, L., Indo-Malaya, China, Australia.
 " *serrulatum*, Rich., Malaya, Australia, America.

DOODIA.

- Doodia dives*, Kunze., Ceylon, Java.

ASPLENIEAE.

THAMNOPTERIS.

- Thamnopteris nidus*, L., Indo-Malaya, Mascarenes.
 " *sula*. " *var. musaeifolia*, Mett., Malay Peninsula.
 " " *var. phyllitidis*, Don., Indo-Malaya.
 " " *var. multilobata*, Malaya.

ASPLENIUM.

- Asplenium Belangeri*, Kze., Malaya.
 " *borneense*, Hook., Malaya.
 " *decussatum*, Swartz, Polynesian and Malaya Islands.
 " *esculentum*, Presl., Indo-Malaya.
 " *lanceum*, Thunb., India, Ceylon, China, etc.
 " *lineatum*, Swartz, Mauritius.
 " *lumulatum*, Swartz, Tropics.
 " *longissimum*, Bl., Indo-Malaya, Mascarenes.
 " *macrophyllum*, Swartz, Indo-Malaya, Polynesia.
 " *maximum*, Don., North India.
 " *nitidum*, Sw., India, Malay Peninsula.
 " *resectum*, Smith, Tropics Old World.
 " *rutaeifolium*, Kunze, India, S. Africa, Japan.
 " *scandens*, Smith, N. Guinea, Philippines.
 " *squamulatum*, Bl., Malay Islands.
 " *tenerum*, Forst, Malaya, Ceylon, Polynesia.
 " *viviparum*, Presl., Mauritius.
 " " *var. nobile*, Hend., Garden variety.
 " *vulcanicum*, Blume, Malay Islands.
 " *unilaterale*, Lam., Indo-Malaya, Polynesia, etc.

DIPLAZIUM.

- Diplazium porrectum*, Wall., Malaya.
 " *speciosum*, Mett., Indo-Malaya.
 " *tomentosum*, Hook., Burmah, Malaya.
 " *porphyrorachis*, Baker, Borneo.

ANISOGONIUM.

- Anisogonium cordifolium*, Mett., Malaya.
 „ *decussatum*, Sw., Malaya.
 „ *esculentum*, Presl., Indo-Malaya.

ASPIDIEAE.

DIDYMOCHLAENA.

- Didymochlaena lunulata*, Desv., Malay, Polynesia, America,
 etc.

MESOCHLAENA.

- Mesochlaena polycarpa*, Bl., Malaya.

POLYSTICHUM.

- Polystichum semicordatum*, Sw., Malaya, Burmah, Trop-
 America.
 „ *triangulum*, Sw., West Indies.
 „ *basipinnatum*, Baker, China.

ASPIDIUM.

- Aspidium angulatum*, Smith, Malaya.
 „ *cicutarium*, Sw., All tropical countries.
 „ *decurrens*, Presl., Indo-Malaya, China, etc.
 „ *melanorachis*, Baker, Borneo.
 „ *plantagineum*, Griseb, West Indies to Peru.
 „ *polymorphum*, Wall., India, Malaya.
 „ *semibipinnatum*, Wall., Malaya.
 „ *singaporianum*, Wall., Malaya.
 „ *trifoliatum*, Swz., Tropical America.
 „ *vastum*, Blume, Indo-Malaya.
 „ *variolosum*, Wall., Indo-Malaya.

PLEOCNEMIA.

- Pleocnemia gigantea*, Bl., Indo-Malaya.
 „ *membranifolia*, Presl., Indo-Malaya.
 „ *membranacea*, Hook., Indo-Malaya, China.
 „ *lenzeana*, Hook., Indo-Malaya, China, Aus-
 tralia.

CYRTOMIUM.

- Cyrtomium falcatum*, Sw., Australia, Indo-Malaya, etc.
 „ „ *var. caryotideum*, Wall. Japan.

LASTREA.

- Lastrea aciculatum*, Baker, Sarawak, Borneo.
 „ *calcarata*, Bl., Indo-Malaya.
 „ *crassifolia*, Bl., Malaya.

- „ *decursivo-pinnatum*, Baker, Japan, China.
 „ *immersa*, Bl., Malay Peninsula.
 „ *dissecta*, Forst, India, Ceylon, etc.
 „ *erythrosorum* var. *prolifera*.
 „ *syrmatica*, Willd., Indo-Malaya.
 „ *setigerum*, Baker, China, Japan, N. India, etc.
 „ *tenericaulis*, Wallich, Malay Peninsula, etc.
 „ *viridescens*, Baker, Japan.

NEPHRODIUM.

- Nephrodium aridum*, Don., India, Malaya.
 „ *cucullatum*, Bl., Indo-Malaya, Polynesia.
 „ *extensum*, Hook., Ceylon, S. India, Malaya.
 „ *molle*, Desv., Whole World.
 „ *procurrens*, Baker, Whole World.
 „ *pennigerum*, Bl., Malay Peninsula.
 „ *unitum*, Linn., India, Trop-Asia, etc.
 „ *urophyllum*, Wall., Indo-Malaya.
 „ *sophoroides*, Desv., Japan, Formosa.

NEPHROLEPIS.

- Nephrolepis acuta*, Presl., Indo-Malaya.
 „ *cordifolia*, Linn., Whole World.
 „ „ var. *tuberosa*, Whole World.
 „ *exaltata*, Linn., Whole World.
 „ „ var. *volubilis*, Malacca, Borneo.
 „ „ var. *cristata*, Whole World.
 „ *Duffii*, Moore, N. Australia.
 „ *Piersoni* var. *compacta*.
 „ „ var. *todaieioides*.

DICTYOPTERIS.

- Dictyopteris Barberi*, Hook., Malaya.
 „ *difformis*, Bl., Burmah, Malaya.

GONIOPHLEBIUM.

- Goniophlebium subauriculatum*, Bl., Indo-Malaya, Australia.
 „ *verrucosum*, Wall., Malaya.

NIPHOBOLUS.

- Niphobolus acrostichoides*, Sw., Burmah, Malay Peninsula.
 „ *hoyæfolium*, Moore, Singapore.
 „ *penangianus*, Hooker, Penang.

DIPTERIS.

- Dipteris Horsfieldii*, Br., Malay Isles, Polynesia.

DRYNARIA.

- Drynaria quercifolia*, L., Indo-Malaya.
 „ *Heracleum*, Kze., Malaya, Philippines.
 „ *Linnaei*, Bory, India.
 „ *rigidula*, Sw., Malay Peninsula.

PLEOPELTIS.

- Pleopeltis angustata*, Swartz, N. & S. Indies, N. S. Wales.
 „ *affine*, Blume, Malaya, Philippines.
 „ *musaeifolia*, Blume, Malay Isles.
 „ *nigrescens*, Blume, India, Ceylon, etc.
 „ *longifolia*, Wett., Malaysia, Philippines.
 „ *hemionitideum*, Wall., India, China.
 „ *ovata*, Wall., India.
 „ *palmata*, Blume, Malay Islands.
 „ *punctata*, L., Trop. Old World.
 „ *phymatodes*, L., Trop. Old World.
 „ *sinuosa*, Wall., Malaya.

PHLEBODIUM.

- Phlebodium aureum*, L., Trop-America, Australia.

GYMNOGRAMME.

- Gymnogramme calomelanos*, Kaulf, Tropics.
 „ *var. chrysophylla*, Kaulf, S.
 „ America, West Indies.

LEPTOGRAMME.

- Leptogramme Totta*, Schl., S. Africa, India, etc.

SYNGRAMME.

- Syngramme alismaefolia*, Hook., Malaya.
 „ *Wallichii*, Hook., Borneo, Singapore.

SELLIGUEA.

- Selliguea Feei*, Hook., Malaya.
 „ *cantoniensis*, Baker, China.

BRAINEA.

- Brainea insignis*, Hook., India, Hongkong.

MENISCIUM.

- Meniscium Hosei*, Baker, Sarawak, N. Borneo.
 „ *triphylum*, Sw., Indo-Malaya, China.
 „ *salicifolium*, Wall., Malay Peninsula.

ELAPHOGLOSSUM.

- Elaphoglossum conforme*, Sw., Tropics.
 „ *latifolium*, Sw., Tropics.

ANTROPHRYUM.

Antrophryum reticulatum, Kaulf, India, Australia.

VITTARIA.

Vittaria elongata, Sw., Trop. Old World.

" *lineata*, Sw., All Tropics.

" *scolopendrina*, Presl., Africa, Indo-Malaya.

TÆNITIS.

Tænitis blechnoides, Sw., India, Malaya.

DRYMOGLOSSUM.

Drymoglossum piloselloides, Presl., Indo-Malaya.

ACROSTICHEAE.

STENOCHLAENA.

Stenochlaena palustre, L., India, China, Polynesia.

" *sorbifolia*, L., All Tropics.

*POLYBOTRYA.

Polybotrya appendiculata, Willd., Indo-Malaya, China.

STENOSEMIA.

Stenosemia aurita, Sw., Malay Isles to Solomon Isles.

GYMNOPTERIS.

Gymnopteris flagellifera, Wall., Indo-Malaya.

" *quercifolia*, Retz., Ceylon.

" *elliptica*.

" *repanda*, Blume, Trop-Asia.

" *subrepanda*, Hook., Malay Peninsula.

" *spicata*, Linn., India.

" *variabilis*, Hook., India.

CHRYSODIUM.

Chrysodium blumeanum, Hook., Assam, Java, Philippines.

ACROSTICHUM.

Acrostichum aureum, L., All Tropics.

PHOTINOPTERIS.

Photinopteris rigida, Wall., Malaya.

PLATYCERIUM.

Platynerium bifforme, Bl., Indo-Malaya.

" " *var. erecta*, Ridley, Singapore, Borneo.

" *Hilli*, Moore, Queensland.

OSMUNDA.

Osmunda regalis var. *Japanica*, Thunb. Japan, Himalayas.

SCHIZAEACEAE.

SCHIZAEA.

Schizaea dichotoma, Sw., Nearly all Tropics.
 „ *digitata*, Sw., Indo-Malaya, Polynesia.

ANEMIA.

Anemia rotundifolia, Schrad, South Brazil.

LYGODIUM.

Lygodium circinatum, Sw., Indo-Malaya, China.
 „ *flexuosum*, Sw., Indo-Malaya, Africa, Australia.
 „ *microphyllum*, Br., Indo-Malaya.
 „ *polystachyum*, Wall., Malay Peninsula.
 „ *japonicum*, Sw., Japan to Australia.

MARATTIACEAE.

ANGIOPTERIS.

Angiopteris evecta, Hoffm., Tropics of old World.

OPHIOGLOSSACEAE.

OPHIOGLOSSUM.

Ophioglossum nudicaule, L., Tropics.
 „ *pendulum*, L., Eastern Tropics.

HELMINTHOSTACHYS.

Helminthostachys zelanica, Linn., Eastern Tropics.
 H. N. RIDLEY AND T. WILSON MAIN.

REWARD FOR THE BEST METHOD OF EXTERMINATING “Termes Gestroi” IN PLANTATIONS.

A REWARD of £5,000 has been offered by the Government of the Straits Settlements and the Federated Malay States together with the Planters' Association of Malaya for the extermination of White Ants, as mentioned in the Agricultural Bulletin of the S. S. & F. M. S. of February 1909 p. 73. Competitors should send full particulars of

their scheme, which will be treated as confidential, to the Editor, Agricultural Bulletin S. S. & F. M. S. Singapore or to Mr. W. J. Gallagher, Office of Director of Agriculture, Kuala Lumpur, F. M. S.

The reward is intended for the destruction of *Termes Gestroi* in rubber plantations; an account of which has been already published in the Bulletin, and not for a mere poison such as Arsenic, Corrosive sublimate or Nicotine which will destroy any insects which happen to be touched by it. The sole difficulty in exterminating *Termes Gestroi* consists in the fact that the main nest lies under ground at an unknown spot and from it radiate small tunnels of considerable distance by which the termites attack the trees in the plantation.

Attempts to destroy them at the point of attack are of little use as the insects can retire underground to the nest, and attack other trees by means of fresh tunnels

Competitors should read the accounts of the life history of the insect, published in the Bulletin May 1908 p. 157 and March 1909 page 91.

EDITOR.

JOHN HADDON & CO. SPECIAL PRODUCE LETTER.

London, 8th April, 1909.

STRAITS REPORT.

BEESWAX

A good business has been done in all yellow descriptions, shipments arriving sell well, market outlook is good for the next few months.

CAPSICUMS

The better qualities are scarce and wanted at 50/- to 55/- per cwt. Common grades have sold at improved rates.

CHILLIES

Market firm, and a good business at high prices in Mombassas and Zanzibars, fair rates have also been paid for Japans which in comparison are cheap.

COPRA

A large business has transpired in all descriptions. We close F. M. Straits at £17. 17. 6.; Sundried £18.10.0.; Manila £17. 7.6.; Java £18.15.0.; Malabar £20; South sea £17.17.6 c.i.f. delivered weights.

GUM BENJAMIN

Trade has been very dull and prices in buyers favour. We value Sumatra, marbled, good to fine seconds at £7 to £8, common to fair £3.5.0. to £6.50; Palembang, common to fair 30/- to 44/-; Siam £8 to £27.

GUM COPAL

Transactions very small and at easier rates. We value Macassar, fair dark brown to fine pale scraped at 50/- to 70/-, middling to fair half hard 32/6d to 47/6d. Nuts, ordinary to hard 18/6d to 35/-, Chips 18/- to 35/-, Soft blocky sorts 17/6 to 22/6 per cwt. Pontianac,

dark to pale 55/- to 65/-, unsorted to half scraped 35/- to 45/-. Nuts, small to bold 26/- to 40/-, Chips 23/- to 29/-d.

GUM DAMAR Has been fairly steady although trade is quiet. Fair to fine Batavia value 65/- to 80/- and Singapore specky to fine clean 25/- to 70/-.

GAMBIER Trade has been difficult, and in consequence sellers have had to reduce values. Sales during the month from 24/- to 21/3d c.i.f. delivered weights at which price we close Sellers for May/June shipment.

PEPPER Black:—A large business has been done at firm to dearer rates, New York being the chief buyers.

While the demand has been on shippers have taken the opportunity of selling forward at what undoubtedly will prove be very good prices. We expect a weaker tendency shortly. We close March shipment New York at 3¼d, and Continent at 3 1/2d, also April/June and June/August at 3d, July/September at 2 15-16d c.i.f. delivered weights. These prices already show a decline of values ruling at the latter part of last month.

White Pepper:—Has sold well, particularly, for the near positions, In sympathy with Black the tendency of late has been weaker owing to slackened demand. We close March shipment at 5d for London, and 5 1-32d Continent, and 5 1/8d New York. March/May shipment we close sellers at 4¾d, April/June at 4 11-16d, June/August at 4½d c.i.f. delivered weights.

RUBBER

Prices have been fairly well maintained, notwithstanding the heavy supplies therefore we do not expect any material change before the end of July, when the outlook may be altered by new crop prospects.

Fine Para, biscuits and sheets 5/4½d to 5/6d, Crepe, ordinary to fine 5/2d to 5/7d, fine block 5/7d to 5/9d, scrap 4/2d to 4/7d per lb.

TAPIOCA

Business has continued quiet and difficult, but prices do not show any material change. For arrival Singapore April/June shipment closes Sellers at 1d 7/8 Singapore medium April/June shipment London 12s/6d, Penang superior fair 11/9d, ordinary fair 11/3d Sellers c.i.f.

SHELL

M.O.P. The next series of sales take place on May 11th. On the last occasion prices ruled firm to 10/- per cwt advance.

Bold and medium £6 to £9.5. medium and chicken £5.15.0. to £6.2.6. ; pickings £3.17.6. to £6.12.6. ; pieces £3.10. to £4.7.6.

MERGUI:—Bold and medium £7.10. ; medium and chicken £6.2.6. to £6.10. ; pickings £5.10. to £6.17.6.

GREEN SNAIL:—Singapore and Penang ; Small to

bold 28/- to 47/-; defective 18/6d. Mergui; Chicken to bold 31/6 31/6d to 46/-; defective 20/- to 26/6d.

VANILLOES

The moderate supply consisted of 436 tins, chiefly sold. Fine firsts were in small supply, realised fully last sales' rates, inferior firsts and doubtful flavor were again slow of sale. The bulk of offerings brown foxy and split beans which sold readily, and considering quality, prices, obtained, were steady.

Seychelles:—Of 167 tins 112 sold, fair to good, 6½ inch at 11/6d, 5½ to 6 inch at 9/6d to 10/-, 3½ to 5 inch at 6/3d to 9/-; common brown and foxy 4/- to 8/-.

Madagascar:—Of 17 tins 14 sold, fair, 3 to 7½ inch at 6/6d to 8/3d; common 4/6d to 6/6d.

Mauritius:—Of 27 tins 24 sold, common, 5 to 8½ inch at 6/6d to 8/6d; various 3/- to 5/9d.

Java:—192 tins sold, common 5/- to 6/6d, mouldy &c. 2/6d to 3/-.

Zanzibar:—26 tins sold, common, 4½ to 7 inch at 6/6d.

Bourbon:—5 tins sold, fair 3 to 6 inch at 4/9d to 7/6d.

Ceylon:—2 tins sold, common 3/-, mouldy 2/6d.

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

For the month of April, 15th & 30th.

			Tons.	
			15th.	30th.
Tin	Str. S'pore. & Penang to U. Kingdom &/or		1,300	2,166
do.	do.	U. S. A.	483	485
do.	do.	Continent	300	170
Gambier	do.	Glasgow	...	...
do.	do.	London	...	50
do.	do.	Liverpool	200	100
do.	do.	U.K. & or Continent	...	250
Cube Gambier	do.	United Kingdom	15	45
Black Pepper	do.	do.	10	15
do.	do.	do.	50	250
White Pepper	do.	do.	20	120
do.	do.	do.	...	...
Pearl Sago	do.	do.	45	80
Sago Flour	do.	London	110	490
do.	do.	Liverpool	1,050	750
do.	do.	Glasgow	...	75
Tapioca Flake	do.	United Kingdom	95	180
T. Pearl & Bullet	do.	do.	240	340
Tapioca Flour	do.	do.	...	550
Gutta Percha	do.	do.	20	55
Buffalo Hides	do.	do.	40	55
Pineapples	do.	do.	15,750	25,000 cases
Gambier	do.	U. S. A.	240	575
Cube Gambier	do.	do.	20	...
Black Pepper	do.	do.	1300	50
do.	do.	do.	..	70
White Pepper	do.	do.	300	20
do.	do.	do.	...	5

				Tons.	
Tapioca Pearl	..	Singapore	do.	270	190
Nutmegs	..	S'pore., Penang	do.	42	10
Sago Flour	..	Singapore	do.	625	...
Pineapples	..	do.	do.	4,250	1,500
do.	..	do.	Continent	1,000	1,000
Gambier	..	do.	South Continent	5	...
do.	..	do.	North Continent	175	330
Cube Gambier	..	do.	Continent	55	40
Black Pepper	..	do.	South Continent	60	75
do.	..	do.	North do.	250	70
do.	..	Penang	South do.	...	10
do.	..	do.	North do.	...	...
White Pepper	..	Singapore	South do.	5	15
do.	..	do.	North do.	70	100
do.	..	Penang	South do.	...	...
do.	..	do.	North do.	...	15
Copra	..	S'pore., Penang	Marseilles	660	600
do.	..	do.	Odessa	...	440
do.	..	do.	Other S. Continent	260	200
do.	..	do.	North Continent	2,100	600
Sago Flour	..	Singapore	Continent	1,700	1,150
Tapioca Flake	..	do.	do.	25	70
do. Pearl	..	do.	do.	5	10
do. Flake	..	do.	U. S. A.	...	50
do. do.	..	Penang	U. K.	60	75
do. Pearl & Bullet	..	do.	do.	35	125
do. Flake	..	do.	U. S. A.	...	...
do. Pearl	..	do.	do.	...	130
do. Flake	..	do.	Continent	10	10
do. Pearl	..	do.	Continent	325	100
Copra	Str.	S'pore., Penang	England	100	50
Gambier	..	do.	U. S. A.	...	...
Cube Gambier	..	do.	do.	...	...
T. Flake & Pearl	..	do.	do.	...	...
Sago Flour	..	do.	do.	...	...
Gambier	..	do.	South Continent	...	...
Copra	..	do.	Marseilles	...	...
Black Pepper	..	do.	South Continent	...	...
White Pepper	..	do.	do.	...	...
do.	..	do.	U. S. A.	...	...
Pineapples	..	do.	do.	...	...
Nutmegs	..	do.	do.	...	...
Black Pepper	..	do.	do.	...	...
do.	..	Penang	do.	...	...
White Pepper	..	do.	do.	...	...
P. Flake & Pearl	..	do.	do.	...	...
Nutmegs	..	do.	do.	...	...
Tons Gambier				750	1,100
Tons Black Pepper				190	470

Wired on 15th April & 1st May.

Perak.

Abstract of Meteorological Readings in Perak for the month of April, 1909.

302

DISTRICT	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taipeng	...	152	81.19	93	71	22	77.60	900	...	85	...	32.65	6.20
Kuala Kangsar	80.75	94	71	23	76.19	844	...	80	...	10.95	3.85
Batu Gajah	...	159	81.21	93	72	21	77.12	878	...	83	...	11.32	3.62
Gopeng	80.74	92	63	29	76.04	836	...	79	...	7.57	2.20
Ipoh	81.07	94	71	23	77.61	900	...	85	...	7.71	1.76
Kampar	79.71	93	70	23	76.09	854	...	84	...	17.02	2.06
Teluk Anson	81.55	93	68	25	76.82	860	...	79	...	11.72	3.46
Tapah	81.65	93	69	24	77.04	867	...	80	...	10.38	1.97
Parit Buntar	82.30	91	72	19	78.14	908	...	82	...	9.03	2.40
Bagan Serai	82.03	91	71	20	77.59	886	...	81	...	14.95	3.19
Selama	80.81	93	72	21	76.94	876	...	83	...	19.22	2.69

STATE SURGEON'S OFFICE,
 Taipeng, 14th May, 1909.

M. J. WRIGHT,
 State Surgeon, Perak.

Penang.

Abstract of Meteorological Readings in Criminal Prison Observatory for the month of April, 1909.

303

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Dew Point.	Mean Humidity.			
Criminal Prison Observatory	29.868	149.7	82.9	90.0	75.3	14.7	79.2	95.4	77.6	82	N.W.	2.32	1.01

CRIMINAL PRISON OBSERVATORY PENANG,

A. H. KENN,

10th May, 1909.

Medical Officer, the Prison Penang.

Negri Sembilan.

Abstract of Meteorological Readings in Negri Sembilan Hospitals for the month of April, 1909.

304

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Seremban	...	142.8	81.6	88.8	71.9	16.9	77.9	88.7	75.3	82.1	N.W.	14.98	2.38
Mantin	15.24	2.36
Ayer Kuning	6.23	2.40
Tampin	8.74	2.70
Kuala Pilah	8.78	1.64
Jelebu	6.60	1.70
Port Dickson Town	11.06	3.67
Port Dickson Beri-Beri Hospital	8.75	1.85

SURGEON'S OFFICE,
13th May, 1909.

S. LUCY,
Medical Officer in Charge.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of March, 1909.

305

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.	
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.				
Kuala Lipis	79	92	66	20	74
Raub	80	93	67	21	74	...	...	...	...	9.39	2.62	
Bukit Fraser	2.86	1.03	
Bentong	79	92	70	17	75	...	...	...	...	8.90	2.33	
Temerloh	92	72	19	...	...	...	...	...	14.44	3.30	
Pekan	83	93	69	15	78	...	...	...	...	4.09	2.80	
Kuantani	87	91	70	16	77	...	...	...	...	4.75	2.04	
												2.54	1.15	

MEDICAL DEPARTMENT

Kuala Lipis, 23rd April, 1909

F. NICHOLAS,

For Medical Officer, in Charge, Pahang.

Kelantan.

Abstract of Meteorological Readings in Kelantan for the month of April, 1909.

306

DISTRICT.	Mean Barometrical Pressure at 320 Fah	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lebir	Mean 90.51	Mean 73.93	Mean 16.58	...	...	...	...	...	3.07	.78
Kuala Kelantan	81.93	73.2	8.8	...	...	...	...	...	3.72	2.35
Kuala Pergau	2.65	.71
Taku Plantation	2.19	.48

STATE SURGEON'S OFFICE,
Kelantan 7th May, 1909.

A. G. H. SMART,
State Surgeon, Kelantan.

10/57

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of April, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
307 General Hospital, K. Lumpor	29.865	147.3	81.0	89.9	72.6	12.3	76.6	0.835	73.7	79	S. W.	9.56	1.25
Pudoh Gaol " "	9.46	2.57
District Hospital " "	7.75	1.90
" Klang	90.6	71.7	18.8	...	...	...	...	...	9.63	1.80
" Kuala Langat	91.8	74.9	16.9	...	...	...	...	...	3.00	0.68
" Kajang	88.2	75.6	12.5	...	...	...	...	...	12.99	3.03
" Kuala Selangor	89.1	76.2	12.9	...	...	...	...	...	6.54	1.83
" Kuala Kubu	92.1	71.5	20.6	...	...	...	...	...	14.34	2.53
" Serendah	92.3	70.6	21.7	...	...	...	...	...	9.71	1.82
" Rawang	90.8	72.0	18.8	...	...	...	...	...	12.80	2.25
Beri-beri Hospital, Jeram	3.91	1.20
Sabak Bernam	7.94	2.73

OFFICE OF SENIOR MEDICAL OFFICER,
Kuala Lumpur, 20th May, 1909.

W. D. DAUR,
Senior Medical Officer.

Seremban.

Table Showing the Daily Results of the Reading of Meteorological Observation taken at the General Hospital, Seremban, for the month of April, 1909.

DATE.	TEMPERATURE OF RADIATION.						TEMP. OF RADIATION.		WIND. DIRECTION.		TEMP. OF EVAPORATION.			COMPUTED VAPOUR TENSION.			RELATIVE HUMIDITY.			CLOUDS 0 TO 10.			WEATHER INITIALS.			RAIN				
	9 H.	15 H.	Mean.	Maxi-mum.	Mini-mum.	Range.	Sun.	Differ-ance Sun & Shade.	9 H.	15 H.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	21 H.	Inch				
	H.	H.							H.	H.	H.	H.		H.	H.		H.	H.		H.	H.		H.	H.	H.					
1	80	81	80.5	89	70	19	143	54	N	E	N	W	76.6	77.7	77.1	916	947	931	90	90	90	3	2	4	S	S	C	.84		
2	81	73	79.5	88	72	16	125	37	N	W	N	W	79.3	64.4	71.8	1000	605	802	95	63	79	6	10	8	S	N	C	.75		
3	76	86	81	87	70	17	143	56	N	W	N	W	72.6	69.5	71	801	721	761	89	58	73.5	2	7	2	S	N	C	.48		
4	82	84	83	88	72	16	135	47	S	W	S	W	77	75.7	76.3	926	888	907	85	76	80.5	4	6	6	S	C	C			
5	79	85	82	89	70	19	143	54	S	W	S	W	73.9	76.7	75.3	889	922	880	85	76	80.5	3	3	3	S	C	C			
6	80	82	81	86	74	12	123	37	S	E	N	W	73.3	75.3	74.3	820	877	848	80	80	80	5	5	2	S	C	C	.32		
7	78	86	82	89	73	16	144	55	S	E	N	W	72.9	76.3	74.6	810	904	857	84	72	78	4	2	9	S	S	C	.05		
8	85	86	85.5	91	74	17	150	59	S	E	S		73.4	77.3	75.3	826	955	890	68	76	72	4	2	2	S	S	C			
9	82	85	83.5	90	73	17	148	58	S	E	S		73.6	76.7	75.1	820	922	871	76	76	76	1	1	1	S	S	C			
10	85	87	86	90	73	17	150	60	S	E	S		73.4	78.8	76.1	826	985	905	68	77	72.5	1	2	2	S	S	C			
11	85	87	86	89	72	17	149	60	S	E	S	W	71.8	75.5	73.6	781	884	832	64	69	66.5	4	4	2	S	S	C			
12	85	88	86.5	91	73	18	150	59	S	E	S	W	73.4	74.9	74.1	826	865	845	68	65	66.5	3	3	9	S	S	C			
13	84	89	86.5	92	73	19	150	58	S	W	N	W	75.7	84.1	79.9	888	1172	983	76	85	80.5	4	4	2	S	S	C	.11		
14	84	89	86.5	90	72	18	148	58	S	W	N	W	72.4	84.1	78.2	794	1172	983	68	85	76.5	2	4	7	S	C	C	.38		
15	80	75	77.5	85	71	14	125	40	N	W	N	W	76.6	73.3	74.9	916	820	860	90	94	92	4	10	8	S	C	C	.60		
16	74	85	79.5	88	71	17	143	55	N	W	N	W	74	76.7	75.3	840	922	881	85	70	83	6	5	8	S	C	C			
17	81	83	82	85	71	14	140	55	S	E	N	W	70.7	76.3	76.5	897	905	901	85	85	82.5	2	2	5	S	C	C	.10		
18	78	86	82	89	70	19	146	57	S	E	N	W	74.6	76.3	75.4	857	904	880	89	89	80.5	3	3	2	S	C	C			
19	76	85	80.5	92	71	21	150	58	N	E	N	W	72.6	76.7	74.6	801	922	861	89	89	82.5	3	4	2	S	C	C			
20	79	76	77.5	89	72	17	145	56	N	E	N	W	75.6	74.3	74.9	888	848	868	90	94	92	4	6	8	S	C	C	.22		
21	80	82	81	89	71	18	144	55	N	W	S	W	76.6	75.3	75.9	916	877	896	90	80	85	4	4	3	S	S	C			
22	80	77	78.5	91	73	18	147	56	N	W	S	W	75	73.6	74.3	867	829	848	85	89	87	3	7	1	S	S	C	.02		
23	80	81	80.5	88	73	15	141	53	N	W	S	W	76.6	76	76.3	916	897	907	90	85	87.5	4	3	9	S	S	C	.04		
24	78	81	79.5	86	73	13	148	62	N	W	S	W	76.3	76	76.1	906	897	901	94	85	89.5	3	3	8	S	S	C			
25	80	78	79	89	73	18	139	50	N	W	S	W	76.6	74.6	75.6	906	857	886	90	89	89.5	0	0	4	S	S	C	.15		
26	78	88	83	91	72	19	147	56	N	W	S	W	76.3	83.1	79.7	885	922	903	89	76	83	2	5	7	S	S	C	.53		
27	79	85	82	89	73	16	142	53	N	W	S	W	75.6	76.7	76.1	885	922	903	89	76	82.5	0	0	6	S	S	C	.37		
28	77	85	81	88	71	17	138	50	N	W	S	W	73.6	76.7	75.1	829	922	875	90	94	92	1	10	10	S	S	C	.73		
29	79	80	78.5	87	73	14	137	50	N	W	N	W	75.6	76.3	75.9	885	906	895	90	94	92	0	0	6	S	S	C	.29		
30	77	88	78.5	88	69	19	151	63	N	W	N	W	71.9	76.6	74.3	783	916	850	84	90	87	0	0	6	S	S	C			
Mean	80.1	83.2	81.76	88.8	71.9	16.9	142.8	54					74.4	76.2	75.3	863	910	887	84.5	79.6	82.1								14	.90

Highest Temperature 92. Lowest Temperature 69. Greatest Rainfall in 24 hours 2.38.

J. A. SCHELKIS,
Apothecary.

SINGAPORE MARKET REPORT.

For April, 1909.

Articles.	Quantity sold.	Highest price.	Lowest price.
	Tons.	\$	\$
Coffee Palembang ...	...	...	...
Bali ...	10	26.00	25.00
Liberian ...	204	25.00	24.50
Copra ...	2,825	8.00	7.35
Gambier Bale ...	1,605	9.12½	8.60
Cube, Nos. 1 & 2 ...	165	14.00	12.00
Gutta Percha, 1st quality ...	...	300.00	240.00
Medium ...	...	240.00	120.00
Lower ...	...	80.00	12.00
Gutta Jelotong ...	...	8.20	6.90
Nutmegs, 110s ...	...	19.00	17.00
80s ...	...	24.00	22.50
Mace, Banda ...	...	78.00	74.00
Amboina ...	...	67.00	63.00
Black Pepper ...	632	11.75	11.37½
White Pepper (Sarawak) ...	254	19.00	18.25
Pearl Sago, Small ...	190	3.70	3.65
Medium ...	...	...	...
Large ...	...	...	...
Sago Flour, No. 1 ...	5,975	3.05	2.80
No. 2 ...	115	1.22½	1.05
Tapioca Flake, Small ...	509	5.10	4.70
Medium ...	...	...	...
Pearl, Small ...	387	7.45	4.05
Medium ...	670	4.85	4.37½
Bullet ...	...	8.25	8.00
Tin ...	2,300	68.37½	67.60

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

No. 7.]

JULY, 1909.

[VOL. VIII

A NEW FUNGUS-PEST ON PARA RUBBER.

I have recently received from a planter in Perak portions of the branches and boughs of Para rubber trees destroyed by the attacks of a bark fungus hitherto unknown to me. The attack commences on the shoots which presently turn black and die, and the disease continues to descend to the trunk of the tree which eventually perishes. On examining the bark attacked, there can be seen numerous raised spots, which split and show a black fungus pushing out in the crack. In some places the bark is quite thickly marked with short straight cracks parallel to the axis of the branch. In older parts of the branch the grey bark is covered with larger elevated patches black in color and looking as if soot had been thrown on the tree. The cambium is dead and black, the wood dry, and soon perishes.

Examination with the microscope shows that in these black patches are round spaces (perithecia) imbedded in a black mass, (stroma) from the interior of which are discharged large numbers of oval spores, mostly transversely divided. The fungus evidently belongs to the group of *Ascomycetes* and appears to me to be allied to a genus *Cucurbitaria* parasitic on the Laburnum in Europe in much the same way as this fungus attacks Hevea here.

The correspondent who sends the specimens writes, "Trees with apparently the same disease are dotted about the Estate singly and in groups. I am cutting down all the diseased trees to the point where the latex exudes healthily. This cutting back appears to stop the disease as the stumps

shoot again in about 7 days. The disease appears to be a bark or leaf one as the death seems to start from the tip or tips of the branches and travels down the tree and if left alone in a short time will completely kill it." Of one specimen he writes, "The tree I send you was alive 12 days ago and yesterday I had to cut it back four inches from the ground to get to healthy wood. The tree is little over 2 years old." From this I gather that the disease is very rapid in action.

In a later letter he says, "The fungus appears to be ripe in the wet season, and seems to be either dying or stationary during the now dry season. The trees are planted fifteen feet by fifteen in hilly land. The disease appeared in the heavy rains of March, April and May. The particular tree I sent you was apparently wintering when I left for Singapore on 11th of May and was dead to within five inches of the ground on my return on the 23rd. It was 2½ years old."

There can be no doubt that this fungus might prove a very serious pest especially in the case of large trees where in an estate it would be both difficult to detect at first and troublesome to get at. Planters should therefore in going over their estates watch very carefully to see if there are any trees beginning to go at the top, branches dying and blackening. If so they should be at once cut off and as quickly as possible burnt. They must not be left lying about, or the spores will be blown by the wind on to other trees. The spores in the specimens before me are extremely abundant, and one fruit of the fungus contains enough to infect half the trees in the estate. Should this pest become aggressive in an estate it might be advantageous to check it by spraying with Bordeaux mixture, which would destroy the spores, and this would be especially valuable in the case of big trees affected, as it is very difficult to cut back the end twigs in an adult Para rubber as the branches are too thin and brittle to bear an operator.

For big trees a full sized spraying machine would be required as they rise to 60 or 80 feet in height; such a machine as is used in spraying orchards in America.

In cutting back the infected boughs the planter must be careful to cut far enough back. The mycelium running in the cambium layer as it appears to do is probably considerably below the point at which the sooty fruit is produced, and even below the point at which the bark appears definitely dead. I would suggest too that the bark of the infected tree round the place where the dead tree is

cut, and the branches of any neighbouring trees should be treated with Bordeaux mixture to prevent any further infection by spores.

ED.

ANOTHER FUNGUS PARASITE ON RUBBER.

Mr. E. Betehe, Botanical Assistant at the National Herbarium, New South Wales, reports that Dr. Funk of Apia communicated a rather interesting parasitic disease which causes the death of Cocoa and Rubber Trees. The fungus has been identified as *Hymenochaete noxia* Henning. (Supplement to Tropical Agriculturist, May 1909, p. 502). I have no other record of this observation. However I have lately seen Para rubber roots attacked and killed by a species of *Hymenochaete* which is probably this pestilential thing. *Hymenochaete* is a very curious fungus, it has the appearance of a thin layer of bright brown velveteen on a tree or root, under ground it seems to hold to itself the soil, sand, etc., making a thick coat upon the root. It kills the roots slowly attacking large sized roots and causing them to dry up.

IMPROVEMENTS IN THE MANUFACTURE OF GAMBIR.

The question of improvement in the methods of manufacture of Gambir is one which has a great deal of importance to the Leather trade in England, and attention has been called by the Director of the Imperial Institute to the improved factories of the Dutch in Indragiri, Sumatra. Gambir was formerly grown to a very large extent in Singapore, usually in combination with pepper. The cultivation died out almost completely somewhat suddenly in 1894 or about that time and at present few Gambir fields remain in Singapore. With the Gambir cultivation went also the pepper gardens. The area formerly under cultivation must have been the greater part of the island of Singapore, as is evinced by the immense area of wasted useless ground, absolutely deserted and covered with secondary scrub and lalang. The cause of the abandonment of this cultivation was due partly to a fall in the price of pepper, but mainly from the so complete destruc-

tion of timber and fire wood, that the cultivator was unable to procure enough posts for the pepper plants, and wood to make burnt earth, to manure it or firewood to boil the gambir. When they had used up what was easily accessible to their plantation, they shifted the plantation and so went on till there was no suitable ground left, then the cultivation disappeared, and the land abandoned became a wretched desert of lalang, and in many cases has begun slowly to come back to secondary scrub.

The Chinese method has been described in the first series of the Bulletin. It was wasteful and reckless. The product was very wet, and though at one time there was a considerable profit on it, it might have been made much higher if the Gambir had been turned out in a dryer and cleaner condition.

In 1894 I being on leave in England visited Leeds the centre of the tanning industry and had an opportunity of seeing the Singapore Gambir being used in the tanneries and was quite surprised to see how much dirt and rubbish came from it when put through the washing machinery and also my attention was called to the very large proportion of water in the product. On my return to the East I made enquiries about this, and attempted to induce planters to turn out a dryer and better product. I was informed by one that chemically dried gambir had been sent home by him on one occasion, but that unfortunately when sold the brokers did not appreciate the value of the product, and it sold for the same price as gambir which was very wet indeed. He did not attempt any further work in this direction.

Some few years ago we had at the Agricultural Exhibition in 1906, some very fine samples of dried gambir, in the form of powder produced at Lanadron in Muar, but we have not heard of this manufacture since.

From Prof. Dunstan I heard lately that gambir was being manufactured in Indragiri, Sumatra, by modern methods, and Mr. Burchard of Indragiri has kindly given some information on the matter. The leaves are boiled by steam and the decoction passes into a vacuum chamber, by pipes there it is treated by steam, till it is of a consistency sufficient to be run off and cooled in cases in which it is shipped. The whole factory is fitted with steam power, leaf cutters, and elevators, electric light, ice works and saws. The factory works day and night and turns out 80 piculs of Gambir a day. The buyers at first did not appreciate the product and would not pay more than 16s. per

picul, but now it has risen in price to 30s. a picul, and as the factory is enlarging its plant, we may presume there is a good profit on this. It seems hardly likely that the cultivation of Gambir will return to the Straits Settlements on the same scale as it formerly was, but this tan stuff is required and will long be of the greatest importance to tanners, and the cultivation may return to waste fields at some time. There is a good deal still grown in Malacca and Johore, but the Para rubber tree is gradually driving all other cultivations before it, even in these places. Should it return we shall hope to see the cultivation run on a better system both as regards the land and the manufacture.

ED.

PARA RUBBER. VARIOUS RECENT PUBLICATIONS.

Abnormalities. Mr. Petch has brought two Circulars from the Botanic Gardens in Ceylon of interest to rubber planters. One deals with the looping and other contortions of the radicle in the germinating of the seed, and the other treats of burrs and outgrowths of wood and bark.

In the germination of Para rubber seed it is too common to find the young root twisted into a loop or recurved in such a way as to seriously interfere with the growth of the tree. Some notes on this point have already been published in the Bulletin. Mr. Petch after giving a description of the structure and moral development of the young plant gives an account of some experiments on germination made by planting the seeds in different positions in the soil. Fifty seeds were planted horizontally with the lower (flat surface) downwards, and fifty the other way up. Fifty were planted vertically with the Micropyle (the little circular spot from which the root is pushed out) downwards, and fifty with the Micropyle upwards. Fifty were planted horizontally on the narrow edge. In all these ways the seeds that germinated came up normal without any bend or loop, except when the seeds were planted with the micropyle upwards, in all of which the young root was curved, or bent or formed complete loops, out of sixty seeds planted in this position not one germinated normally. There are however other ways in which looping of the root is produced irrespective of the position of the seed, occasionally the

tip of the plumule is held between the cotyledons in the seed and comes out between the two stalks of the cotyledons, a figure is given of this. One plant growing thus got an excess of water and the loop swelling too much, the tip broke off. The plumule had thus no growing point. Headless seedlings he says are not uncommon in nurseries. They then produce two buds from the axils of the cotyledons and a double stemmed plant is the result. The paper is illustrated by photographs of abnormal and normal seedlings.

Burrs. The second circular deals with the subject of Burrs, of which the author distinguishes two forms. Wound burrs and burrs formed by nodules. The first is due to the injury of the wood in tapping, or otherwise. At the edge of any wound the cambium produces a swollen crust of new wood and bark, and this wood is of a distinct structure from normal wood and is known as wound wood. The amount produced is greater at the point where the cambium is injured than would be the case where it is not injured consequently the wounded part is elevated and the pattern of the wood raised. In a short time the cambium produces normal wood instead of wound wood and theoretically the gradual growth of the wood should obliterate the pattern, but this appears to be a slow process in Hevea. (Strictly speaking these elevated portions of wood and bark produced in wound repair should not be called burrs but perhaps wound-scars would be a better word). The burrs caused by nodules, are what are usually known as burrs. The structure and history of these is fully described. They are very troublesome if they develop to any great extent on the trunk for the bark over them often dries up and no latex can be got, as the only laticiferous tissue lies behind the burr. The author urges the excision of the core of the burr before it attains any considerable size. "If the outside of the burr is sliced off the core can be shelled out quite easily but if they are allowed to grow they become attached to the main wood at several points and a very ugly wound results when an attempt is made to cut them out."

The main source of such burrs lies in the use of the pricker, according to the author and this seems to be sufficiently well proved. An improved pricker has been invented which is said not to produce burrs, but it is too soon to prove this, and theoretically at least the new one which is blunt should prove more injurious than the old one.

It would be better probably to abolish the pricker altogether.

The paper is illustrated with figures of nodules, and of a tree covered with burrs. The whole article is well worth studying by rubber-planters.

MANURING OF RUBBER.

An article on manuring of rubber by Mr. Cowie appears in the *India-Rubber Journal*, Ap. 19, 1909, p. 463, it is based on work done by Mr. Eckert of Ceylon, and on experiments of Deli-Muda Sumatra. A manure containing 6 per cent of nitrogen and 5 per cent potash was found to develop the foliage to such an extent that the trees were broken down by the wind, but a mixture with 4 per cent nitrogen and 15 per cent potash improved immensely the trunks of the trees.

The following manures are recommended.

I. For land rich in nitrogen, with good leaf-growth.

- 28 p.c. Muriate of potash
- 25 p.c. Superphosphate
- 20 p.c. Bone-meal
- 17 p.c. Oil-cake
- 10 p.c. Sulphate of Ammonia
- 400 to 800 lbs. per acre.

II. For land poor in nitrogen.

- 20 p.c. Muriate potash
- 30 p.c. Superphosphate
- 10 p.c. Bone-meal
- 14 p.c. Sulphate Ammonia
- 16 p.c. Oil-cake
- 400 to 700 lbs. per acre.

These manures can be sprinkled at a foot or a foot and a half distant from the stem for each year of the plants growth. (By the way why do planters so constantly plant their manures right up to the trunk of their trees? The growing tips of the important roots are not there, they lie at a distance from the tree in a regular ratio to the height of the tree. One does not feed a horse by putting its corn on its back, and waiting till it falls off and the horse can pick it up off the ground, Ed.) To prevent the manure being washed away by rain it is advisable to lightly pick it in or to dig a trench round the tree and cover it in with surface soil.

ANIMALS ASSOCIATED WITH RUBBER.

This is the title of a Ceylon circular by Mr. E. Green, who describes a number of insects attacking the rubber tree

in Ceylon. The roots are attacked by a Cockchafer grub, *Lepidiota pinguis* which attacks roots of all kinds of trees including *Hevea*.

One correspondent had lost 3,000 plants in one clearing, apparently all young trees. The grub burrows in the ground and bites through the roots. He recommends the use of "vaporite" a patent insecticide sold by the Strawson Company. It is dibbled into the soil 1 to 1½ oz. at about the distance of 6 inches from the stem, and gradually diffuses a vapour through the soil which destroys the insects.

Nitrate of soda, applied at the rate of from 1 to 2 oz. for each plant was also found effective.

Termites do not affect the Ceylon trees as they do here, as *Termes gestroi* does not occur there.

A longicorn beetle grub burrowing into the root is also recorded. It burrows up the tap root into the stem which breaks off at or below the level of the ground. On the stem, the Bark-eating Caterpillar (*Comoeritis pieria*) is mentioned. It rubbles the bark and resides in a silken web composed of bark fragments and their own excretar. It really does no harm as it only eats the outer cork. (It or an allied species is not uncommon here). It can be brushed off the tree by hand. The short hole borers are mentioned but in all cases at present, these insects can only attack dead wood, patches on trees killed by some fungus or some such injury. A bark eating beetle (*Moechotypa verrucicollis*) was accused of girdling young Heveas nibbling the bark in a ring round the stem. It was found however that the trees attacked were already dry from the attacks of a fungus. When the animal was allowed to bite a healthy young tree, the latex choked its mouth and it fled and would not try again. The Cut worm (*Agrotis segetum*) an omnivorous moth caterpillar was reported as damaging seedlings, but seems generally to prefer other herbage.

Locusts of different kinds attacked the young bark, and the leaves. Poisoned baits are recommended made of 1 part Paris green 2 parts Salt and 40 parts fresh horse-dung with sufficient water to make the mixture soft without being sloppy.

The ends of stumped plants; constantly die back for a short way leaving a dead stick on the end and small bees and wasps sometimes use this to put their nests in, burrowing down the pith. The only possible danger from this is the continuation downwards of the decay. This may be obviated by stumping immediately above the node, and in any case the dead bits when dry should be always removed.



A Remarkably Prolific Coconut.

Scale insects (*Coccidae*) do not seem to have done much harm in Ceylon. A bagworm is also mentioned as attacking the leaves, but no caterpillar seems to actually like Hevea leaves, though occasionally a few having exhausted their food plant will have a try at the Para rubber trees. The slugs in Ceylon apparently confine their attentions to the latex in the wounds of the tree. One given a saucer of latex drank it for ten minutes and was none the worse. Here they attack the leaf buds of the trees even climbing up to the top of the big trees.

ED.

A REMARKABLY PROLIFIC COCONUT.

PLATE II.

With this number we give a photograph of an exceedingly prolific coconut tree grown on Klanang Estate, Jugra in Selangor. The tree is only eleven years old and the total number of nuts on the tree at the time at which the photograph was taken was more than three hundred and sixty. I imagine that there are few coconut trees that can beat this record.

The coconut industry is one of the most important and valuable ones, and it is gratifying to be able to show that it is not only in rubber that the Malay Peninsula comes well to the front.

For the photograph and notes on this remarkable tree we are indebted to Mr. Gallagher.

ED.

REPORT OF THE WELLCOME RESEARCH LABORATORIES AT KHARTOUM.

(REVIEW.)

We have received a copy of the third Report of the Wellcome Research Laboratories of the Gordon Memorial College Khartoum a really magnificent piece of work reflecting the greatest credit on the Director Dr. Andrew Balfour and his staff. The book contains 450 pages and is beautifully illustrated with photographs and colored drawings. The objects of the Laboratory are given briefly in a separate slip with the book. They are to promote technical

education, to study the tropical disorders of man and beast peculiar to the Sudan, to study the poisons of this region, the agricultural pests, sanitation, minerals and other things relating to industrial development. The work on the blood parasites of man and domestic animals is of the greatest importance to all living in the tropics, and although we here are fortunate in not being affected with sleeping-sickness or Kala-Azar, still we have enough blood-parasites for this work to be of the utmost importance not only to doctors of man but of those of our agricultural stock. The coloured figures of Trypanosomes are as fine as anything that has been published. The article on the Sanitation of Khartoum is worth reading by all Municipal Commissioners in the Tropics, and the story of the conversion of Khartoum from a filthy, stinking malarious spot into a decent clean comparatively healthy town, is one of no small interest. In this part of the work some experiments are detailed of the use of *Derris uliginosa* as a larvicide for mosquitoes. This climber is an extremely common and rather pretty plant with pale pink pea-flowers in our mangrove swamps, and perhaps it might be used here. It is allied to the well-known Tuba root, and was found to be very effective in killing mosquito larvae, a decoction of the bark being used. The plant is however difficult to procure in Khartoum. It might be possible to make an extract of these barks which could be used as a larvicide in parts of the world where the plants themselves could not grow.

The report on harmful insects closely allied or identical with species common here is well illustrated by fine colored drawings. There are chapters on ethnology and anthropology with excellent photographs, and a good deal of the results in chemical research on water, and vegetable fats and oils. The work ends with a valuable account of the Sudan Gums, and Gum trade.

During the year the staff sustained the loss of a valuable assistant in Dr. Mactier Pirrie who after making an important expedition into the interior was taken ill with Kala-azar and malaria to which he succumbed after his return to Scotland. Much of his work appears in the report.

The bacteriological laboratory too was destroyed by fire entailing a severe loss of specimens and records for the past five years. Notwithstanding these losses the report is of great value, and fully justifies the existence of the Research Laboratories.

ED.

HAILSTORM IN SINGAPORE.

A correspondent of a local paper records the occurrence of a hailstorm in Singapore on May 14th. It passed over the North East Corner of the island in the afternoon. The hailstones were said to be as large as hazel-nuts, and rubber leaves were cut to pieces and vegetables destroyed. There does not seem to have ever been a record of hail in Singapore before and this is the most Southern spot in which hail has been recorded in the Peninsula.

ED.

CASTILLOA ELASTICA FRUITING IN SINGAPORE.

A number of trees, raised from seed of *Castilloa elastica* were planted in a low swampy bit of ground in the Botanic Gardens in 1898. The plant has not done well here at any time or in any place, and of those planted in this damp spot, some perished and others made little or no growth, after a few years. One however which had a certain amount of shade and had the advantage of having a rubbish pit within easy reach of its roots, has developed into a fine looking tree about 46 ft. tall and has commenced to fruit plentifully. The seeds seem to be sound; I believe this is the first record of the tree fruiting here, at least I have no other record. Perhaps some of our readers know of other cases.

ED.

THE CLIMATE OF PENANG.

The following is a comparison of the chief meteorological readings taken at the Government Hill and the Prison Observatory for April, which will show at a glance the great difference, as regards heat, between the Hills and the plains:—

The mean minimum temperature in the shade on the Government Hill for April was 65° and the maximum was 77°; the mean minimum at the Prison Observatory for April was 75.3° and the maximum 90°.

The highest sun temperature on the Government Hill for April was 136° on 30th; the highest temperature in the sun at the Prison Observatory was 160° on the 4th.

The lowest sun temperature on the Government Hill for April was 110° on the 17th; that at the Prison Observatory was 142° on the 2nd.

The rainfall for April, 1909, was as follows:—

Pulau Jerejak	5.86
Prison Observatory	1.32
Government Hill	7.08
Fort Cornwallis	2.16
Lumut	8.64
Pangkore	2.41
Bruas	9.36
Balik Pulau	9.21

It has always been observed, and fairly correctly too, that our dry season generally lasts from about December 15 to the same date in the following month of May, so that we are at present fairly ushered into our usual rainy season, which may last often to the middle of December—August, September, and October helping to increase the rainfall for the year.

M. E. SCRIVEN.

AGRI-HORTICULTURAL EXHIBITION FOR 1909.

The exhibition will be held at Penang on Monday, Tuesday, and Wednesday, 9th, 10th and 11th. The Schedule of prices is published and can be had on application to W. Fox Esqr., Botanic Gardens Penang, or the Director Botanic Gardens Singapore. A considerable number of cups are offered for different exhibits by various donors. His Excellency Sir John Anderson offers a cup for the best general exhibit in Division A. Agricultural Produce. In the Rubber section, cups are offered by Hon. J. Turner for crepe and sheet, by Mr. Lauder Watson for Block; for the best sample for shipment 50 lbs. packed, one case of crepe sheet or block and one of scrap the Caledonia cup, from Caledonia estate; for the best sample of commercial rubber not less than 100 lbs., a cup presented by Mr. Pears, for the best sample of sheet, crepe, biscuit, block and scrap, not less than 100 pounds. A cup by the Malay Peninsula Agricultural Association. Cups are also offered for various plants, fruit and vegetables, and special prizes for cattle, horses, etc.

Entries close for Agricultural and Horticultural produce on August 2nd; Dogs and Horses, July 19th; Native Arts and Industries, and Agricultural Implements, Aug. 2nd.

The regulations governing the exhibition are the same as on previous occasions. Exhibitors desiring free transport by Railway must give notice to a District Officer or the General Secretary who will if they approve their exhibits, provide them with numbered tickets and a free third class pass on the railway for themselves and their exhibits. A reduction of 25 per cent off the usual freight will be made by the Straits Steamship Co. on all bona-fide exhibits. All other reasonable expenses in connection with the transport of exhibits will be considered by the Committee.

ED.

EFFECT OF GALE ON A PARA-RUBBER TREE.

A correspondent sends in a letter on account of a Para-rubber tree in which the tap root seemed to have lost its bark which was regrowing, and on which were large lumps of rubber. The tap root itself seemed sound and solid though small in proportion to the size of the tree. The side roots were very numerous and healthy. Some of the side roots at a foot from the tree have broken up into a tuft of smaller roots, rather suddenly as if the end had died and the tree was trying to save itself by producing fresh roots from the cut or dead end. The tree itself looked as healthy as any in the block. No signs of disease of any kind were found. It appears that the ground on which this tree stands is liable to an annual gale and while other trees in the block have been blown down or into a slanting position, this has resisted the violence of the gales. There is no doubt that the tree has had a violent wrench in one of these gales and some of the side roots parted and probably the tap root got cracked as well, so that the latex exuded to repair the damage. The tree however had so strong a hold in the ground by its anchor-roots that though some broke the others held firm and the tree did not fall.

ED.

AZOLLA, AS AN ANTI-MOSQUITO PLANT.

Mr. Peckholt in a German publication is quoted as suggesting the use of this little water-plant to cover ponds and so keep out the larvae of mosquitoes. He states that it forms a mat 6 centimetres thick on the surface of the water and so prevents the mosquitoes laying their eggs in the water and the larvae existing.

Azolla is a minute reddish coloured plant belonging to the order *Rhizocarpeae*. There are five species recorded of which one, *Azolla pinnata* R. Br. is by no means an uncommon plant in ditches and especially in the ponds in which the Chinese cultivate *Pistia Stratiotes* L. (Kiamban) and *Colocasia antiquorum* the Keledi to feed their pigs. In general appearance and growth it resembles a Duckweed, but instead of having one round leaf, it is rather finely cut up into small lobes, the whole pond being usually about half an inch long. According to Peckholt, the plant forms a thick mat nearly six inches thick on the water, but *Azolla pinnata* forms with us a thin broken up layer, hardly calculated to check any mosquito from laying its eggs in the water or the larvae from living happily beneath the shade.

As a matter of fact it does not cover the pond as thickly as Duckweed, (*Lemna*) and is very fugacious, that is to say it has a habit of altogether disappearing from its pond. I have not found it at all an easy plant to cultivate for any length of time. Further more the difficulty in dealing with *Anopheles* or other mosquitoes does not lie in excluding them from ponds in which only *Azolla* thrives. Any pond big enough to carry *Azolla*, will in this part of the world soon become stocked with fish, or if by any chance fish have not found their way in can easily be introduced, and fish are more useful in killing mosquitoes than anything else.

Puddles, cut bamboos, potted milk tins, and such like small lots of water are responsible for most of the objectionable mosquitoes.

Some time ago a good deal was written about the little West Indian fish which was called "Millions" and which was introduced successfully into some of the islands in which such fish were scarce or absent, and it was proposed even to introduce it into the Peninsula, which would be a good case of carrying coals to Newcastle, for the Malay Peninsula abounds in fish of every size and there are few ponds are places large enough for a fish to exist in which does not contain one or many, in every way as suitable as the West Indian fish.

ED.

REMEDIES FOR SNAKE-BITE.

A note in the Kew bulletin, No. 3, 1909, deals with two remedies for snake-bite sent from Siam by Mr. E. St. J. Lawson, and Dr. A. Lawson, as very efficacious in cases of

snake-bite. These two plants proved to be very well known *Justicia Gendarusa* and *Barleria prionitis*.

The first of these is known to the Malays here as Ganda-rusa, and occurs in every kampong probably all through the peninsula. Curiously though it is commonly cultivated by Malays as a medicine, and as having some value against demons, the idea of its being an antidote to snake-bite has never been suggested by them. It is improbable that it has any value in this direction at all.

Barleria prionitis, is a spiny herb with bright orange yellow flowers, common in Siam. The only place it has been seen in the Malay Peninsula is at Bukit Sabukor in Malacca, where it has been probably been accidentally introduced.

This is the plant apparently most valued by the Siamese, as the *Justicia* is rare there, though the latter is said to be more efficacious. A native who had been bitten by cobras which he used to train more than ten times and cured by *Barleria* was bitten by a Hamadryad, above the wrist. He applied the medicine, but although he lived till the next day he succumbed to the bite. The Doctor states that he has never known any one bitten by a cobra survive two hours, and they usually die in thirty minutes, so that although the drug did not save the man, it prolonged his life.

The *Barleria* is pounded, leaves and twigs in Samshu, the liquid is taken internally and the pounded remains placed on the wound immediately after being bitten.

Comparatively little seems to be known of the qualities of this plant, and it may have some properties but so many alexipharmics of this nature have failed though highly recommended by natives that the plant requires a thorough examination before trusting to it. The account is however interesting.

Ed.

BIBLIOGRAPHY.

“UNIVERSAL DIRECTORY OF THE INDIA-RUBBER GUTTA-PERCHA AND ALLIED INDUSTRIES.”

We have received for notice a copy of the above work published by the Journal “Le Caoutchouc et la Gutta-percha,” the only official organ of the French rubber trade. It contains a trade list of estates and manufacturers of rubber and Gutta-percha in all forms, in all parts of the

world, and is published in English, French and German. It contains also a large number of receipts for vulcanizing for various purposes in which we notice that Pontianac, that is to say Jelutong plays quite an important part. Many would be surprised to see how little of the rubber goes into some of the cheaper vulcanized articles of every day use.

The booklet is more likely to be of use to the manufacturer and dealer in rubber articles than to the planter, but to them it will doubtless supply a want in an efficient manner. It is procurable from the office of the journal above-mentioned, 49 Rue des Vinaigriers, Paris.

ED.

JOURNAL OF THE COOPER RESEARCH LABORATORY.

We have received a copy of the first Journal of this Laboratory which is situated at Berkhamstead in England. It is a well bound and illustrated book of seventy two pages, dealing with the work of the staff, of especial value are the experiments with Insecticides and Fungicides, use of lime in Agriculture and Copper as a Fungicide.

The staff do not only carry on researches of this kind valuable as they are, but undertake inspections of orchards, crops and stock suffering from disease, hold consultations with Colonial Departments of Agriculture, Country Councils and such bodies and maintain a Museum of pests and beneficial insects showing their life-histories and the damage they do. The laboratory was founded by Sir Richard Cooper in 1902, who is principal of the Laboratory, and maintains a staff of twelve persons. The Director Mr. Walter E. Collinge edits the report. Such experimental laboratories are absolutely invaluable, and it is a cause of surprise to many that we have so very few in our vast Empire.

ED.

PACKING RUBBER.

An interesting letter on the subject of rubber packing is published by James Ryan in the India rubber Journal of May 31, 1909, p. 647, which as the writer says of his

specimens "gives one furiously to think." The specimens were two cut from the same Lanadron block which was shown at the Peradeniya show two years and a half ago, and travelled all over India, to Assouan, Europe and finally came to anchor in London. Thus they went through the extremes of heat and cold, of damp and dry. Of the two one is as clear, amber brown resilient, tough and good as when it was turned out of the press. The other tacky black and soft like half chewed toffee. Why? what caused this remarkable difference? The good one was carried about loose in a Kit bag or suit case. The spoilt one in a nice air tight metal case and carefully fixed to the lid to prevent its rattling about. It began to degenerate in three weeks.

In this connection I may mention a sample of a small square block made in the Botanic Gardens fifteen years ago or more, which has just been left about usually in a glass case fully exposed to the air, and has not gone tacky or soft at all but is firm and thoroughly resilient.

As Mr. James Ryan in his letter states much has to be learnt yet in the method of packing rubber for export, and promises in a future article to give some practical suggestions on the way it should be done, in the India Rubber Journal.

These suggestions will be welcome to all planters and we shall look forward to their publication.

ED.

PLANT SANITATION.

The cultivation of clove trees, which was once an extensive industry in Singapore, is said to have almost ceased owing to the attacks of disease; and it is stated that the chief cause is a fungus which produces red spots on the leaves. On the appearance of this report, the few clove trees at Peradeniya were examined to see whether the same disease occurred in Ceylon. All were found to be fairly vigorous, and showed no signs of any serious injury, except in one instance. Dark red spots were fairly common on the leaves, but these were purely local and did not affect the general health of the trees; they answer to the description of the spots on the leaves in Singapore, though, until the fungus in the latter case is identified, it is impossible to determine whether the cause is the same. The red spots at Peradeniya are caused by a red alga, *Cephaleuros parasitica*. This species is closely related to *Cephaleuros my-*

coidea, which causes the "red rust" of tea; but, whereas the latter lives on the surface of the leaves of tea and most tropical trees without causing much damage, *Cephaeuos parasitica* lives inside the leaf, and only its fruiting branches are visible externally like a tuft of minute red hairs. *C. parasitica* is fairly common on cinnamon and tea in the low country; on cinnamon it causes a dark-brown, stellate, raised patch, while on tea it produces a spot which superficially resembles "Grey Blight." The red spot on clove leaves is due to the death of the tissues attacked by the alga, not to the colour of the latter. Neither on tea, nor cinnamon, nor clove does it cause any serious damage. Some of the branches of the clove trees were found to be killed by *Loranthus cuneatus*; and in one case, where a branch had been broken off, the main stem was attacked by *Fomes substygius*, which is thus proved to be a wound parasite.

CASTILLOA VERSUS PARA RUBBER.

In a little book published for the La Zacualpa Rubber Company by O. H. Harrison there are some statements of interest as to growth and yield of the Castilloa trees which are cultivated at La Zacualpa estate in Soconusco, Chiapas State, Mexico.

The Castilloa of this region is described by Mr. O. F. Cook as a new species under the name of *Castilloa lactiflua* to distinguish it from other species of which the milk does not flow freely but has to be collected in the form of scrap.

The Castilloa rubber is described as next to Para in quality, far more productive in quantity and of all rubber trees responding most readily to cultivation.

One feels bound to say however that the account given of the returns in the booklet hardly bears out these statements.

The estate comprises 10,000 acres planted. The trees are stated to reach the height of fifty feet and a diameter of 12 to 18 inches in a wild state, and as much as 25 pounds of rubber is said to have been taken from a tree in one season.

In 1889 and 1890, 5000 trees were planted and are now (1908) on an average 18 to 20 inches in diameter and 40-50 feet tall and yield $2\frac{1}{2}$ lbs. about per tree.

There are 400 to the acre. A tree selected at random gave 2 lbs. 11 ozs. of "refined" rubber. The cultivated trees raised from seed begin to yield in the sixth year.

In Mr. Harrison's report to shareholders, it is stated that up to December 10, 1907, there were tapped 257,760 trees which gave 40,600 pounds of rubber: an average of 2.52 ounces at each tapping. These trees varied in age from 5 to 7 years, the average being under 6 years.

One tapper and a boy can tap 50 to 80 trees a day according to size and brings in 5 gallons of latex which will produce from 8 to 10 pounds of rubber, according to the season, as in the rainy season the latex is more watery.

Mr. Harrison has no hesitation in saying that from three tappings a year of a six to seven year old tree, can be obtained a total of six ounces of rubber.

The cost of collecting and curing the rubber worked out to 7½ cents a pound, and allowing 8 cents for maintenance and marketing a total of 15 cents a pound for harvesting and marketing. The rubber is valued at 1 dollar a pound, the average price for the past six years. These figures obviously refer to American coinage.

Now while without doubt *Castilloa* is a plant which in Mexico will pay well to plant, the figures given hardly bear out the statement that it is more productive than Para and of all rubber trees responds most readily to cultivation.

Its actual returns are apparently considerably less, for age, and it does not appear to be as fast a grower.

However our readers can for themselves compare the figures with those of their own estates, and decide which of the trees they would prefer.

Ed.

**JOHN HADDON & CO. SPECIAL
PRODUCE LETTER.**

London, 7th May, 1909.

STRAITS REPORT.

BEESWAX

A good demand has continued, yellow descriptions selling at higher prices, East Indian up to £6.10.0. per cwt.

CAPSICUMS

Fine bold of good color are scarce, further arrivals should sell well.

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- CHILLIES** A fair business has been done, but market closes rather easier.
- COPRA** A good business has been done at steady prices although market closes rather easier. F. M. Straits value £18, Sundried ditto £18.17.6., Java £19.5.0., Ceylon £19.15., Malabar £20.2.6., Southsea £18.5.0., Trinidad £19.2.6., c.i.f. delivered weights.
- GUM BENJAMIN** Trade has been very quiet, and in recent offerings Sumatra fair almondy sold at £7.5.0., medium to fair brownish £6 to £6.10.0., middling brownish £5.10. to £5.12.6., ordinary £5 per cwt.
We value Sumatra second quality, marbled, fair to fine at £7 to £8, middling to good £5.10. to £6.10., Palembang and thirds, middling to fair part almondy 30/- to 50/- Siam, firsts and seconds, fair block to fine clean £7.15. to £27 per cwt.
- GUM DAMAR** Has been in slow demand, the small business transacted, only at prices favouring buyers. Penang, good clean grey at 52/-, small grey and dark 42/6, grains 30/- to 33/-, fine pickings 40/-, ordinary 20/- to 30/-, siftings 25/- to 27/-, clean block 36/6d, dusty block 15/-, Singapore, pale clean 64/-, grey clean 43/-, brown dusty 25/- per cwt.
We value Batavia, good to fine pale at 60/- to 65/-, Singapore, ordinary specky to fine 30/- to 65/- per cwt.
- GUM COPAL** The recent offerings-only part found buyers at about previous rates. Trade privately has been quiet, Macassar, hard pale scraped 51/- to 52/-, hard Araber scraped 45/- to 47/-, pale bold pipey 37/-, pipey, yellow 31/- to 32/6, nubbles, good pale 34/6, fair 25/-, dark 20/-, glassy block 24/-, chips 16/- to 20/-, pickings 19/-. Pontianac, Amber hard scraped 63/-, coated 40/-, nubbles 30/- to 34/-, chips 22/-. Sambas, pale chips 32/6. We value Macassar etc., hard scraped pale at 60/- to 67/6, amber 50/- to 57/-, dark 48/- to 52/6, soft scraped, dark to pale 30/- to 45/-, nubbles, pale 28/- to 36/-, dark and mixed 19/- to 25/-, chips, pale hard clean 25/- to 35/-, ordinary and softy 20/- to 24/- per cwt.
- GAMBIER** A steady demand has existed more particularly for near positions from the Continent and America. Sales of block up to 22/6, afloat to New York, and 22/- March shipment to the Continent, but we close easier May/June shipment at 21/7½d c.i.f.
- GUTTA-PERCHA** Market quiet. Good to fine genuine red value 4/6d to 7/-, good to fine white 1/4d to 2/9d. Cotie, Siak and Sooloo reboiled value 4d to 5d per lb.
- INDIA RUBBER** A good market has existed, and firm to dearer prices have been obtained for Plantation kinds. Block, fine clear pale 5/6d to 5/9d, fine sheets and biscuits 5/4d to

5/5½d. Crepe, good to fine pale 5/5d to 5/7d, fair grey and brown 5/2d to 5/4d, dark and black 4/9d to 5/-. Scrap, fair and good pale 4/6d to 4/9½d. Rambong, good clean crepe 4/8d to 5/-per lb. Penang and Singapore, good to fine red clean 3/1d to 3/2½d, red and white, part soft 2/3d to 2/6d, white, part soft and barky 1/4d to 1/7d. Java and Sumatra, fair to fine Rambong 4/-to 4/6d per lb.

ISINGLASS

The offerings of Penang sold well. Long leaf, thin at 3/4d, fair palish 4/2d to 4/3d, red and yellow 3/6d to 3/10d, reddish 2/6d to 3/4d, red 2/- to 2/3d. Tongue, fair yellow 4/2d to 4/5d, red and yellow 3/9d to 4/-, red 3/5d to 3/7d, red and dark 2/8d to 3/-, dark 2/2d. Purse, red and yellow 11d to 1/-, red 6d to 9½d, tails 1/8d.

PEPPER

For awhile a good-business was done in black Singapore for near positions to America, Singapore, March was done up to 3 5-16d, and March/April up to 3½d, closing sellers and buyers to New York at 2 29-32d, March/May shipment, and buyers for June/August Steamer at 2½d c.i.f. delivered weights.

WHITE PEPPER:—has declined about 5-16d per lb. April shipment closing at 4½d c.i.f. and June/August shipment offers at 4 11-32d and August/October at 4 5-16d c.i.f. delivered weights.

SHELL

M. O. P. Macassar—The offerings were all withdrawn; Manila, Penang, Ceram etc.—250 Cases sold, edium and bold fair to good substance and yellow £7 to £9.5.0. thin, medium and chicken £5.12.6 to £6.2.6 heavy shells part only slight grubby £5.7.6. to £6.12.6. grubby pickings badly coated and inferior 85/-to £5.7.6. broken pieces 72 6d to 85/-.

Green Snail, Mergui and Penang, bold good color 44/-to 47/-, medium 41/-to 43/, small 28/-to 31/6d, grubby pickings 20/6d to 23/-per cwt.

TORTOISE:—Nothing offered from Singapore and Macassar. We value heavy sorts, good mottle 23/-to 30/-per lb. sorts on the string, small to bold, part chicken 10/-to 20/-per lb.

TAPIOCA

The market has been very dull with only a small business, sellers of flake at 1 13-32d. A few sales of medium Pearl at 12/- c.i.f. New York for fair quality Singapore, and for Liverpool at 11/6d c.i.f. Penang Seed nearest value 10/9d c.i.f.

VANILLOES

The moderate supply consisted of 436 tins-chiefly sold. Fine firsts were in small supply, realised fully last sales' rates, inferior firsts and doubtful flavour, were again slow of sale. The bulk of offerings being brown foxy and split beans which sold readily, and considering quality, prices obtained were steady.

Seychells-Of 167 tins 112 sold, fair to good $6\frac{1}{2}$ inch at 11/6d, $5\frac{1}{2}$ d to 6 inch at 9/6d to 10/-, $3\frac{1}{2}$ to 5 inch at 6/3d to 9/-; common brown and foxy 4/-to 8/-.

Madagascar-Of 17 tins 14 sold, fair 3 to $7\frac{1}{2}$ inch at 6/6d to 8/3d; common 4/6d to 6/6d.

Mauritius-Of 27 tins 24 sold, common 5 to $8\frac{1}{2}$ inch at 6/6d to 8/6d; various 2/-to 5/9d.

Java-192 tins sold, common 5/-to 6/6d, mouldy &c. 2/6d to 3/-

Zanzibar-26 tins sold, common, $4\frac{1}{2}$ to 7 inch at 6/6d.

Ceylon-2 tins sold, common 3/-, mouldy 2/6d.

GOW, WILSON & STANTON, Limited— India Rubber Market Report.

13 & 23, ROOD LANE, LONDON, E. C.

28th May, 1909.

Since the last sale an active demand has existed privately, principally for the finer descriptions of Crepe.

To-day's auction was on a somewhat larger scale than the last, but nearly all kinds came to a strong market. Bidding was animated and a general advance of from 2d. to 4d. per lb. must be recorded.

The strongest competition was for the finger grades of Crepe, Sheet and Biscuits.

The highest price of the sale, *viz.*, $5/11\frac{3}{4}$, was paid for a good quantity of Fine Block from the Lanadron Estate, whilst the Highlands and Lowlands Estate made the highest price for Smoked Sheet, *viz.*, 5/11 to $5/11\frac{1}{2}$, Vallambrosa coming next with 5/11 to $5/11\frac{1}{4}$, and Sekon following with 5/11.

Finest Crepe sold at 5/10, this figure being obtained for a small lot from the Sagga Estate.

The lowest grades of Crepe were a little irregular, but Scrap, which was in rather small supply, met with good attention and sold up to $5/0\frac{1}{2}$.

NUMBER OF PACKAGES ADVERTISED.	Quantity in Tons.			Price of Plantation Rubber.		Comparative Prices.			
	Ceylon.	Malaya.	Totals.	No. of Packages sold.	Price.	Hard Fine Para.	Plantation.		
							Fine	Scrap.	
To-day	1,796	10 $\frac{3}{4}$	82 $\frac{3}{4}$	93 $\frac{1}{2}$	1,312	5/6 $\frac{3}{8}$	5/7 $\frac{1}{2}$	5/8 $\frac{3}{4}$, 5/11 $\frac{3}{4}$	4/10 to 5/0 $\frac{1}{2}$
Corresponding } Sale Last year }	636	10 $\frac{1}{2}$	26 $\frac{1}{2}$	37	381	3/8 $\frac{3}{4}$	3/10 $\frac{1}{2}$	4/1 to 4/4 $\frac{1}{2}$	2/5 to 3/-

TO-DAY'S QUOTATIONS.

SHEET AND BISCUITS.		CREPE.	UNWASHED SCRAP.
Good to Fine Biscuits	5/8 $\frac{3}{4}$ to 5/9 $\frac{1}{2}$	Very Pale Medium and Palish	5/8 to 5/10
Good to Fine Sheet	5/8 $\frac{1}{2}$ to 5/11 $\frac{1}{2}$	Dark and Brown Rambong Crepe	5/5 $\frac{1}{2}$ to 5/7 $\frac{1}{2}$ 4/4 to 5/4 $\frac{1}{2}$ 4/10 to 5/2 $\frac{3}{4}$
			Medium to Fine Dark
			4/10 to 5/0 $\frac{1}{2}$ 3/4 to 4/4

PLANTATION EXPORTS.

CEYLON—1st January to
3rd May.

MALAYA—1st. January to
20th April.

		Singapore.	*Penang.	Total.
1909	... ..	145 $\frac{1}{2}$ tons	1909... 371 $\frac{3}{4}$ tons...	351 $\frac{1}{4}$ tons 723 tons
1908	... ..	97 $\frac{3}{4}$ tons	1908... 271 $\frac{1}{4}$ tons...	133 tons...404 $\frac{1}{4}$ tons
1907	... ..	71 $\frac{1}{2}$ tons	1907... 176 $\frac{3}{4}$ tons...	17 $\frac{1}{2}$ tons...194 $\frac{1}{4}$ tons
1906	... ..	40 tons		

*Penang figures are from 1st January to 3rd, April.

PARA FIGURES.

LIVERPOOL IMPORTS.
January 1st to April 30th.

*STOCKS.
at 30th April.

1909	... ..	5,805 tons	1909	... ..	1,210 tons
1908	... ..	7,595 tons	1908	... ..	3,783 tons
1907	... ..	5,445 tons	1907	... ..	1,917 tons

*Excluding those in Dealers hands.

U. S. A. STATISTICS.—Imports for March.

	1909	1908
India Rubber	... .. 3,467 $\frac{1}{4}$ tons	... 2,995 tons
Gutta and Balata	... .. 1,566 $\frac{3}{4}$ tons	... 185 $\frac{3}{4}$ tons
Old Scrap (for re-manufacture)	... .. 477 tons	... 87 $\frac{1}{2}$ tons

IMPORTS FOR NINE MONTHS ENDING MARCH.

	1909	1908	1907
India Rubber	... 29,413 $\frac{1}{4}$ tons	... 18,839 $\frac{3}{4}$ tons	... 25,975 tons
Gutta and Balata	... 7,884 $\frac{1}{4}$ tons	... 9,478 $\frac{3}{4}$ tons	... 8,161 tons
Old Scrap (for re-manufacture)	... 6,158 $\frac{3}{4}$ tons	... 6,433 tons	... 9,771 $\frac{1}{2}$ tons

CEYLON.

MARK.	PKGS.	DESCRIPTION.	PRICE.
J. H.	8	Good Biscuits	... 5/8 $\frac{1}{2}$ to 5/9
R.	14	Good and dark crepe	... 4/6 to 5/4
	4	Scrap	... 2/6 to 5/0 $\frac{1}{2}$
	1	Dark Block	... 3/6
Deviturai	1	Scrap	... 4/11 $\frac{1}{2}$
Warriagalla	3	Biscuits	... 5/9
	1	Scrap	... 3/2

MARK.	PKGS.	DESCRIPTION.	PRICE.
Tallagalla	4	Biscuits	... 5/9 $\frac{1}{4}$
	4	Scrap	pt. sold ... 4/3 to 5/0 $\frac{1}{2}$
Doranakande	3	Biscuits	... 5/8 $\frac{3}{4}$ to 5/9 $\frac{1}{4}$
	1	Rough sheet	... 5/5
	3	Scrap	... 4/7 $\frac{1}{2}$
Ayr	4	Fine sheets	... 5/9
Rosehaugh	23	Good and dark crepe	... 4/4 to 5/5 $\frac{1}{4}$
Welkandala	4	Good biscuits	... 5/9
	3	Brown crepe	... 5/0 $\frac{3}{4}$
T.	15	Good sheets and biscuits	... 5/8 $\frac{1}{4}$ to 5/9 $\frac{1}{4}$
	9	Fine worm	... 5/8 $\frac{1}{4}$
T.	4	Biscuits	... 5/9 $\frac{1}{4}$ to 5/9 $\frac{1}{2}$
Hapugahalande	3	Good to fine thick amber crepe	... 5/6 $\frac{3}{4}$ to 5/8
	1	Dark crepe	... 5/3
Elston	2	Good Biscuits	... 5/9 $\frac{1}{4}$
	5	Crepe	... 5/5 $\frac{1}{2}$ to 5/6
Kumaradola	8	Fine Biscuits	... 5/9 $\frac{1}{4}$
	1	Fine scrap	... 5/0 $\frac{1}{4}$
Clara	2	Brown crepe	... 5/4 $\frac{1}{2}$
Kumbukkan	2	Good biscuits	... 5/9 $\frac{1}{4}$
Ingoya	9	Fine Crepe	... 5/6 $\frac{3}{4}$ to 5/8 $\frac{3}{4}$
	1	Block	... bought in
Yaha Ella	2	Biscuits and sheets	... 5/6 to 5/8 $\frac{3}{4}$
	1	Scrap	... 4/7
N.	6	Fine pale crepe	... 5/8 $\frac{1}{2}$
G. C.	6	Amber crepe	... 5/7 $\frac{3}{4}$
Wavena	4	Good to fine thick crepe	... 5/8 $\frac{1}{4}$
	2	Dark crepe	... 5/2 $\frac{3}{4}$ to 5/6
M. B.	50	Dark crepe	... 4/11 $\frac{1}{2}$ to 5/6 $\frac{1}{4}$

MALAYA.

MARK.	PKGS.	DESCRIPTION.	PRICE.
B. & D.	5	Scrap	... 4/4 to 4/11 $\frac{1}{4}$
	27	Good and rough sheet	... 5/5 $\frac{1}{2}$ to 5/9 $\frac{1}{4}$
	2	Rambong scrap	... 3/4 to 4/2
	4	Crepe	... 5/3 $\frac{1}{2}$ to 5/8 $\frac{1}{2}$
R.	54	Good and dark crepe	... 5/7 to 5/8 $\frac{1}{4}$
M. P.	16	Dark	... 5/4 $\frac{1}{4}$
Co.			
Damansara	25	Dark crepe	pt. sold ... 5/- to 5/1 $\frac{1}{2}$
Batu Caves	10	Sheets	... 5/8 $\frac{3}{4}$ to 5/9
	5	Crepe	... 5/1 to 5/6
	1	Rambong crepe	... 4/10
L. E.	74	Very fine block	... 5/11 $\frac{3}{4}$
Muar Straits			
E. B. M. & Co.	10	Scrap	... bought in
Sumatra	18	Rambong crepe	... 5/2 $\frac{3}{4}$
Edinburgh	8	Fine sheets	... 5/9 $\frac{1}{4}$
	1	Good crepe	... 5/3 $\frac{3}{4}$
	1	Dark and dirty crepe	... bought in
Highland Estate	56	Fine sheets	... 5/11 to 5/11 $\frac{1}{2}$
	48	Good and dark crepe	... 5/2 $\frac{1}{4}$ to 5/6
	1	Sheet crepe, etc.	... 4/9
Bila	13	Fine sheets	... 5/9 $\frac{1}{4}$ to 5/9 $\frac{1}{2}$
	20	Good crepe	... 5/5 $\frac{1}{4}$ to 5/6 $\frac{1}{4}$
	1	Dark crepe	... bought in
	14	Rambong crepe	... bought in
Blankahan	4	Good sheets	... 5/9 $\frac{1}{4}$
U. S. R. E. Ltd.	7	Fine crepe	... 5/9
Linggi Plants.	16	Good dark crepe	pt. sold ... 5/1 $\frac{1}{2}$ to 5/6

MARK.	PKGS.	DESCRIPTION.	PRICE.
S. S. B. R. Co. Ltd.	23	Good sheet	... 5/9½
	13	Dark crepe	... 5/4 to 5/5¼
	1	Block crepe	... bought in
Golconda	23	Good sheet	... 5/9½
	17	Good and dark crepe pt. sold	... 5/5½
Sagga	4	Very fine pale crepe	... 5/10
	1	Brown	... 5/-
Batu Tiga	10	Good crepe	... 5/7
	4	Dark "	... 4/0¾ to 5/0¾
R. W.	17	Good to fine amber crepe	... 5/7 to 5/8½
	13	Dark crepe	... 5/1½ to 5/3¾
Linsum	20	Dark and dirty crepe pt. sold	... 5/0¼ to 5/1½
	4	" "	... 5/1½
Batang Kali	1	Rambong scrap	... 4/2
	1	Rejected sheet	... 5/8¼
W. W. W.	1	Dark crepe	... bought in
	3	Good Brown	... 5/4¾ to 5/7
X. X. X.	8	Rough sheet	... 4/10* to 5/7½
	4	" "	... 5/8
	1	Dark crepe	... 4/6
	3	Rambong scrap	... bought in
K. P. A.	2	Virgin rejections	... bought in
United Serdang	25	Good to fine Rambong crepe	... 4/10¼ to 5/3¼
	23	Good to very fine pale crepe	... 5/6¼ to 5/9
Linggi	4	Dark crepe	... 5/1
	37	Good crepe	... bought in
F. S. R. Co., Ltd.	11	Fine sheets	... 5/9¼
	21	Good and dark crepe pt. sold	... 5/1½ to 5/9¼
Harpenden	7	Good sheet	... 5/9½
	4	Good and dark pressed crepe	... pt. sold 5/3¾
N. H. R. Co., Ltd.	8	Good sheet	... 5/9¼
	6	Good crepe	... 5/4½ to 5/5¾
	4	Dark crepe pt. sold	... 4/9 to 5/0½
	2	Good Rambong crepe	... 4/8½
P. S. E. T. A.	12	Sheet	... 5/9 to 5/9¼
	2	Dark crepe	... 5/0¾
K. P. R. E. Ltd.	2	Good sheet	... bought in
	1	Dark crepe	... bought in
V. R. Co., Ltd.	Klang 22	Fine sheet	... 5/11 to 5/11¼
	F. M. S. 36	Good and dark crepe	... 5/1 to 5/5¾
	1	Block	... 5/3½
K.	21	Good and fine crepe	... 5/6½ to 5/8½
	9	Dark crepe pt. sold	... 5/5¾
G.	3	Sheet	... 5/8½
	7	Good sheet	... 5/8½
S.	4	Scrap	... 5/- to 5/0¼
	35	Good crepe	... 5/6 to 5/7¼
S. R. Co., Ltd.	37	Dark crepe	... 4/6 to 5/0½
	3	Good crepe	... 5/9
G. C.	15	Good and pressed sheet pt. sold	5/5½ to 5/8¾
	12	Fine pale crepe	... 5/6½ to 5/8¾
P. S. E. C.	6	Good crepe	... 5/4 to 5/5¾
	6	Dark "	... 4/7 to 5/5¾
J. C.	2	Rejected sheet	... 4/6 to 5/7¼
	6	Good crepe	... 5/7¾
F. P. R.	4	Dark sheet	... 5/2¼ to 5/6¼
	26	Good sheet	... 5/6½ to 5/9
S.	2	Rejections	... bought in
	1	Rough sheet	... 5/6
C. M. R. E. Ltd.	28	Very fine pale crepe	... 5/9 to 5/9¼
	24	Very fine palish crepe	... 5/9
	2	Light brown crepe	... 5/8

MARK.	PKGS.	DESCRIPTION.	PRICE.
	9	Good scrap crepe	... 5/5 $\frac{3}{4}$ to 5/6 $\frac{1}{4}$
	35	Good dark crepe	... bought in
	4	Fine Rambong crepe	... bought in
Inch Kenneth	21	Fine pale and palish crepe	... 5/7 $\frac{1}{4}$ to 5/8 $\frac{1}{4}$
	5	Dark crepe	... 5/2 $\frac{1}{4}$ to 5/5 $\frac{3}{4}$
S. S. C. P.	15	Fine pale and palish sheet	... 5/9 $\frac{1}{4}$
	3	Brown crepe	... 5/3
	4	Dark crepe	pt. sold ... 3/10
P. S. E. Selaba	1	Fine amber crepe	... 5/7 $\frac{1}{2}$
	6	Good sheet	... 5/9
	3	Dark crepe	... bought in
	1	Dark crepe (very barky)	... 3/10
Beverlac	3	Good crepe	pt. sold ... 5/4 $\frac{3}{4}$
	15	Brown and dark	pt. sold ... 5/0 $\frac{3}{4}$

JAVA.

MARK.	PKGS.	DESCRIPTION.	PRICE.
Pasir Oetjing	3	Good sheet	... 5/9 $\frac{1}{4}$
	5	Scrap	... 4/9 $\frac{3}{4}$ to 4/11 $\frac{3}{4}$
	2	Pressed Rambong sheet	... 4/7 $\frac{1}{4}$
	2	Rejections and Rambong scrap	... bought in
J. R. P. C.	1	Pressed sheet and scrap	... bought in

BORNEO.

MARK.	PKGS.	DESCRIPTION.	PRICE.
T. B. B. Sekong	12	Fine smoked sheet	... 5/11

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

For the month of May, 15th & 31st.

Tons.

			15th.	31st.
Tin	Str.	S'pore. & Penang to U. Kingdom &/or	1,671	1,001
do.	"	do. U. S. A.	1,078	800
do.	"	do. Continent	350	285
Gambier	"	Singapore Glasgow	...	...
do.	"	do. London	75	50
do.	"	do. Liverpool	175	...
do.	"	do. U.K. & or Continent	75	...
Cube Gambier	"	do. United Kingdom	35	50
Black Pepper	"	do. do.	30	75
do.	"	Penang do.	325	190
White Pepper	"	Singapore do.	100	140
do.	"	Penang do.	...	...
Pearl Sago	"	Singapore do.	55	20
Sago Flour	"	do. London	125	225
do.	"	do. Liverpool	1,025	470
do.	"	do. Glasgow	25	25
Tapioca Flake	"	do. United Kingdom	95	190
T. Pearl & Bullet	"	do. do.	260	170
Tapioca Flour	"	Penang do.	775	360
Gutta Percha	"	Singapore do.	70	30
Buffalo Hides	"	do. do.	40	50
Pineapples	"	do. do.	18,250	18,250

		Tons.	
Gambier	,, Singapore.	U. S. A.	1,200 500
Cube Gambier	,, do.	do.	95 25
Black Pepper	,, do.	do.	400 85
do.	,, Penang	do.	15 20
White Pepper	,, Singapore	do.	10 45
do.	,, Penang	do.	... 10
Tapioca Pearl	,, Singapore	do.	240 210
Nutmegs	,, S'pore., Penang	do.	50 34
Sago Flour	,, Singapore	do.	230 230
Pineapples	,, do.	do.	4,250 6,250
do.	,, do.	Continent	1,750 1,750
Gambier	,, do.	South Continent	25 10
do.	,, do.	North Continent	340 325
Cube Gambier	,, do.	Continent	30 85
Black Pepper	,, do.	South Continent	80 30
do.	,, do.	North do.	10 200
do.	,, Penang	South do.	... ..
do.	,, do.	North do.	... ..
White Pepper	,, Singapore	South do.	20 ...
do.	,, do.	North do.	10 45
do.	,, Penang	South do.	10 5
do.	,, do.	North do.	... 15
Copra	,, S'pore., Penang	Marseilles	800 200
do.	,, do.	Odessa	... 560
do.	,, do.	Other S. Continent	460 340
do.	,, do.	North Continent	2,150 1,900
Sago Flour	,, Singapore	Continent	2,800 1,600
Tapioca Flake	,, do.	do.	110 100
do. Pearl	,, do.	do.	15 35
do. Flake	,, do.	U. S. A.	... 45
do. do.	,, Penang	U. K.	49 45
do. Pearl & Bullet	,, do.	do.	200 160
do. Flake	,, do.	U. S. A.	... ..
do. Pearl	,, do.	do.	150 120
do. Flake	,, do.	Continent	... 55
do. Pearl	,, do.	Continent	95 275
Copra	,, S'pore., Penang	England	380 100
Gambier	,, do.	U. S. A.	... ..
Cube Gambier	,, do.	do.	... ..
T. Flake & Pearl	,, do.	do.	... ..
Sago Flour	,, do.	do.	... ..
Gambier	,, do.	South Continent	... ..
Copra	,, do.	Marseilles	... ..
Black Pepper	,, do.	South Continent	... ..
White Pepper	,, do.	do.	... ..
do.	,, do.	U. S. A.	... ..
Pineapples	,, do.	do.	... ..
Nutmegs	,, do.	do.	... ..
Black Pepper	,, do.	do.	... ..
do.	,, Penang	do.	... ..
White Pepper	,, do.	do.	... ..
T. Flake & Pearl	,, do.	do.	... ..
Nutmegs	,, do.	do.	... ..
Tons Gambier			800 1,500
Tons Black Pepper			675 440

Wired on 15th & 31st May.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of May, 1909.

337

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.	
			Mean Dry Bulb.	Maximum.	Minimum.	Mean Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.				
Kuala Lipis	80	96	68	20	75
Raub	81	93	67	19	74	...	...	...	...	2.29	.95	
Bukit Fraser	6.58	4.20	
Bentong	80	92	70	18	76	...	...	...	...	10.24	1.89	
Temerloh	95	71	16	...	...	...	...	...	7.23	1.77	
Pekan	82	91	69	14	78	...	...	...	...	2.69	2.00	
Kuantan	83	92	66	19	77	...	...	...	...	13.07	3.92	
Sungei Lembing	88	67	...	...	...	...	...	...	7.79	3.55	
												11.31	3.40	

OFFICE OF THE MEDICAL OFFICER IN CHARGE, PAHANG.

Kuala Lipis, 26th May, 1909

S. C. G. Fox.

Senior Medical Officer, Pahang.

Penang.

Abstract of Meteorological Readings in the Prison Observatory for the month of May, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Dry Bulb.	Maximum.	Minimum.	Range.	Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean		Ins.	Ins.
Prison Observatory Penang.	29.864	147	82.57	91.3	75.3	16.0	77.56	930	74.4	84	N.E.	3.11	58

CRIMINAL PRISON PENANG,

8th June, 1909.

A. H. KEUN,

Medical Officer

10/14

The Duff Development Company Limited, Kelantan.
Abstract of Meteorological Readings in Kelantan for the month of May, 1909.

339

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
				Mean	Mean	Mean						Inches	Inches
Kuala Lebir	91.38	74.72	16.66	...	...	...	...	...	6.65	2.34.
Kuala Kelantan	85.19	74.03	11.16	...	...	...	...	...	5.71	1.90.
Kuala Pergau	10.67	1.58.
Taku Plantation	8.00	1.85.

SURGEON'S OFFICE,

June 8th, 1909.

A. G. H. SMART,

Surgeon.

Negri Sembilan.

Abstract of Meteorological Readings in Negri Sembilan Hospitals for the month of May, 1909.

340

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Seremban Hospital	...	137.9	82.2	89.4	72.2	17.2	77.9	.876	75	79.4	N.W.	4.63	.98
Mantin "	4.55	1.73
Ayer Kuning "	5.59	.71
Tampin "	3.38	.79
Kuala Pilah "	7.06	2.10
Jelebu "
Port Dickson Town Hospital	4.91	1.38
Port Dickson Beri-Beri Hospital	3.68	1.23

M. O's SURGEON'S OFFICE,

14th, June, 1909.

S. LUCY,

M. O. In Charge, N. S.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of May, 1909.

DISTRICT.	Mean Barometrical Pressure at 320 Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
341 General Hospital, K. Lumpor	29.853	146.6	81.3	90.2	73.1	17.1	76.7	0.833	73.7	78	S. W.	4.98	1.20
Pudoh Gaol " "	4.52	1.18
District Hospital " "	4.81	1.28
" Klang	90.2	72.1	18.1	..	..	..	..	..	7.05	5.20
" Kuala Langat	5.29	1.12
" Kajang	7.34	1.75
" Kuala Selangor	88.8	75.8	13.0	..	..	..	..	..	6.36	2.62
" Kuala Kubu	92.6	71.9	20.7	..	..	..	..	..	11.48	2.92
" Serendah	92.8	70.6	22.2	..	..	..	..	..	6.04	2.00
" Rawang	91.9	72.3	18.7	..	..	..	..	..	7.71	2.04
Beri-beri Hospital, Jeram	3.63	1.60
Sabak Bernam	1.63	0.73

OFFICE OF SENIOR MEDICAL OFFICER,
Kuala Lumpur, 21st June, 1909.

G. D. FREER,
Senior Medical Officer.

REGENWAARNEMINGEN JAAR, 1908.

Rantan Crap at Bila O Krebses.

DAG	JAN	FEB:	MAART	APRIL	MEI	JUNI	JULI	AUG:	SEPT:	OCT:	NOV:	DEC:	AANMERKINGEN.
1				32						60	22	6	
2				20		38				92	4	84	
3	45		57			50				1	1	67	
4			69			10				43	5	19	
5						45			2	16	30	4	
6					6				3		2		
7	18	3	20			5		2	5			23	
8						47	3		33	69	15	4	
9			27			50	22		1		2	2	
10		31			58				62		1	3	
11	5	22			8	2	15		40		1		
12	4	13		1	65	6	11				68		
13		60						12		53		14	
14		12		30		5	8	63	2	12		6	
15		11				42			14	61		13	
16					8	1		18	2	39		13	
17					7		8	20	2	13		12	
18			3	10	110			8	3	41	23		
19			7		18				1	60	14		
20			2				40		7	32			
21		15	37					2		15	57		
22			50	18		16	24			31			
23					26	2	4	10	8		15		
24			7	10	40			31	15	42		50	
25	3		21	9	23			39	16	19	12	14	
26			2								3		
27					10			1			9		
28			42		8		3			153			
29				90		3	2						
30				15			12		61	99			
31			10		10		9						
													Totaal van het Jaar.
Totaal mm.	75	167	357	235	397	322	176	206	275	975	354	322	3,858
Aantal reg. dagen	5	8	14	10	14	15	14	11	17	20	19	16	163

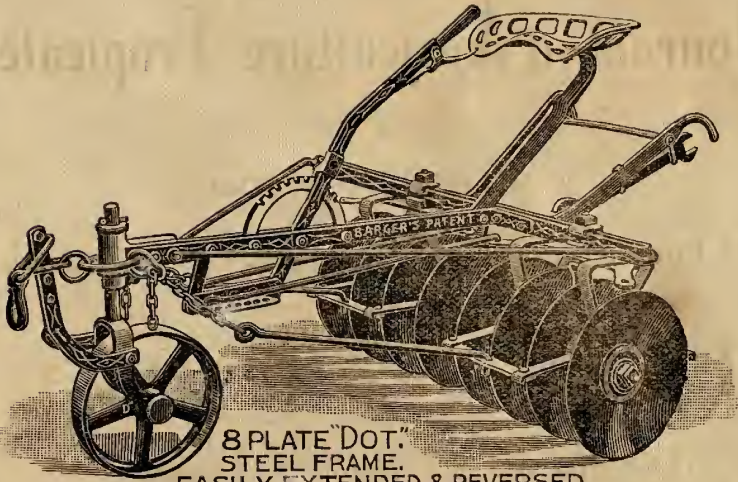
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SINGAPORE MARKET REPORT

For May, 1909.

Articles.	Quantity sold.	Highest price.	Lowest price.
	Tons.	\$	\$
Coffee Palembang ... ..	...	...	...
Bali	20	24.62½	24.50
Liberian	74	25.00	24.00
Copra	3,605	8.00	7.30
Gambier Bale	2,000	9.15	8.80
Cube, Nos. 1 & 2	285	14.00	13.00
Gutta Percha, 1st quality ... ..	...	300.00	240.00
Medium ... ..	...	240.00	120.00
Lower ... ..	...	80.00	12.00
Gutta Jelotong ... ..	...	7.50	6.00
Nutmegs, 110s ... ..	...	17.00	16.75
80s ... ..	...	21.75	...
Mace, Banda ... ..	...	78.00	74.00
Amboina ... ..	...	66.00	64.00
Black Pepper	988	11.37½	11.00
White Pepper (Sarawak)	424	18.25	17.25
Pearl Sago, Small	70	3.50	...
Medium ... ..	...	...	...
Large ... ..	...	...	...
Sago Flour, No. 1	3,730	3.06	2.82
No. 2	129	1.15	1.10
Tapioca Flake, Small	387	4.90	4.70
Medium ... ..	...	...	...
Pearl, Small	261	7.00	4.15
Medium	615	4.45	4.35
Bullet	15	8.25	7.75
Tin	2,350	67.50	66.62½



Dix Cultivators for 2 Bullocks very suitable for Tobacco Cocoanut and Rubber Estates.

"Lalang grass will not live in ground that is cross ploughed with this Machine."

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AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

No. 8.]

AUGUST, 1909.

[VOL. VIII

CAMPHOR.

PRELIMINARY NOTES ON THE PREPARATION OF CAMPHOR IN THE F. M. S.

In view of the forthcoming Agricultural Show at Penang in August, the following notes on investigations which are now being carried on in the preparation of Camphor from the common Formosan or Japanese Camphor tree together with notes on the cultivation and growth of the plant in the Malay Peninsula have been published, since it is hoped that an exhibit of this product among others prepared by the Agricultural Department of the F. M. S. will be on view at the Show and may be of interest to planters.

Considerable attention has been attracted to this product during recent years owing to the Japanese monopoly; indeed to such an extent that the synthetic product has already been placed on the market at home and in Europe to compete with the natural product and this has been due to the prevailing high prices of the natural Camphor owing to the monopoly by Japan. The synthetic product however has been (for the time at any rate) short lived, as owing to a fall in the price of the natural product it was soon unable to compete successfully with natural camphor. It must, however, still be borne in mind that cheaper sources of raw material may eventually be found from which to prepare the synthetic compound, than oil of turpentine, which is

the present raw material, and which on account of its great demand for other purposes is very costly. This monopoly by the Japanese Government has had another effect, for it has directed the attention of planters and tropical agriculturalists in the various colonies of the Empire and in other countries *e.g.* Ceylon, Hawaii, Southern India, and California to the cultivation of the plant, and considerable interest has been taken in it recently in the Malay Peninsula.

The value of the camphor industry to the Japanese is thoroughly recognised by their Government and the wholesale destruction of camphor trees in Formosa and other places is now being compensated for by a vigorous planting scheme. It is interesting to note that between 1900 and 1906 some 3,000,000 trees were planted and arrangements have been made for the planting of some 750,000 in each successive year.

It will thus be seen that the Japanese are fully alive to their interests in this matter and the tropical planter must not look too much for that shortage of supply, due to the destruction and non-renewal of the trees, which many thought would come sooner or later.

SUPPLY.

The World's consumption of camphor in 1907 was estimated at 10,600,000 pounds, (figures for 1908 are not available) about 70 per cent of which was used in the manufacture of celluloid, 15 per cent in the preparation of disinfectants; 13 per cent in medicinal and pharmaceutical preparations, and the remaining 2 per cent in the manufacture of explosives.

To this amount Formosa contributed 5,388,918 lbs., the remainder came from other Japanese Islands and from China.

The camphor industry is one that can of course never be put on the same footing as rubber in Malaya, but considering the free growth of camphor trees in this country it would form a very suitable subsidiary industry especially as a very fair return may be expected in the third year.

It would probably scarcely pay to plant less than 50 acres, while larger areas up to a reasonable limit would pay better.

BOTANY AND HABITAT.

The common Japanese or Formosa camphor *Cinnamomum Camphora*, Nees, also known as *Camphora offic-*

nalis or *Laurus Camphora*, is an evergreen tree belonging to the Natural Order *Laurineæ*. It is found along the Eastern Coast of Asia from Cochin China to Shanghai, in the island of Hainan and in the Japanese Islands Kinshu and Shikoku, largely abounding in Formosa the head quarters of the industry. The products, chiefly camphor and camphor oil, are obtained by distillation, details of which are given below.

CULTIVATION IN MALAYA.

The following notes on the cultivation of the plant in the Government Experimental Plantation, in Selangor, the preparation of the crude and purified camphor and camphor oil are intended only as a preliminary note, as it is hoped to prepare an article on the subject when the investigation is more complete.

The first experiments in camphor by the F. M. S. Agricultural Department were initiated in Batu Tiga 5 years ago by Mr. Stanley Arden.

The seeds of the Batu Tiga trees were obtained from the Yokohama Nursery Company and sown in May 1904.

They were planted out in their permanent quarters 10' x 10' in December of the same year. The growth as a whole is very good, while the growth in some cases is exceptional. The average height of the trees is now about 18 feet, the tallest tree being over 26 feet.

A further supply of seeds and young plants was received from Japan in May 1907 and planted out in the Experiment Plantation, Kuala Lumpur, in September of the same year.

The growth of the plants in this case has also been good, the trees averaging in one plot 5 ft. 6 inches in height and 4 feet 6 inches in breadth; this plot was cut over, bringing all the trees to one even height of five feet and leaving the sides untouched and yielded a crop of clippings averaging 1226 lbs. per acre; the actual yield of camphor from which amounted to 0.6 per cent.

PREPARATION OF CAMPHOR.

Method of distillation:—

The first experiments were made on a very small scale in a small copper still of 7 litres (= 12.3 pints) capacity and capable of holding only about 1½ lbs. of leaves or about 4 lbs. of twigs, using an ordinary glass Liebig condenser to condense the camphor and oil.

Steam was generated in a separate boiler and passed through the leaves or twigs in the still.

PREPARATION OF MATERIAL.

Experiments were made with material prepared in the following manner (1) the unbroken leaves (2) leaves cut up into small pieces (3) air dried leaves (4) mouldy leaves (5) twigs cut up into small pieces about an inch long. The leaves and twigs used in these experiments were cut by coolies using parangs (knives) only.

On a commercial scale some kind of chaff cutting or other similar machine could be used for the purpose, to save labour, either worked by hand, by bullocks, or machine driven as circumstances necessitate.

PRELIMINARY EXPERIMENTS.

11.5 kilograms = 26 lbs. of prunings consisting of 64.9 per cent leaves and 35.1 per cent twigs were received for experiment from the Superintendent of Experimental Plantations (Mr. J. W. Campbell) being the part prunings from a five year old tree at the Experimental Garden, Batu Tiga, Selangor.

As only the small apparatus (described above) was at the time available for the experiment, the distillation had to be extended over a number of days and the results of each distillation were kept separate for comparison and carried on under different conditions as described above, entirely for experimental purposes, in order to ascertain if these conditions gave different results.

The following results were obtained:—

(1) 1st distillation. 400 grams of cut leaves gave 4.89 grams of camphor and camphor oil = 1.22 per cent.

This consisted of camphor 1.16 per cent and oil 0.06 per cent.

(2) 2nd distillation. 500 grams of leaves more finely cut than in (1) gave 5.86 grams of camphor and oil = 1.17 per cent.

This also consisted mainly of pure camphor.

(3) 3rd distillation. 1500 grams of twigs gave 6.75 grams of camphor and oil = 0.45 per cent.

This also consisted chiefly of camphor.

(4) 4th distillation. 500 grams of leaves and twigs gave 6.25 grams of camphor and oil = 1.25 per cent.

(5) 5th distillation. 1000 grams of twigs gave 0.6 grams of camphor and oil = 0.60 per cent.

(6) 6th distillation. 500 grams of leaves (mouldy) gave 6.26 grams of camphor and oil = 1.25 per cent.

(7) 7th distillation. 500 grams of leaves previously dried in the sun for two or three days, gave 6.27 grams, (weight of dried leaves = 300 grams) camphor and oil = 1.25 per cent. Calculated on air dried leaves = 2.09 per cent.

(8) 8th distillation. 500 grams of leaves (mouldy) gave 7.35 grams camphor and oil = 1.47 per cent.

(9) 9th distillation. 750 grams of leaves and twigs previously air dried. (Final weight = 468 grams) gave 8.27 grams of camphor and oil = 1.10 per cent. Calculated on air dried material = 1.77 per cent.

(10) 10th distillation. 500 grams of leaves air dried, (Final weight = 240 grams) gave 5.83 grams camphor and oil = 1.16 per cent. Calculated on air dried material = 2.4 per cent.

(11) 11th distillation. 500 grams of mouldy leaves, air dried, (Final weight = 270 grams) gave 7.71 grams camphor and oil = 1.54 per cent. Calculated on air dried material = 2.8 per cent.

(12) 12th distillation. 500 grams of whole leaves air dried, (Final weight = 285 grams) gave 7.53 grams camphor and oil = 1.50 per cent. Calculated on air dried material = 2.6 per cent.

(13) 13th distillation. 500 grams of leaves and twigs etc., gave 7.92 grams of camphor and oil = 1.58 per cent.

CONCLUSIONS:—These experiments show (1) that a much larger percentage of camphor and oil is obtained from the leaves than from the young wood or twigs.

(2) That air drying has no detrimental effect on the yield:—if air drying be resorted to however, it should not be carried out in direct sunlight.

(3) That the principal product is camphor with a small percentage of oil.

(4) That a yield of at least 1 per cent of camphor with a small percentage of oil may be expected from the prunings of trees of this age viz: 5 years, and probably from trees younger than this.

FURTHER EXPERIMENTS ON A LARGER SCALE.

As the above preliminary experiments appeared to be so satisfactory it was decided to erect a large still on a more practical scale.

A plant was constructed on our design by the Federated Engineering Company, Kuala Lumpur, and although satisfactory, experience has shewn that it can be improved in many ways.

Description of large still and Condenser:—

(1) Boiler. On many Estates where rubber and other produce is grown the question of steam has already been settled and there would be no necessity for another boiler. For experimental purposes however a small boiler had to be erected. This consisted of a simple cylindrical boiler which was erected horizontally on a simple brick and cement foundation and was fired externally by wood. The boiler is fitted with a water level, and safety valve, together with an opening for filling at the top.

(2) Still. A pipe from the boiler conducted the steam below a perforated plate in a plain cylindrical still, the leaves, wood, etc., to be distilled, being placed on the top of the perforated plate, the still being charged from the top. The top of the still was fixed by means of nuts and screws and rendered air tight by asbestos rings.

(3) The Condenser. The condenser was a kind of quadruple Liebig condenser, consisting of a vertical cylinder containing four copper tubes connected above and below with an air space. The tubes were surrounded with the cooling water which was led in by means of a pipe over the bottom and flowed away near the top. The bottom and top of the condenser were fixed by means of nuts and screws and rendered air tight by asbestos and were detachable for cleansing purposes. A short bent copper tube from the bottom air space carried off the condensed steam, camphor, and oil, which was collected in glass vessels.

The boiler, still, and the outer shell of the condenser were constructed of iron, the tubes of the condenser and upper and lower plates attached to these tubes were of copper. The following are the dimensions of the above apparatus and the capacity of the still in terms of fresh camphor leaves, prunings, and wood (the latter cut up into small pieces).

Boiler.	Length 2 feet 9 inches.
	Diameter 1 foot 9 inches.
Still.	Length 2 feet 6 inches.
	Diameter 1 foot 9 inches.
	Capacity in terms of camphor leaves 30 lbs.
	Capacity in terms of camphor wood 90 lbs.
	Capacity in terms of prunings 50 lbs.
Condenser.	Length 2 feet.
	Diameter 9 inches.
	Length of copper condensing tubes 1 ft. 9 ins.
	Diameter of copper condensing tubes 1 inch.

Criticisms of apparatus: (1) The chief disadvantage of a metal (iron) condenser is the discolouration of the camphor by iron rust. If the condenser were entirely of copper there would be little or no colouration.

(2) Since practically all the camphor condenses in the condenser tubes and only the oil and water pass into the receiver, a tube condenser has the disadvantage that the tubes would soon get blocked. Apart from this the layer of camphor on the tube would form a nonconducting medium and lessen the efficiency of the condenser.

(3) It is difficult to clean out a tube condenser, and easily remove the camphor, though this could easily be done by a special scraper fitting the condenser tubes.

(4) The chief disadvantage of the particular still described is the time wasted in discharging and recharging.

The discharging could be hastened by having a lateral opening above the perforated plate, and made air tight by an asbestos sheet.

(5) In a large still the weight of the leaves or wood, especially when wet, would tend to create pressure inside, by blocking the passage of steam. This could be remedied by using a series of perforated plates, a definite quantity of material (wood or leaves) resting on each.

A better plan and one which would simplify discharging and charging would perhaps be a metal cage which could be lifted bodily out of the still by means of a crane or other mechanical device and easily emptied by inversion and replaced when discharged. This would also allow steam to enter the material from all sides.

YIELDS.

In the first experiment with this apparatus, a whole tree, including roots, was received from the Batu Tiga Experimental Plantations and consisted of:—

Leaves weighing $12\frac{1}{2}$ lbs. = 7.5 per cent.

Twigs less than $\frac{1}{2}$ inch diameter weighing 30 lbs. = 18.2 per cent.

Twigs and wood over $\frac{1}{2}$ inch diameter 93 lbs. = 56.3 per cent.

Roots 29.5 lbs. = 18.0.

Separate distillations were made of the leaves, twigs under $\frac{1}{2}$ inch diameter, wood, and root with the following results.

$12\frac{1}{2}$ lbs. of leaves yielded 2 ozs. of camphor and oil = 1.0 per cent.

30 lbs. of small twigs yielded 1.07 ozs. of camphor
= 0.22 per cent.

93 lbs. of large twigs and wood yielded 9.8 ozs. of
camphor = 0.66 per cent.

29½ lbs. of Roots yielded 5.7 ozs. of camphor and oil
= 1.2 per cent.

The camphor in these experiments was of a brownish colour, due to contamination with iron oxide or rust from the condenser.

Most of the camphor scraped from the copper tubes of the condenser was almost white, which leads to the conclusion that a copper condenser would not discolour the product. The discoloured camphor can readily be rendered white by redistillation through a glass condenser or by sublimation.

PERIOD OF DISTILLATION.

In the small preliminary experiments it was found that all the camphor and oil distilled over within three hours or rather less, in fact the greater portion of the camphor distilled over within half an hour after steam commenced to pass through the material. In the later experiments the distillation was carried on for a longer period than three hours in order to ascertain whether in the large plant, similar results would be obtained. In each case the camphor and oil from three hour distillations were collected separately and the following results obtained.

- (1) Distillation of leaves.

First period of three hours.	Camphor and oil obtained = 1.0 per cent.
Second period of three hours.	Trace only.
Third period of three hours.	Nil.
- (2) Distillation of twigs.

First period of three hours.	Camphor and oil = 0.20 per cent.
Second period of three hours.	Camphor and oil = 0.022 per cent.
Third period of three hours.	Nil.
- (3) Distillation of wood.

First period of three hours.	Camphor and oil obtained = 0.56 per cent.
Second period of three hours.	Camphor and oil = 0.075
Third period of three hours.	Camphor and oil = 0.022
- (4) Distillation of roots.

First period of three hours.	Camphor and oil = 1.0 per cent.
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Second period of three hours. Camphor and oil = 0.2 per cent.

Third period of three hours. Camphor and oil = Trace.

CONCLUSIONS:—These experiments indicate that it would probably not be advisable to carry on the distillation for a longer period than three hours in the case of camphor prunings.

COMPARISON WITH PREVIOUS INVESTIGATIONS.

The results compare favourably with the investigations of Messrs. Willis and Bamber on the cultivation and preparation of camphor in Ceylon (Vide Circular Series I, No. 4 Royal Botanic Gardens, Ceylon 1901). Hooper, (Vide *Pharmaceutical Journal* (56) Vol. ii P. 21) also obtained a yield of 1 per cent of oil from leaves of plants grown in India. In one instance the oil is stated to contain only 10-15 per cent of camphor, while another specimen yielded 75 per cent of camphor.

Schimmel & Co. in Germany, one of the largest manufacturers of essential oils, also obtained an oil from the roots, which was stated to consist chiefly of camphor. The amount of camphor isolated from the oil will depend on temperature etc., more camphor can be separated from the oil by cooling, and also by redistilling the oil alone, preferably under reduced pressure, or with steam.

The camphor is a much more valuable commercial article than the oil, but the oil is also used to a considerable extent now for the preparation of safrol, as well as for solvent purposes, in cheap perfumery, soaps, etc.

FUTURE EXPERIMENTS.

The experiments already initiated will be carried on as time permits with further material and with younger trees. The trees in the Experimental Plantation, Kuala Lumpur are only two years old, and experiments will be made with these at intervals, to ascertain the yields at different stages of the plant's growth. Experiments are also being made to find the most suitable planting distances, and in addition, the most suitable form of cultivation, methods of pruning and their effects are being investigated.

Analyses of the soils on which these trees are being cultivated will also be made, and the manurial value of the prunings estimated before and after extraction.

BORNEO CAMPHOR.

Investigations are also being carried on with *Dryobalanops Camphora* of the Natural Order *Dipterocarpaceae*, commonly known as the Borneo or Sumatra camphor tree, from which the valuable so called Borneo Camphor is obtained.

This tree does not yield the true "camphor" known in commerce but a closely related compound known as Borneol.

The oil and "camphor" has not hitherto been an article of commerce at home but is chiefly used by various Eastern nations for ritualistic purposes and for embalming. No very detailed chemical examination of the oil has so far been carried out, owing to the scarcity of the oil. The oil has been obtained previously by distillation of the wood (age?) and by tapping the trunks.

The crystals of "camphor" can often be seen in cavities in the wood.

According to Watts "Commercial products of India" 1908, this camphor is valued by the Chinese at 40 to 80 times that of ordinary camphor. An average tree (age?) is said to yield 11 lbs., the older trees being the most valuable, while only some 10 per cent of the trees destroyed are really remunerative.

Experiments are being carried on at present with the prunings from trees nine years old cultivated in the Experimental Plantation, Kuala Lumpur.

J. W. CAMPBELL,

Supt. Exp. Plantation, F. M. S.

B. J. EATON,

Government Chemist, F. M. S.

**PROGRESS OF AGRICULTURE IN THE
FEDERATED MALAY STATES,
DURING 1908.**

We take the following notes from the Resident General's Annual Report for 1908.

"In his report for 1908 the Director of Agriculture (Mr. J. B. Carruthers) puts the agricultural acreage of the Federated Malay States at 319,722 acres which he divides among the several States as under:—

Perak	131,830	acres
Selangor	111,710	„
Negri Sembilan	58,718	„
Pahang	17,464	„

Total .. 319,722 acres

This acreage, which excludes padi lands and horticulture, was planted with staple products as follows:—

Coconuts	118,697	acres
Rubber	168,048	„
Coffee	8,431	„
Other forms of cultivation, chiefly Tapioca	24,546	„

Total .. 319,722 acres

The acreage under coconuts increased during 1908 by 3,310 acres in Perak, 1,848 acres in Selangor, 779 acres in Negri Sembilan and 200 acres in Pahang.

The increase in the rubber acreage during the year was made up of 10,539 acres in Perak, 20,694 acres in Selangor, 9,649 acres in Negri Sembilan and 931 acres in Pahang.

Rubber has now become the most important form of cultivation in these States and the acreage under rubber is much in excess of that of any other form of cultivation. The number of Rubber estates in the Federated Malay States is given as 300 and their acreage as 455,596 with 168,048 acres actually planted with rubber.

The number of trees the Director of Agriculture gives as 26,165,310. The out-put of dry rubber is quoted as 3,190,000 lbs. (= 1,425 tons) against 1,980,000 lbs. (= 885 tons) in 1907.

The distribution of 168,048 acres of rubber land is given as Perak 56,706 acres, Selangor 82,246 acres, Negri Sembilan 27,305 acres and Pahang 1,791 acres. During the year under review the applications for land for the purposes of rubber cultivation showed a falling off but there would appear to have been no decrease of activity in planting operations in land already alienated.

The planting of Para rubber (*Hevea braziliensis*) has almost entirely superseded that of Rambong (*Ficus elastica*) which was regarded with great favour by many planters a few years ago.

During the year 1908, according to the Director of Agriculture, the price of rubber varied from 3/- a pound in

the early part of the year to 5/9 towards the close, the average stated being about 4/3.

The cost of production is put at 1/- to 1/6 so that even though the year was not so good as 1907 the margin of profit was still large.

Trouble was experienced on most estates during the year owing to the ravages of White-ants (*Termes gestroi*) and to a fungoid disease well known as *Fomes semitostus*. These matters received the earnest attention of the Government Entomologist and Mycologist and an early practical means of cure and prevention is hoped for.

The yield of rubber trees is, of course, a matter of first importance and in this connection the Director gives some interesting figures. The average yield for 1908 over the whole Peninsula is given at 1 lb. 15 $\frac{3}{4}$ oz., an increase of 11% as compared with the preceding year.

This he considers to be a satisfactory yield having regard to the fact that most of the trees were being tapped for their first year. In Negri Sembilan the average yield is given as 3 lbs. 2 $\frac{1}{2}$ oz., and this the average yield of nearly a million trees, the Director of Agriculture regards is extraordinary high. Negri Sembilan trees show a higher average than other trees because of their age but the figure in question is satisfactory as showing what may be expected in respect of trees that have been tapped for two or three years.

In Parit Buntar an interesting experiment was carried out in connection with the tapping of eight 17 years old trees, which, tapped every other day, gave an average yield of 28 $\frac{1}{2}$ lbs. of dry rubber.

The labour employed on rubber estates in the Federated Malay States is over 57,000 souls and he divides it up between the four States as follows:—Perak 20,032, Selangor 29,513, Negri Sembilan 6,929 and Pahang 596. Of these labourers 43,515 are tamils, 4,999 are Javanese, 1,916 are Malays, and 6,595 are Chinese.

The health of the labour force improved during 1908 owing to the greater attention given to the matters of sanitation on estates and to the opening up of estate hospitals for the treatment and care of the sick. A similar improvement is not recorded in the case of the Managers or Superintendents and their Assistants who in many cases suffered severely from Malaria.

About two-thirds of the area under Coconuts is estimated to be in bearing, and the value of the whole is said by the Inspector of Coconut Plantations (Mr. L. Brown) to

be, say, \$23,000,000. The Inspector says that the area under this form of cultivation increased by 6,137 acres in 1908—1,600 acres of this being on estates owned and managed by Europeans.

The area under cultivation is distributed through the four states in the following proportions, Perak 61,086 acres, Selangor 23,169 acres, Negri Sembilan 18,779 acres and Pahang 15,663 acres.

The amount of Copra exported therefrom was:—Perak 49,016 pikuls, Selangor 20,879 pikuls, Negri Sembilan 285 pikuls and Pahang 659 pikuls.

The Copra produced on the European-owned estates was of good quality and obtained high prices; but the Copra from native holdings is very inferior. This is a question that is receiving attention and it is hoped that native cultivators may be induced to adopt sounder views with regard to the industry and to collect and treat the nuts after the fashion recommended by the Officials of the Agricultural Department.

The quantity and value of cultivated rubber exported are shown as 3,165,600 lbs. and \$4,558,026 respectively—an increase of quantity of 59% and an increase of value of 16%.

The exports of Copra increased from 49,326 pikuls valued at \$452,270 in 1907, to 71,981 pikuls valued at \$462,870 in 1908.

The cultivation of Coffee at the present price leaves a profit. In some of the newer estates in the Klang District of Selangor Coffee has been planted among the young rubber trees, but in view of the large profits to be obtained from rubber it is not to be expected that it will anywhere become a permanent rival to the latter cultivation.

Over 10,000 acres were devoted to Tapioca. The low prices prevailing during the year discouraged cultivation and it is alleged that in some instances the cultivators did not think it worth while to harvest the crop. It is being used to some extent as a catch-crop in conjunction with rubber and as such is well spoken of."

The above facts and figures indicate a distinct advance in matters Agricultural in the Federated Malay States during the year under review. The subject of plant sanitation, which has become an important one received great attention and many things have been discovered and remedies recommended for the eradication of *Fomes semitostus* and white-ant (*Termes gestroi*).

The out-put of the dry rubber and the yield of latex per tree show substantial increases especially the former which at this rate of increase should in 4 or 6 years give a total out-put for the *Federated Malay States* equal to or greater than the World's harvest of Para rubber at the present moment.

During the early months of 1908 the price of Para rubber fell to as low as 3/- but during the latter months prices showed a substantial increase until the year closed with the market prices at 5/9. During 1909 the price has been gradually improving until at the present time as much as 8/- has been obtained for sheet. With no indication of a sudden drop in prices in the near future the present year should close showing an average price per pound greatly in advance of 1908.

In our next issue of the *Bulletin* we hope to give the Annual Report of the Director of Agriculture in full.

T. W. MAIN.

A LEPIDOPTEROUS PEST OF COCONUTS,

BRACHAETONA CATOXANTHA, HAMPS:

(ZYGAENIDÆ).

Under the above heading we have received from the Department of Agriculture, Federated Malay States in Bulletin form an article on this destructive pest by Mr. H. C. Pratt, Government Entomologist. I became acquainted with this insect a few years ago in Perak and had opportunities of viewing its ravages on several plantations, principally native. Mr. Pratt gives a clear description of the Eggs, Larva, Pupa and Moth male and female, also the life history of the insect showing that during the fourth brood as many as forty thousand Caterpillars may be present on a single tree. The damage caused by such a mass of insects if allowed to remain will be quickly understood. As the subject is an important one to coconut planters and as excellent remedial and preventive measures are given at the end of the article we take the liberty of reprinting the pamphlet in full.

Copies of the Bulletin (No. 4) may be obtained on application to the Department of Agriculture, Kuala Lumpur.

T. W. M.

Taken generally throughout the Federated Malay States the native owners of coconut plantations have had up to the present time, with the exception of the coconut beetle, but few insect pests to fight against. Quite a large number of minor insect pests exist, such as scale insects, and sporadic lepidopterous pests, *e.g.* *Erionota thrax* (one of the skippers) and a species of *Thosea*. The damage caused by these is usually not extensive, but considerable improvement is desirable in certain parts of the Federated Malay States where scale insects are in large numbers on the leaves.

During the past three years, in two widely separated localities, a new pest of coconuts has appeared. It was first reported from Pusing Bharu, Batu Gajah, in March 1906, and was continuing to defoliate the trees in September of the same year when a short visit to the plantation showed that the pest on account of the activity of several parasites was rapidly decreasing in numbers.

Although this was the first reported example of its occurrence it appears that it is known to certain natives, although not as a serious pest. The owner of the plantation at Pusing Bharu stated that seven years had elapsed since the previous attack when very few trees were affected. It is possible that if it did occur previously the period of its absence is exaggerated, and it is equally likely that he is connecting the pest with *Erionota thrax*, also a defoliator, although a totally different insect, with distinct methods of work.

There was a second occurrence of the insect on the same plantation in February 1908. No report was received by this department until June 1908 when a visit to the place showed it would be too expensive to prevent further depre-dations. The third brood was in progress and fifteen to twenty thousands caterpillars were present on many trees. Later in February 1909 the same disease was reported from Province Wellesley and during the 8 days of my visit an opportunity was afforded to obtain a partial knowledge of its life history. At Pusing Bharu about 20 per cent of the third brood of caterpillars were parasitised, but no eggs have been noticed to be similarly affected.

The somewhat sporadic occurrence of this insect as a pest appears to be due to a diminution of its parasites, perhaps on account of the presence of a hyperparasite, thus enabling the moth to increase without hindrance.

It is advisable that managers of plantations acquaint themselves with this insect, and its methods of work. The

disease if no precautions against its progress are taken lasts for about 8 months, and during this period it is able to spread over 500 acres causing considerable monetary loss in addition to the severe trial on the trees.

DESCRIPTION OF EGGS.

The eggs are slightly oval, shiny, bare, semitransparent, having a yellow watery appearance. Unless in large numbers they are somewhat difficult to detect. Length $\frac{1}{2}$ mm. Width $\frac{1}{4}$ mm.

The under side of the leaf is chosen for oviposition, the eggs often being laid in large numbers towards the tip; they are laid separately, distributed unevenly, and at times extend throughout the whole length of the leaf. Providing sufficient food is present for the young larvae i.e. during the 1st and 2nd broods the lower branches of the tree are preferred by the moth for depositing the eggs. The number of eggs laid by each female is not known.

LARVA—The young larva is pale yellow or nearly white; when adult it presents a very different appearance. The blue markings mentioned in the following description do not appear for more than a week after hatching.

The adult larva consists of thirteen segments, excluding the head, the three thoracic each bearing a pair of legs, the 6th, 7th, 8th, and 9th bearing the prolegs, and the anal segment the anal prolegs. The head and the first two thoracic segments are yellow, the mandibles dark brown, the second thoracic segment has a few dark stripes on it (sometimes absent and not unfrequently light brown).

The abdomen below is yellow, lateral margins sometimes light green due to food. Upper surface of abdomen has a longitudinal blue fascia commencing at the apex of the third thoracic segment and terminating at the base of the 10th. The following markings of the same colour as the fascia are present on the segments. A large medium spot on the 12th, a small lateral spot on each side of the 11th, a spot on each side of the 3rd and 4th segments. The spots on the sides of the 4th segments are sometimes absent and are often more like stripes. Body with single long hairs radiating from it. Length when adult 12-14 mm.

PUPA—When adult the larva spins a covering for itself, strong in texture, and yellowish or dirty white in colour. The cocoons are elliptical in shape and depressed; during

a large brood they may be seen in enormous numbers often along the midrib and usually on the under side of the leaf. Length of cocoon 11-13 millimeters. Width 5-7 millimeters. Length of contained pupa 7-8 millimeters.

On first changing into the pupal state it is of a light yellow becoming later a darker hue, and just before the moth emerges the wings change to a dark brown. There are nine visible dorsal segments. The segments 3-7 each have a comb of teeth which extend about halfway on either side of the centre of the dorsum. The moth makes its escape by forcing up one end of the cocoon attached to the leaf, leaving the empty pupa case partially extruding.

MOTH—The following description is taken from Hampson's Fauna of British India Vol. 1 p. 233 and appended is a fuller description. For the identification of the insect I am indebted to E. Meyrick Esqr., F.R.S.

MALE—“Upperside uniform dark brown; frons and palpi yellow, the former with a black spot at middle; underside of thorax, abdomen and legs yellow. Fore wing brown below with yellow patches on the costa at base and apex; hind wing brown; the costal area yellow, the veins on it black.

Hab: Tenasserim valley. **Exp:** 16 mm.”

MALE AND FEMALE—Upperside of the uniform dull chocolate brown; head with a yellow band behind; frons yellow with a brown stripe down the centre. Costa of the forewing slightly yellow; underside of the forewing lighter chocolate brown with the costa yellow, the yellow terminating broadly near the apex.

Costal margin of hind wing on upper side of a dirty whitish yellow; underside with the costal margin broadly yellow extending length of wing. Other half of wing on inner angle of uniform colour with underside of forewing. Underside of body and legs yellow. Upperside of body chocolate brown. Antennæ chocolate brown, slightly yellow towards tip in some females.

LIFE HISTORY.

The first brood is between the months of November and February. As the higher trees are usually chosen first it is usually impossible, on account of the small number of

insects in the first brood, and the small size of the individuals composing it, to detect its first appearance without the aid of a glass. Very careful examination during these months is requisite to detect its presence, and a pair of binoculars is necessary for this purpose. It is on account of the shade afforded by the lower leaves that these are usually chosen first and detection of the disease is thus somewhat easier than it might otherwise be. The second brood is considerably larger and the brown appearance of the leaves show that some disease is proceeding. By the time the 4th brood has finished the trees in the affected acreage present an appearance resembling that which would be caused by a fire passing through the estate. The pest after running a course of 8 months then disappears, but is likely to return in two years.

For the first and second broods oviposition is on the lower leaves, but as these become mined the later broods gradually work to the upper leaves until the whole of the foliage is dead. Usually the very fresh leaves are not touched. The larva hatches in 3-5 days and commences to nibble away small portions of the epidermis; when about a week old the larva discontinues this nibbling, and mines the leaf on the underside in straight longitudinal narrow lines.

During the fourth brood as many as forty thousand caterpillars may be present on one tree and the damage caused by such a mass of insects will be easily understood. In four weeks the larva is adult, spins its cocoon, and pupates. A week to nine days later the moth emerges, fresh individuals continuing to make their appearance for about eight days, and for fifteen to twenty days they may be seen flying in enormous numbers around the trees. In the very early morning they are not active, but as soon as the sun rises a little they commence to fly about the flowers of the coconut trees whereon they feed. At midday they may be seen resting quietly, frequently in copulation, on the dead lower leaves and on the trunk of the coconut tree; when flying they somewhat resemble large midges. Thus the period taken for the completion of the life cycle from egg to moth is 5-6 weeks and approximately ten days for the appearance for a further brood increases the time to $6\frac{1}{2}$ to $7\frac{1}{2}$ weeks. Five broods may appear before the insect is reduced by parasites. A further report of this pest is to be published soon.

REMEDIAL AND PREVENTIVE MEASURES.

It is of the utmost importance to detect the first brood, and report is immediately. The greatest mistake that can be made is to allow the insect to increase and report the disease at the third brood. At a small cost, and before much damage has been caused to the trees it can be stopped during the first brood, while if allowed to increase for three consecutive broods it is next to impossible to prevent further ravages. Kerosine Emulsion was found to be far more effective than London Purple, although I am unable to state what quality of London Purple was used. Under any circumstances spraying with kerosine emulsion has the additional advantage of killing the scale insects with which the coconut trees in the Federated Malay States are so frequently infected.

The solution was as follows:—

Kerosine	2 gallons.
Water	1 gallon.
Soap	$\frac{1}{4}$ lb.

Dissolve the $\frac{1}{4}$ lb. soap in the 1 gallon of water by heating. When thoroughly dissolved add water slowly while boiling hot to the kerosine. Churn thoroughly for 10 minutes while and after adding water. Dilute with 10 parts of water when cool.

If this mixture is applied by a sprayer to the trees both the larvae and the scale insects present on the coconut trees will be killed. With large broods a considerable amount of good may be done with coconuts of 5-7 years of age by killing the moths. They may be caught in thousands in butterfly nets by sweeping the nets along the edges of the leaves. This must be done before the eggs are laid. It will further reduce the next brood if the time of the egg laying is carefully watched and when the eggs are found instructions should be given to the coolies to cut off the tips (for about a yard) of the lower coconut leaves. The cut portions of the leaves may be made into small piles where the heat of the sun will soon dry them and prevent the young larvae from maturing.

The most important object however should be to detect the first appearance of this pest and it must be reported immediately if the best and most effective results are sought.

NOTE ON IPECACUANHA CULTIVATION.

BY E. M. HOLMES, F.L.S.

Curator of the Pharmaceutical Society's Museums.

About a year ago I pointed out, with respect to the Ipecacuanha cultivated near Klang, in the protectorate of Selangor, that it was found by Mr. Pfenningwerth, the manager of the estate where it is cultivated, that although the fresh crop from fresh soil was a fairly good one, on trying to raise a second it invariably turned out very poor, although all kinds of manure had been tried to enrich the land, without apparently restoring to the soil the necessary ingredients for luxuriant growth. Under these circumstances, it occurred to me that it would be interesting to determine the mineral constituents of the root itself, so that if these were known they might indicate the mineral manure that should be added to the soil. Moreover, if these constituents were found to occur in similar proportion in the root collected in such widely distant localities as Matto Grosso, the United States of Colombia, and Selangor, it would still further emphasise the need of such ingredients being required by the plant. Fortunately, I found in Mr. G. S. Blake, B. Sc., A.R.S.M., an analytical chemist willing to undertake the analysis of Brazilian, Carthagena, and Selangor Ipecacuanha roots as met with in commerce and I have at length received his report. The details as given below seem to indicate that phosphate of lime and salts of magnesia and potash are the principal ingredients required by the plant. A certain amount of potash would probably be yielded by the leaf mould in which the plant grows, but lime and magnesia are not so equally distributed as a rule, and it is possible that on a siliceous soil these elements might be deficient. The quantity of calcium oxalate present in Ipecacuanha root in the form of raphides indicates that lime is used in building up the tissues of the plant. At all events, the use of these bases—the lime in the form of phosphate—is worthy of trial. Fortunately, Mr. Blake has now left for Matto Grosso in connection with a Baptist Missionary expedition to that province, to conduct scientific investigations, and has kindly promised to examine the soil in which the Ipecacuanha plant grows, and the other natural conditions under which the plant flourishes in the wild state.



Seraya or Seraya Batu (*Shorea Leprosula*, Miq.)

Analysis of Ipecacuanha Root.

BY M. G. S. BLAKE, B. Sc.

Composition of Ash.		Brazilian.	Carthagena.	Selangor.
		%	%	%
	Ash	2.04	2.72	1.80
Potash	... K ₂ O	25.53	7.42	28.55
Soda	... Na ₂ O	2.70	2.25	2.06
Lime	... Ca O	15.50	17.00	16.87
Magnesia	... Mg O	13.57	10.68	14.25
Manganous Oxide	Mn O	0.30	0.58	0.45
Phosphoric Oxide	P ₂ O ₅	12.70	5.16	13.81
Sulphuric Oxide	S O ₃	7.40	5.05	8.57
Silica	Si O ₂	11.02	—	10.50
Chlorine	Cl.	Trace.	Trace.	Trace.

(The Pharmaceutical Journal and Pharmacist).

June 5th 1909, p. 765.

SHOREA LEPROSULA, MIQ., "SERAYA" OR
"SERAYA BATU."

PLATE III.

Shorea leprosula, the subject of our illustration this month, is a lofty tree over 100 ft. tall occurring abundantly in the jungles of the Malay Peninsula. The timber well known as Seraya Batu or Seraya is derived from this tree and is largely used for planks, boxes, etc., but it would appear to be much inferior to timber obtained from other species of *Shorea* notably *Sal.* (*Shorea robusta*), Damar Lout and Resak.

The natural order to which *Shorea leprosula* belongs, namely *Dipterocarpeæ*, supplies the largest number of important timbers of any group in this region, including as they do such well known kinds as Meranti, Chengei, Resak, Giam, Damar Lout and Camphor wood.

As a rule the Shoreas flower only once in six years when the weather is very dry and hot. This makes the propagation of this tree somewhat troublesome. The seed is

produced in great quantities when the tree does fruit and germinate readily. Very often a large percentage of the seed are barren.

The rate of growth is very slow in *Shorea leprosula* and the other species and having few data as to its rate of growth we can only roughly guess the age of the large tree in the illustration; but judging by the rate of growth of young trees we should say that this tree is considerably over 100 years old with a girth of 10 ft. 3 ins. at 4 ft. from the base.

During a severe thunderstorm last February this tree was struck by lightning the bark being split from the bole for a length of 60-70 feet. As would be expected the tree has not recovered from the shock and at the present is almost entirely dead.

The loss of this tree to the Gardens is unfortunate as it was the finest specimen we possessed, and was a constant object of admiration and enquiry from visitors.

T. W. MAIN.

RUBBER PLANTING IN BRITISH NORTH BORNEO.

At the end of 1908 there were in British North Borneo ten Companies planting rubber. The total area of land owned by these companies is 87,000 acres excluding the North Borneo Trading Company's properties of 94,000 acres, of which approximately 6,000 acres were planted up with Para Rubber.

The Commissioner of Lands in his Report on Agriculture for 1908 states that Sekong, the only estate which has reached the productive state, was sold in June of that year by the North Borneo Trading Coy. to the Sekong Rubber Coy., the price paid being £40,000.

In November of the same year the Government estate at Lumat was sold for £25,000 to the North Borneo State Rubber Coy., Ltd. This price would seem to have included the remaining 5,000 acres of land (150 acres planted and 500 felled) and the buildings, plant and improvements. During 1908 the Tenom Borneo Coy. who have an estate of 3,000 acres at Beaufort opened a further 2,000 at Menggatal north of Jesselton. By the end of the year 500 acres of this had been planted.

Owing to the gradual rise in the price of rubber during the year the planters of British North Borneo are optimis-

tic and it is stated that British North Borneo now takes its place among the rubber producing countries of the world.

No doubt is felt as to this acreage increasing every year. 5/2½ per lb. was the price realised for the first trial consignment of rubber from Sekong Estate which shews that British North Borneo need not shrink comparison with other countries in this respect.

T. W. MAIN.

MINUTES OF MEETING OF THE PLANTERS' ASSOCIATION OF MALAYA.

Held at the Masonic Hall, Kuala Lumpur,

On July 11th, 1909, at 10 a.m.

Present: For the Kuala Lumpur District Planters' Association: Mr. E. B. Skinner, Mr. A. J. Fox, Mr. C. Burn-Murdoch, Mr. H. F. Dupuis, Mr. H. C. E. Zacharias. For the Klang District Planters' Association: Mr. R. W. Harrison, Mr. J. Gibson, Mr. A. B. Lake. For the Kapar District Planters' Association: Mr. H. W. Bailey, Mr. C. T. Hamerton. For the Batu Tiga District Planters' Association: Mr. P. W. Parkinson, Mr. H. F. Browell. For the Negri Sembilan Planters' Association: Mr. C. M. Cumming, Mr. G. W. Hingston, Mr. J. le P. Power (by proxy), Mr. E. N. T. Cummis. Chairman: Mr. C. M. Cumming. Secretary: Mr. H. C. E. Zacharias.

I. Mr. C. M. Cumming in thanking the delegates for having elected him Chairman of the Association, apologises for not being present at the previous Meeting. He had been asked to express his idea of the future policy of the Association. The Association was now a strong body, and its policy should be a strong and firm one, not to worry Government over small matters, but to agree among themselves in important questions what they wanted, and to press that fully home.

II. The Minutes of the previous Meeting are taken as read. The Secretary points out that these Minutes should have included the fact that Mr. R. W. Harrison did not seek re-election and expresses regret for this omission.

The Minutes are confirmed.

III. LONDON RUBBER EXHIBITION. The Secretary reads the following letter:

11th June, 1909.

The Federal Secretary, F. M. S.
Kuala Lumpur.

SIR,—I have the honour to refer to your letter No. 4014 of March 23rd and to enquire, when I may expect payment of the \$309.34.

I have, etc.,
(Sgd.) H. C. E. ZACHARIAS,
Secretary.

IV. COOLIES' CREDIT. The Secretary reports the following correspondence:

8th May, 1909.

The Federal Secretary, F. M. S.
Kuala Lumpur.

SIR,—I have the honour to submit to you the following Resolution, passed at the last Meeting of this Association, held on the 25th ultimo:

“That the Government of the Federated Malay States be approached with a view to obtaining legislation by which the Estate Tamil Coolies' credit be limited to \$10 recoverable at law.”

I have, etc.,
(Sgd.) H. C. E. ZACHARIAS,
Secretary.

No. 2268/1909.

2nd June, 1909.

SIR,—I am directed to acknowledge the receipt of your letter dated the 8th May, 1909, forwarding a Resolution of your Association to the effect that “the Government of the Federated Malay States be approached with a view to obtaining legislation by which the Estate Tamil Coolies' credit be limited to \$10 recoverable at law.”

2. I am to inform you that the question was considered at the Conference of Residents held in Kuala Lumpur during last month, and that the Conference while in sympathy with the aims of the proposal was unable to admit that the matter could be effectively dealt with by legislation.

I have, etc.,
(Sgd.) R. G. WATSON,
Federal Secretary.

To

The Secretary,
The Planter's Association of Malaya,
Kuala Lumpur.

V. INDIAN IMMIGRATION COMMITTEE. The Secretary reads the following letter:

6th May, 1909.

The Federal Secretary, F. M. S.
Kuala Lumpur.

SIR,—I have the honour to acknowledge receipt of your letter No. 1397 of March 25th and to inform you that same was laid before the Members of this Association at their last Meeting held on the 25th ultimo.

The discussion thereon having been postponed until our next Meeting, I was instructed to hold over my reply until after that date.

I have, etc.,
(Sgd.) H. C. E. ZACHARIAS,
Secretary.

Mr. Lake proposes the following motion, standing in his name:

“That H. E. the High Commissioner instruct the Chairman of the Immigration Committee that no proposal involving a financial change be submitted to the Immigration Committee without two months’ notice of such intended change having first been given in writing to the Planting Members of the Committee.”

In introducing this proposition, Mr. Lake points out, that the question of qualification was not the point at issue at all. The anomaly consisted in the fact, that, as the Indian Immigration Committee Meetings were at present conducted, it was impossible for the Planting Members to know beforehand, what the opinions of the majority of planters would be on a point, which might only have been brought before them at that very Meeting. The Planting Members on the Indian Immigration Committee not having sufficient notice given to them, were precluded from consulting this Association. Any member sent up by this Association to the Committee would try to support the views of the Association. But at present they could not, because they did not know what was coming up at a Meeting until they got there. If they were informed before-hand, they could express the views of the Association and also their private views if these differed. Where drastic financial changes were involved, it would be wise of Government to consult the Association. The Government had hitherto always worked hand in hand with them and he hoped they would continue to consider them as an advisory body on matters agricultural.

Mr. H. W. Bailey seconds the motion.

Mr. Cumming thinks the proposal perfectly reasonable and feels sure that the Government cannot have the least objection to doing what Mr. Lake desired.

Mr. J. Gibson is of opinion that when members were sent forward by the Association they should only represent the views of the Association.

Mr. Lake points out that the Planting Members were not sent forward by the Association, but were appointed by Government.

Mr. Cumming reminds them that they were appointed by Government as planting advisers. If they were forced to convey only the views of other people, irrespective of their own, the Government would immediately remove them. Mr. Harrison and he himself both wished that all matters should first be placed before the Association. But if they were forced, and not able to express their individual views as well as the views of the majority for the time being of the Association, the Government would have no use for them.

The motion is then put to the vote and carried nem. con. and the Secretary instructed to write accordingly a full and explanatory letter to the Government.

VI. RULES. The Secretary having given a resume of the previous action taken in this matter, the Meeting goes into Committee.

Open Meeting having been resumed, Mr. Harrison proposes and Mr. Gibson seconds the following two new rules:

(1.) *"Any member of a Constituent Association, other than a delegate bringing forward and carrying a resolution in such Association, shall have the right to conduct the same through all Meetings of the P. A. M."*

(2.) *"All members of Constituent Associations shall have the right to attend and vote at the Annual General Meeting in April, but 21 days' notice of any resolution to be brought before such Annual General Meeting shall be given in writing to the Secretary."*

Carried unanimously.

Mr. Skinner proposes, Mr. Cumming seconds, and it is carried unanimously, that Rule 6 be amended to read as follows:

"The Association shall meet at the requisition of the Secretary or of three members of the Association, and at such Meetings ten members personally present shall form a quorum."

Mr. Harrison proposes, Mr. Skinner seconds and it is carried unanimously, that Rule 4 be amended to read as follows:

“The Association shall consist of the Chairman and one in ten or part of ten of all members of Constituent Associations, subject to the right of any Constituent Association to be represented by not less than four representatives, if it announces its wish to that effect at the beginning of the financial year.

Mr. Skinner seconds this motion, which is carried.

Mr. Lake proposes that financial changes, if any, arising out of the alteration of the rules, take effect from the commencement of the new financial year (April 1st 1910). Mr. Bailey seconds this. Carried.

Mr. Cumming proposes, and Mr. Lake seconds, a vote of thanks to the Sub-Committee which had drawn up the report.

VII. MADURA CO., LTD. The Secretary reads the following correspondence:

Penang, 11th May, 1909.

SIR,—I have the honour to inform you that at a recent Meeting of the Immigration Committee it was decided that copies of the enclosed correspondence between the Chairman and the Madura Co., Ltd., Negapatam, on the subject of the Company's charges should be forwarded to your Association for its information and for any action that it may think desirable.

2. The charge of 8 annas per head on coolies was imposed by the Madura Co. early last year after a circular letter, a copy of which is also enclosed, had been sent to planters.

3. All Kangany coolies are accommodated in the Kangany Camp at Negapatam which is under the supervision of the department. The clerks of the Madura Co. attend the camp on the day of shipment to issue tickets as agents of the British India Steam Navigation Co. and they undertake the shipping of the coolies for which a charge of 4 annas per head is made.

4. Their work in other respect is that of the financial agents and they do not to the best of my knowledge come into contact with the coolies in any way except as mentioned above. No doubt however they are always ready to give the benefit of their advice to any Kangany who may get into a difficulty, although that cannot often occur.

5. In the circumstances it is not clear in what way the services that the Company renders to the planters differ

from those of an ordinary agent to a commercial undertaking that I am unable to agree with the statements contained in paragraph 4 of the Company's letter.

I have, etc.,

(Sgd.) L. H. CLAYTON,
Supdt. of Immigrants, S.S. & F.M.S.
Chairman, Immigration Committee.

Penang, 3rd March, 1909.

Gentlemen,—I have the honour to inform you that the possibility of reducing the initial cost to employers in the Federated Malay States of recruiting labourers by means of kanganies in India has recently engaged the attention of the Immigration Committee.

2. The scale of charges for the services you render to planters has been made the subject of some comment and as the question is to come up for discussion at a Meeting of the Committee to be held shortly I should be glad to receive an expression of your views as to the possibility of a reduction in existing rates.

3. I am informed that the existing charges are as follows:

Five per cent on all disbursements, a fixed fee of 8 annas per cooly and a shipping charge of 4 annas per head. It is understood that as a rule a bill is drawn on the employer for the amount due within a very few days of the expenditure and that the bank charges for remittance are paid by the planters.

4. The services rendered to the planters in return for these charges do not so far as I am aware differ in any considerable degree from those of an agent to a commercial undertaking for which a very usual inclusive charge is 2 per cent on the monthly disbursements.

5. While there is so far as I am aware no disposition to criticise the manner in which your services to the planters are carried out, there does appear to be a feeling that the work could and should be done at something approximate to ordinary agency charges.

6. I would ask you to give this question your serious attention and I should be glad to hear from you at an early date whether you see your way to making a reduction in the rates now charged.

I have, etc.,
 (Sgd.) L. H. CLAYTON.

No. P. 15/396.

Negapatam, 13th March, 1909.

The Superintendent of Immigrants,

F. M. S.,

Penang.

SIR,—We have the honour to acknowledge receipt of your No. P.O.L. 270/09 of 3rd instant and note that the possibility of reducing the initial cost to employers in the Federated Malay States of recruiting labourers by means of Kanganyies in India has recently engaged the attention of the Immigration Committee.

2. We are surprised to hear that the scale of charges for the services we rendered to Planters has been made the subject of some comment as your letter under reply is the first we have heard of it.

3. The charges are as enumerated by you.

4. We cannot at all agree with you that these services do not differ in any considerable degree from those of an agent to a commercial undertaking.

The work we do for the planters cannot in any way be compared with ordinary agency services. They are on an entirely different plane and involve a great amount of work, which does not appear on the surface, but which has had the result of building up to the position it now occupies, the Kangany labour force in the F. M. S. and Straits Settlements, and we must say we consider it a little unfair to us after the exertions we have made in this direction to wish to reduce our remuneration.

5. We are glad to know that there is no disposition to criticise the manner in which our services to the Planters are carried out but are very much surprised to learn that there appears to be a feeling that the work could and should be done on other terms.

When the present scale of charges was fixed they were fully explained to all the Planters with whom we have dealings and one and all unhesitatingly agreed to them, and the question of reducing these charges has never been raised by the Planters. On the other hand we have many letters from Planters thanking us for the attention we give to their interests.

We have, etc.,

(Sgd.) MADURA Co., LTD.

Mr. Cumming says that the question had not been brought up by the planters at all. The Madura Company had always treated the Kangany employers with great consideration. They had won the confidence of Kanganies, and there had never been any question of their squeezing the coolies. Their charges might look high, but there was no doubt that they did work which did not appear in the bill, helping coolies up country, and so on. Therefore he thought it would be a great pity for them, wanting a regular supply of labour, to upset the Madura Co. If later on it were necessary to cut down expenses, they could do so, when the labour conditions were on a firmer basis.

Mr. Gibson endorses Mr. Cumming's remarks. He had made it a point to ask every one he met, and he had heard not a single complaint. The telegram costs were the only charge which seemed heavy, but he had a talk with Mr. Mansfield, of the Madura Company, (who was at present on a visit to Selangor), and he had learnt that they had arranged a code which would reduce expenses. The Company's correspondence alone was enormous. The kanganies and coolies all spoke very highly of the Company.

Mr. Lake agrees and mentions that if a kangany had to appear in Court, the Company made arrangements for him to be defended. He would like to know to whom they would have recourse if the Madura Co. refused to reduce their charges.

Mr. Skinner says that the question probably arose through a letter which he wrote last year to the Superintendent of Immigrants asking if there was any chance of the Madura Co. reducing their charges. The Superintendent replied that it would be no good unless the planters were prepared to run an agency of their own and all planters would have to promise not to support the Co. This of course, they would not do. He also had had a conversation with Mr. Mansfield and he was convinced that the Co. was doing everything in their power to help them.

Mr. Zacharias produces the code referred to and explained that in any word could be given the name of the Estate and the number of coolies out of the boat. Messrs. Hampshire & Co. would get the cable and would send out postcards. The whole charge would be \$1, inclusive of everything.

Mr. Cumming proposes that in reply the Superintendent of Immigrants be informed that the Association do not think it necessary to interfere with the Madura Co.

and that a resume of what had been said at the meeting should be forwarded to the Co.

Mr. Gibson seconds this motion, which is carried nem. con.

VIII. THE AGRI-HORTICULTURAL SHOW. The Secretary's action is confirmed in offering at the forthcoming Agri-Horticultural Show a cup, value \$150. to the exhibitor, taking the greatest number of cups in Division A, Section 2.

IX. PREVENTION OF PLANT DISEASE. Mr. Harrison brings up the question of the prevention of Plant Disease. Everybody, he said, was on the look out for disease. There was the danger of a fungoid pest getting serious hold in the many and scattered small native holdings and he thought they should approach the Government to give the Department of Agriculture stringent powers to deal with cases of neglect to report disease. He understood that Government was now dealing with the question, and they might show their sympathy.

Mr. Lake having supported the idea of moving in the matter, Mr. Harrison undertakes to formulate a motion and to place same on the Agenda of the next Meeting.

X. Mr. Lake similarly gives notice that he will bring forward at their next meeting the question of licensing rubber dealers and of amending the Prædial Produce Enactment.

The Meeting terminates at noon.

H. C. E. ZACHARIS,

Secretary.

The Agri-Horticultural Show, Penang.

SECTION II.—RUBBER (REVISED LIST.)*

Class.		Number or quantity to be Exhibited.	Prizes.
10	Para-Crepe, best sample	not less than 25 lbs.	(a) Cup.
11	„ Sheet do.	do.	(b) Cup.
12	„ Biscuit do.	do.	S. M.
13	„ Block (ry) best sample	do.	(c) Cup.
14	„ Best Exhibit ready for Shipment. The Exhibit to be on case of Crepe, one case of Sheet and one case of Scrap, not less than 50 lbs. each	...	(d) Cup.
15	„ Best sample of Commercial Rubber, not less than 100 lbs. in weight	...	(e) Cup.
16	„ Best sample of Sheet, Crepe, Biscuit, Block and Scrap, each sample not less than 20 lbs.	...	(f) Cup.
17	„ Bamboog, any form, not less than 25 lbs.	...	S.M.B.M.
18	Any other Rubber, plant from which obtained must be stated with each	...	S.M.B.M.

(d) Cup presented by Hon. John Turner.

(i) do. do.

(j) do. E. Lauder Watson, Esq.

(k) Caledonia Cup value \$200, presented by Sir John Ramsden Bart.

(l) Cup presented by Francis Pears, Esq., value 20 guineas.

(m) Cup presented by Malay Peninsula Agricultural Association, value \$100.

The Planters' Association of Malaya will present a Cup, value \$150 to the Exhibitor winning the greatest number of prizes in the Rubber Section.

The Bertam Cup—Presented by the Bertam Estate will be awarded to the best Rubber Exhibit in the Show.

Competitors are reminded that their Exhibits must not bear the name of the Estate, nor the Manager, but the Exhibitor's number only.

N.B.—S.M. means Silver Medal.

B.M. means Bronze Medal.

***Revised in consequence of information received subsequent to the issue of the Prize Schedule.**

W. FOX,

Honorary General Secretary.

JOHN HADEN & CO. SPECIAL PRODUCE LETTER.

London, 4th June, 1909.

STRAITS REPORT.

- BEE SWAX** There has been a continued good demand, all descriptions of yellow selling at good prices, further arrivals will sell well.
- CAPSICUMS** The arrivals consisted mostly of poor quality. Good to fine beans are readily saleable at 50/- to 75/- per cwt.
- CHILLIES** Market steady. Good quality value 35/- to 43/-, fine 45/- to 50/- per cwt.
- COPRA** Market firm. We quote F. M. States at £18.2.6.; Sundried £19.5.0.; Manila £17.17.6.; Java £18.5.0.; Ceylon £20; Malabar £20.10.; Southsea £18.15.0. and Trinidad £19.5.0. per ton.
- GUM DAMAR** Market rather easier. In Sales Singapore, pale sold at 63/-; Pongang, grayish sorts at 48/6d to 42/6, specky grains 28/6, siftings, pale 24/6d, pickings 30/-, block 23/6d to 25/- per cwt.
- GUM BENJAMIN** Easier. Sumatra, fair almondy sold at £6 to £6.10.0., ordinary middling and brownish £5.5.0. to £5.15.0.
- GUM COPAL** Market very quiet, and prices easier. Macassar, pale and amber scraped sold at 51/-, small to bold yellowish scraped 44/-, part blocky 41/- to 43/-, pipey, yellow, medium and bold 29/- to 33/-, rough dark sort 16/-, inferior 14/6, nubbles, pale yellow 33/-, fair 26/-, pipey, yellow 27/-. Chips, specky 21/6, blocky 17/- to 19/-, grains 19/-, block 21/6d to 24/-. Amboyna, dark sorts 17/-; Sambas, pale pinky scraped 65/- to 69/-, part blocky 56/- to 64/-; nubbles and chips, pale 32/- to 34/-, block 25/6 to 26/-. Pontianac, nubbles, fair pale 35/- per cwt.
- GAMBIER** The market has ruled firm for this article, particularly, for near positions, which have commanded a premium. A fair business has been done. We close May shipment at 22/9, May/June at 22/7½d, July/August 22/6 c.i.f. delivered weights.
- PEPPER** As foreshadowed in our previous report, this market has been exceedingly dull, but closes rather firmer. On the spot black Singapore 3¼d to 3¾d. For arrival April/May shipment 3 1-32d, June/August 3 1-32d, August/October 3 1-32d with buyers. **WHITE PEPPER**:—Spot, fair Singapore 5¼d to 5½d, near shipment 5d, May/June 4 15-16d London landed

terms. Also May/June shipment 4 21-32d, June/August 4 $\frac{1}{2}$ d, August/October 4 $\frac{3}{4}$ d, September/November 4 $\frac{3}{4}$ d, delivered weights.

RUBBER

The market has been strong, Plantation kinds selling readily at dearer prices.

Sheet, good to fine pale 5/4 $\frac{3}{4}$ d to 5/6 $\frac{1}{4}$ d; Crepe, very fine pale 5/6 $\frac{1}{4}$ d to 5/7d, good to fine pale 5/4 $\frac{1}{4}$ d to 5/6 $\frac{1}{2}$ d, fair to good palish 5/3d to 5/5d, brown and grey 5/1 $\frac{1}{2}$ d to 5/3 $\frac{1}{4}$ d, clean dark brown 5/0 $\frac{1}{2}$ d to 5/2 $\frac{1}{2}$ d, dark specky 4/10d to 5/-, black softish 4/5 $\frac{1}{2}$ d to 4/6d, scrap, fair to good 4/6 $\frac{1}{2}$ d to 4/11d.

SHELL

M. O. P. The supplies offered were small, prices remained steady.

Macassar-Green small shells, small and medium good quality sold at 32/6 to 43/-per cwt.

Trocas Shells-Singapore sold at 17/-per cwt.

Supplies were small, competition good, and everything sold. Singapore, 43 lbs., of Shell sold at 17/6 per lb., for sorts on string.

TAPIOCA

Little change has taken place. The spot market has been very quiet, and business difficult.

For arrival only a moderate business closing sellers of Flake, April/June and June/August shipment at 1 $\frac{1}{2}$ d c.i.f. and Pearl, medium June/August shipment at 11/6d, July/September 11/4 $\frac{1}{2}$ d, and fair Penang at 10/6d and 10/4 $\frac{1}{2}$ d per cwt.

VANILLOES

Supplies offered in last sales met with good competition, prices shewing an advance of 1/- to 1/6d per lb.

Mauritius-123 tins offered and sold. Fair to good, 8 to 9 inch at 16/-, 8 to 8 $\frac{1}{2}$ inch at 15/-, 7 $\frac{1}{2}$ to 8 inch at 12/- to 13/-, 7 to 7 $\frac{1}{2}$ inch at 11/6d to 12/6d, 6 $\frac{1}{2}$ to 7 inch at 9/9d to 11/6d, 4 $\frac{1}{2}$ to 6 $\frac{1}{2}$ inch at 8/3d to 11/-. Fine splits 8/6 to 9/9d, common 7/9 to 10/6d.

Seychelles-Of 182 tins about 135 sold. Fair to good 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ inch at 13/6d, 7 to 8 inch at 11/- to 13/-, 3 to 7 $\frac{1}{2}$ inch at 8/3d to 11/-, common 7/3d to 8/6d.

Madagascar-34 tins offered and sold. Fair to good 6 $\frac{1}{2}$ to 7 $\frac{1}{2}$ inch at 10/9d, 6 $\frac{1}{2}$ to 7 inch at 9/9d to 10/6d, 5 to 6 inch at 9/- to 9/6d, common 8/3d to 8/6d.

Mexican-1 tin sold. Good 7 to 8 inch at 16/6d.

Australian-6 tins sold. Fair to good 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ inch at 9/6d, 6 to 7 $\frac{1}{2}$ inch at 8/6d, common 8/3d.

Bourbon-4 tins sold. 4 $\frac{1}{2}$ to 5 $\frac{1}{2}$ inch at 8/3d.

Zanzibar-8 tins sold. Common 4 $\frac{1}{2}$ to 7 inch at 7/9d to 8/3d.

Java-7 tins sold. Common 5 to 7 inch at 8/3d.

Ceylon-2 tins sold. Common at 7/-.

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

For the month of June, 15th & 1st.

Tons.

			16th.	1st.
Tin	Str.	S'pore. & Penang to U. Kingdom &/or	1,375	1,200
do.	"	do. U. S. A.	613	830
do.	"	do. Continent	390	210
Gambier	"	Singapore Glasgow	...	...
do.	"	do. London	225	30
do.	"	do. Liverpool	325	...
do.	"	do. U. K. & or Continent	75	190
Cube Gambier	"	do. United Kingdom	100	60
Black Pepper	"	do. do.	25	...
do.	"	Penang do.	125	90
White Pepper	"	Singapore do.	150	150
do.	"	Penang do.	5	...
Pearl Sago	"	Singapore do.	95	70
Sago Flour	"	do. London	200	430
do.	"	do. Liverpool	1,400	...
do.	"	do. Glasgow	75	...
Tapioca Flake	"	do. United Kingdom	260	210
T. Pearl & Bullet	"	do. do.	500	230
Tapioca Flour	"	Penang do.	500	460
Gutta Percha	"	Singapore do.	40	...
Buffalo Hides	"	do. do.	80	...
Pineapples	"	do. do.	40,000	11,250
Gambier	"	do. U. S. A.	15	550
Cube Gambier	"	do. do.	...	60
Black Pepper	"	do. do.	175	200
do.	"	Penang do.	...	...
White Pepper	"	Singapore do.	10	20
do.	"	Penang do.	...	10
Tapioca Pearl	"	Singapore do.	190	170
Nutmegs	"	S'pore., Penang do.	18	41
Sago Flour	"	Singapore do.	75	50
Pineapples	"	do. do.	1,750	4,500
do.	"	do. Continent	1,250	2,500
Gambier	"	do. South Continent	150	...
do.	"	do. North Continent	160	175
Cube Gambier	"	do. Continent	35	20
Black Pepper	"	do. South Continent	35	40
do.	"	do. North do.	55	310
do.	"	Penang South do.	35	40
do.	"	do. North do.	...	25
White Pepper	"	Singapore South do.	10	...
do.	"	do. North do.	5	40
do.	"	Penang South do.	...	...
do.	"	do. North do.	5	5
Copra	"	S'pore., Penang Marseilles	400	150
do.	"	do. Odessa	...	100
do.	"	do. Other S. Continent	340	340
do.	"	do. North Continent	1,250	2,150
Sago Flour	"	Singapore Continent	2,000	750
Tapioca Flake	"	do. do.	180	70
do. Pearl	"	do. do.	15	30
do. Flake	"	do. U. S. A.	50	5
do. do.	"	Penang U. K.	50	75
do. Pearl & Bullet	"	do. do.	170	100
do. Flake	"	do. U. S. A.	...	...
do. Pearl	"	do. do.	...	160
do. Flake	"	do. Continent	...	10
do. Pearl	"	do. Continent	125	100

				Tons.	
Copra	„	S'pore., Penang	England	200	100
Gambier	„	do.	U. S. A.	..	...
Cube Gambier	„	do.	do.	...	...
T. Flake & Pearl	„	do.	do.	..	...
Sago Flour	„	do.	do.	..	...
Gambier	„	do.	South Continent	...	...
Copra	„	do.	Marseilles	...	...
Black Pepper	„	do.	South Continent	...	...
White Pepper	„	do.	do.	...	...
do.	„	do.	U. S. A.	...	...
Pineapples	„	do.	do.	...	...
Nutmegs	„	do.	do.	...	...
Black Pepper	„	do.	do.	...	...
do.	„	Penang	do.	...	...
White Pepper	„	do.	do.	...	...
T. Flake & Pearl	„	do.	do.	...	...
Nutmegs	„	do.	do.	...	...
Tons Gambier				1,200	400
Tons Black Pepper				975	575

Wired on 15th & 1st June.

LEWIS & PEAT'S PLANTATION RUBBER REPORT.

June 25th, 1909.

The following Lots, comprising about 72 Tons Straits and 10 Tons Ceylon, were offered at Auction to-day and sold as follows:

STRAITS & MALAY STATES.

MARK.	PKGS.	DESCRIPTION.	PRICE.
S. S. B. R. Co. Ltd.	13	Cases Sheets	
	6	„ Crepe	... bought in
Golconda	12	„ Sheets	... 5/9 @ 5/11
	30	„ Crepe	... 6/6
Sagga R. Co. Ltd.	5	„ „	... 3/8 @ 6/
Seafield	22	„ „	... 6/6½ @ 6/7¾
B. R. R. Co. Ltd.	11	„ „	... 5/2 @ 6/8¼
Harpenden	5	„ „ part sold	... 5/3¼
	4	„ Sheets	... 6/0¾ @ 6/6¼
N. H. R. Co. Ltd.	6	„ „	... 6/6
	14	„ Crepe part sold	... 5/0½ @ 6/6
F. S. R. Co. Ltd.	9	„ Sheets	... 6/3¾
	23	„ Crepe most sold	... 6/6¼
P. S. E.			... 5/6½ @ 6/3¾
T. A.	3	„ „	... 5/-
	6	„ Sheets	... 6/4 @ 6/4½
Highland	67	„ „	... 6/10¼ @ 6/11
Estatoe	35	„ Crepe most sold	... 6/2 @ 6/4¼
C. M. R. E. Ltd.	70	„ „	... 5/2½ @ 5/9
R.	6	„ „ 2 sold	... 6/1½
S. S. Co.	14	„ Sheets	... 6/6½
S. S. C.	13	„ „	... 66/½
R.	6	„ Crepe 5 sold	... 5/4 @ 6/1
P. S. E.	3	„ „	... bought in
Selaba			

MARK.	PKGS.	DESCRIPTION.	PRICE.
Beverlac	10	6 sold	... 6/2 @ 6/2½
T. B. B.			
Sekong	10	Sheets	... 6/6 @ 6/10½
	3	Scrap	... 4/10 @ 5/3
Bila	26	Sheets	... 6/6½ @ 6/6¾
	38	Crepe	... 6/0¾ @ 6/4¾
			... 6/6½
U. S. R. E. Ltd.	3	Sheets	... 5/3
	2	Scrap	... 6/6¾ @ 6/8½
Sungei Krudda	12	Crepe	... 6/1½ @ 6/8½
C. R. W. R.			
Co.	17		
E			
L.			... 4/6 @ 6/4½
A. R. Co.	10		
O. H.	2	Sheets	... 6/6¾
Kamuning Linggi.	5	Crepe	... 5/1 @ 6/3¾
G. C. L.	8	Rambong Scrap 4 sold	... 4/8
F. F. E.			
B. P.	40	Crepe (Rambong)	... 5/1½ @ 5/6½
United Serdang.			
V. V. V.	2	Crepe	... bought in
	2	Scrap	... " "
Kepitigalla	12		... 5/4
Vallambrosa.			
V. R. Co. Ltd.	24	Sheets	... 6/6¾ @ 7/-
Klang.	41	Crepe	... 5/6¾ @ 6/5½
F. M. S.			
K. P. & Co. Ltd.	15	Sheets	... 6/7
	12	Crepe	... bought in
	2	Scrap	... " "
S. R. Co. Ltd.	25	Crepe	most sold ... 6/6 @ 6/6¾
			... 6/6¾
S.	5	Sheets	... 5/3
	3	Scrap	... 6/6¾
K.	1	Sheets	... 5/5 @ 6/7½
	29	Crepe	... 6/6½ @ 6/7½
P. S. E.	10		part sold
C.			... 6/7
S.	11	Sheets	... 5/2¾ @ 5/3½
B. B.	9	Scrap	... 6/3¾ @ 6/7
T. C. Y.	10	Crepe	... 6/-
P. S. C. R.	2	Sheets	... 5/2
J. C.	1	Scrap	... 6/5 @ 6/7½
S. K. R. Co. Ltd.	30	Crepe	part sold
B. & D.			... 6/7
F. D.	4	Sheets	... 5/- @ 6/7½
T.	4	Crepe	... 3/6 @ 5/3¾
B. & D.	9	Scrap	... 6/- @ 6/7
	12	Sheets	... 5/1½ @ 5/3½
	2	Biscuits	... 4/4 @ 6/7½
R.			
M. P.	101	Crepe	... bought in
Ltd.			
L. E.	79	Block	... 6/1¾ @ 6/4½
M. U. A. R.			... 4/1 @ 5/4½
			... 4/-
M. B.	49	Crepe	most sold ... 5/1½ @ 6/3½
E.			... 4/9 @ 6/3
Sumatra.	25		... 6/6¾ @ 6/7
S.	2		

MARK.	PKGS.	DESCRIPTION.	PRICE.
Jugra.	9	„ „	
Buta Caves.	6	„ „	... 4/9 @ 5/1
	11	„ Sheets	... 6/6½ @ 6/6¾
Damansara Selangor.			... bought in
	25	„ Crepe	
Edinburgh.	10	„ Sheets	
Estate.	2	„ Crepe	

CEYLON.

MARK.	PKGS.	DESCRIPTION.	PRICE.
Kumaradola.	5	Cases Biscuits	... 6/3
Kumbukkan.	3	„ „ „	... 6/6
	1	„ Scrap	... 5/2½
Dangan.	7	„ Biscuits	... 6/5¾ @ 6/5
	2	„ Scrap	.. bought in
St. George.	7	„ Biscuits	... 6/6½
	2	„ Scrap	... 5/3½ @ 5/4¾
Glanrhos.	14	„ Crepe	... 6/3 @ 6/9¼
	1	„ Block	... bought in
Clontarf.	5	„ Crepe	... 6/2¾ @ 8/9
Gikiyanakande.	14	„ Worms	... 6/4½
	10	„ Crepe	... 6/2 @ 6/7½
	1	„ Scrap	... bought in
Pataling	2	„ Crepe	...
H. C.	7	„ Sheets	... 6/3¼ @ 6/6½
Kepitigalla.	3	„ Scrap	... 5/3
	2	„ Sheets	... 6/6¾
Maddagadera.	22	„ Scrap	... 5/3¼
	3	„ Biscuits	... 6/6¾
	6	„ „	... 5/3¾
Yalla Ella	2	„ Scrap	... 6/6¾
	1	„ Biscuits	.. bought in
Hattangalla.	1	„ Crepe	.. 6/2
	2	„ „	1 sold ... 6/6¼
Rosehaugh.	4	„ Biscuits	... 5/1¼
Palli.	2	„ Crepe	... 6/5½
	11	„ Biscuits	... 6/5½
Ambatenne.	2	„ Sheets	... 6/6½
	3	„ Biscuits	... 5/2½
Densworth.	2	„ Scrap	... 6/6½
	5	„ Biscuits	... 5/2½
Rosehaugh.	2	„ Scrap	
	10	„ Crepe	... bought in
Doranakande.	1	„ Biscuit	... 6/6¼
	3	„ „	... 6/6 @ 6/6½
Tallagalla.	5	„ Crepe	... 6/2
	4	„ Biscuits	... 6/6½
	1	„ Crepe	... bought in
	1	„ Scrap	... 4/6
	1	„ Biscuit	... 6/6½

The price of Fine-Hard to-day on the spot is 6/3½ per lb.

Negri Sembilan.

Abstract of Meteorological Readings in Negri Sembilan for the month of June, 1909.

382

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Seremban Hospital	Not recorded	135 Not recorded.	80.9 Not recorded.	86.8 Not recorded.	70.9 Not recorded.	15.9 Not recorded.	76.7 Not recorded.	84.9 Not recorded.	74.44 Not recorded.	81.1 Not recorded.	N.W. Not recorded.	13.79	3.10
Mantin	"	"	"	"	"	"	"	"	"	"	"	6.38	1.27
Ayer Kuning	"	"	"	"	"	"	"	"	"	"	"	4.33	1.70
Tampin	"	"	"	"	"	"	"	"	"	"	"	5.58	2.30
Kuala Pilah	"	"	"	"	"	"	"	"	"	"	"	7.29	1.60
Jelebu	"	"	"	"	"	"	"	"	"	"	"	4.89	1.97
Port Dickson Town Hospital	"	"	"	"	"	"	"	"	"	"	"	6.53	2.19
Port Dickson Beri-Beri Hospital	"	"	"	"	"	"	"	"	"	"	"	6.96	1.62
"	"	"	"	"	"	"	"	"	"	"	"		

M. O's IN CHARGE, OFFICE,
24th, July, 1909.

S. LUCY,
Medical Officer, in Charge.

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Penang.

Abstract of Meteorological Readings in the Prison Observatory for the month of June, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	Mean F°	F°	Mean F°	Mean F°	Mean F°	F°	Mean F°	Mean F°	Mean F°		Ins.	Ins.
Prison Observatory.	29.894	142.3	80.6	90.1	74.7	15.4	77.6	90.7	74.8	86	N.W.	14.67	3.75

PRISON OBSERVATORY, PENANG.

9th July, 1909.

A. H. KEUN.

Medical Officer.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of June, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew-Point.	Humidity.			
384 General Hospital, K. Lumpor	29.857	146.0	80.5	89.1	72.7	16.4	76.4	0.825	73.5	77	Calm	6.12	1.01
Pudoh Gaol " "	6.78	1.56
District Hospital " "	7.90	2.82
" Klang	89.6	71.4	18.2	...	...	...	...	...	2.76	0.94
" Kuala Langat	2.15	1.50
" Kajang	7.29	1.75
" Kuala Selangor	88.2	75.4	12.8	...	...	...	...	...	3.94	1.52
" Kuala Kubu	92.2	71.5	20.7	...	...	...	...	...	11.14	3.50
" Serendah	92.3	70.6	21.7	...	...	...	...	...	7.98	1.80
" Rawang	90.9	71.6	19.3	...	...	...	...	...	5.77	2.65
Beri-beri Hospital, Jeram	6.67	2.30
Sabak Bernam	2.65	0.80

OFFICE OF SENIOR MEDICAL OFFICER,
Kuala Lumpur, 19th July, 1909.

G. D. FREER,
Senior Medical Officer, Selangor.

Perak.

Abstract of Meteorological Readings in Perak for the month of May, 1909.

385

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taipeng	...	151	82.85	94	72	22	77.70	882	...	78	...	5.65	1.25
Kuala Kangsar	80.89	93	72	21	76.51	856	...	81	...	2.51	67
Batu Gajah	...	157	81.01	93	72	21	76.39	849	...	79	...	2.86	75
Gopeng	80.77	92	62	30	75.17	807	...	77	...	11.35	2.54
Ipoh	81.23	94	71	23	77.15	880	...	82	...	7.71	1.87
Kampar	80.67	93	69	24	76.45	858	...	81	...	5.56	2.04
Teluk Anson	81.52	93	68	25	76.59	849	...	78	...	4.75	1.96
Tapah	81.11	93	65	28	76.19	837	...	78	...	7.29	2.12
Parit Buntar	82.17	91	72	19	77.58	885	...	80	...	3.60	1.24
Bagan Serai	82.01	91	71	20	77.48	883	...	81	...	3.29	1.05
Selama	81.29	92	72	20	77.17	880	...	82	...	7.16	2.02

STATE SURGEON'S OFFICE,
Taipeng, 15th July, 1909.

M. J. WRIGHT,
State Surgeon, Perak.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of May, 1909.

386

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis	80.	92	67	19	75.	...	...	...	...	8.18	2.20
Raub	77.96	93	68	19	73.	...	...	...	...	5.11	2.43
Bukit Fraser	5.49	1.52
Bentong	81.87	93	70	19	76.83	...	...	...	...	5.01	1.40
Temerloh	95	72	18	79	...	...	...	...	3.98	1.50
Pekan	82	92	71	15	78	...	...	...	...	9.56	1.94
Kuantan	84	92	68	19	...	...	...	...	...	6.62	2.23
Sungei Lembing	87	68	...	...	...	...	...	...	10.32	2.24

OFFICE OF THE SENIOR MEDICAL OFFICER, PAHANG.

Kuala Lipis, 23rd June, 1909.

S. C. G. Fox.

Senior Medical Officer, Pahang.

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Seremban.

Table Showing the Daily Results of the Reading of Meteorological Observation taken at the General Hospital, Seremban, for the month of June, 1909.

387

DATE.	TEMPERATURE OF RADIATION.						TEMPT. OF RADIATION.		WIND. DIRECTION.			TEMPT. OF EVAPORATION.			COMPUTED VAPOUR TENSION.			RELATIVE HUMIDITY.			CLOUDS 0 TO 10			WEATHER INITIALS.			RAIN. Inch
	9 H.	15 H.	Mean.	Maxi-mum.	Mini-mum.	Range.	Sun.	Differ-ence Sun & Shade.	9 H.	15 H.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	21 H.		
1	87	89	88	90	72	18	147	57	N W	S W	67.3	74.3	70.8	659	847	758	52	61	56.5	2		2	S	S	S		
2	80	78	79	90	73	17	110	20	N N E	N N E	75	71.6	73.3	867	775	821	85	58	71.5	3	1	10	S	N	N		
3	79	80	79.5	90	72	18	137	47	N N E	N N E	75.6	75	75.3	885	867	876	90	85	87.5	3	10	10	S	N	N		
4	79	80	79.5	88	72	16	135	47	N N W	S W	72.3	73.3	72.8	793	820	806	80	80	80	2	10	8	S	N	N	3.10	
5	78	79	78.5	86	70	16	138	52	N N W	N W	74.6	73.9	74.2	857	839	848	89	85	87	8	10	10	N	N	N	2.45	
6	78	79	78.5	85	70	15	110	25	N N W	S W	78	77.3	77.6	958	937	947	100	95	97.5	8	10	10	N	N	N	1.05	
7	76	80	78	86	70	16	132	46	N N W	N W	74.3	78.3	76.3	848	903	905	94	95	94.5	7	7	10	N	N	N	05	
8	70	78	79	86	72	14	138	52	N N W	N W	76.6	74.6	75.6	916	857	885	90	89	89.5	6	6	7	C	C	C	88	
9	78	83	80.5	83	69	14	114	31	N N W	N W	78	76.3	77.1	958	935	931	100	80	90	5	7	5	C	C	C	60	
10	78	81	79.5	84	71	13	129	45	N N W	S W	72.9	72.6	72.7	810	802	806	84	76	80	4	6	10	C	C	C		
11	75	84	79.5	84	69	15	124	49	N N W	N W	71.6	74.3	72.9	775	847	807	89	72	80.5	4	7	4	C	C	C		
12	80	89	84.5	90	69	21	148	58	N N W	N W	74.3	73.3	73.8	848	819	833	94	61	77.5	2	4	1	S	C	S		
13	77	88	82	88	70	18	149	61	N N W	N W	73.3	71.6	72.4	820	775	793	94	58	76	2	1	1	S	S	S	03	
14	75	88	81.5	89	70	19	148	59	N N W	N W	72.9	76.7	74.8	810	922	865	84	76	80	4	0	0	S	S	S		
15	78	85	81.5	88	71	17	142	54	N N W	N W	74.7	75.5	75.1	856	884	870	76	69	72.5	2	3	2	S	S	S		
16	83	87	85	88	71	17	148	69	S W	S W	74.7	76.7	75.5	840	904	872	100	72	86	2	2	0	S	S	S		
17	74	86	80	86	71	15	142	56	N N W	N W	74	76	75	897	922	909	85	76	80.5	6	2	5	C	C	C	2.10	
18	81	85	83	87	71	16	145	55	N N W	N W	76.2	70.7	76.4	867	955	911	85	76	80.5	6	2	5	C	C	C		
19	80	86	83	86	72	14	148	62	N N W	N W	73.3	76.7	75	820	922	871	80	76	78	2	3	2	S	S	S		
20	80	85	82.5	86	72	14	145	59	N N W	N W	75	77	76.5	867	955	911	85	76	80.5	2	3	2	S	S	S		
21	78	86	82	87	87	72	147	60	N N W	N W	72.9	76	74.4	810	904	857	84	72	78	1	2	2	S	S	S		
22	78	87	82.5	86	86	72	142	62	N N W	N W	74.6	77.1	75.8	857	933	895	89	73	81	2	2	2	S	S	S		
23	78	87	82.5	87	87	73	148	61	S W	N W	72.9	78.8	75.8	810	985	897	84	77	80.5	2	1	1	S	S	S		
24	80	80	80	87	87	70	115	28	N N W	S W	71.6	75	73.3	775	867	821	75	85	80	3	5	2	S	S	S		
25	83	85	82.5	87	87	72	130	43	N N W	N W	69.9	73.6	71.6	732	825	779	71	68	69.5	3	6	4	C	C	C		
26	82	80	81	86	85	73	110	24	N N W	N W	70.3	76.6	73.4	742	916	829	68	90	79	3	4	5	S	S	S		
27	76	80	78	85	85	69	115	30	N N W	N W	72.6	75	73.8	831	867	834	89	85	87	3	6	7	S	S	S		
28	77	83	80	89	89	69	145	56	N N W	S W	73.6	76.3	74.9	829	905	867	89	80	84.5	3	5	5	C	C	C	2.05	
29	77	78	77.5	85	85	70	129	44	N N W	N W	73.6	74.6	74.1	829	857	843	89	89	89	4	2	4	C	C	C		
30	77	79	78	85	85	72	138	53	N N E	N E	75.3	75.6	75.4	877	885	851	94	90	92	5	6	7	C	C	C	28	
Mean	78.6	83.2	80.9	86.8	70.9	15.9	135	48.2	N W	N W	73.6	75.2	74.4	831	868	849	85.2	77	81.1								13.79

Highest Temperature 90. Lowest Temperature 68. Greatest Rainfall in 24 hours' 3.10

J. A. SCHELKIS,
Apothecary.

TRADE.

Average Annual quantities of Rice in pikuls imported into and exported from the Colony during the five years ended 1906, also for the years 1907 and 1908:—('000 omitted).

	IMPORTS.	EXPORTS.
Average for the five years 1902-1906 ...	7,679	6,627
1907 ...	7,521	7,151
1908 ...	8,734	8,181

TRADE.

Average Annual Export Value per pikul declared in Singapore of the principal articles of produce for the five years ended 1906, and also for 1907 and 1908:—

PRINCIPAL ARTICLE.	AVERAGE FOR THE FIVE YEARS ENDED 1906.		1907.		1908.	
	\$	c.	\$	c.	\$	c.
Coffee	21	72	21	68	22	36
Sago Flour	3	45	2	93	3	00
Sago, Pearl	4	91	4	71	4	22
White Pepper	42	61	24	80	18	77
Tapioca, Flake	5	93	9	37	6	60
Tapioca, Pearl	5	66	5 22		6	33
Tapioca Flour	5	50	6	40	5	25
Borneo Rubber	103	28	98	82	86	15
Sticklac	51	09	67	93	36	80
Hides, Raw	24	36	26	74	21	25
Rattans	11	11	9	56	8	64
Tin	82	54	87	15	67	05
Gambier, including Cube ...	11	78	7	96	8	37
Black Pepper	28	43	17	69	11	92
Gutta-Percha	135	06	54	18	49	37
Copra	8	62	9	63	7	12
Gum Copra	15	55	15	66	13	36
Para Rubber	*339	00	266	70	191	48

TRADE.

Statement showing the average annual quantities of the principal articles of produce exported for the five years ended 1906, also the exports for the years 1907 and 1908:— (Thousands of pikuls).

ARTICLES.	AVERAGE FOR THE FIVE YEARS 1902-1906.	1907.	1908.
Coffee	87	49	54
Sago Flour	696	856	953
Sago, Pearl	104	139	137
Spices :—			
Arecanuts	672.	883	799
Cloves	5	3	6
Cubebs	2	2	2
Mace	3	3	3
Ginger	4	6	10
Nutmegs	16	23	23
Black Pepper	250	328	496
White Pepper	95	111	134
Long Pepper	4	7	13
Tapioca, Flake	206	167	201
Tapioca Flour	305	81	155
Tapioca, Pearl	367	413	401
Copra	818	954	1,301
Gambier	650	574	538
Hides, Raw and Tanned	88	90	85
Gums :—			
Benjamin	21	22	21
Camphor	2	2	3
Copal	123	176	159
Damar	45	62	60
Gutta-percha	42	52	28
Gutta Inferior, including Jelutong	178	251	103
India Rubber	7	6	3
Borneo Rubber	22	29	20
Sticklac	10	3	3
Shells, M. O. P.	4	3	3
Rattans	452	465	452
Tin	951	949	1,064
Preserved Pines (cases)	Not stated.	846	717
Para Rubber (pikuls)	Not stated.	16	27

SINGAPORE MARKET REPORT.

June, 1909.

Articles.	Quantity sold.	Highest price.	Lowest price.
	Tons.	\$	\$
Coffee Palembang ...	...	...	...
Bali ...	5	26.50	26.00
Liberian ...	89	24.75	23.50
Copra ...	5,098	8.45	7.50
Gambier Bale ...	1,895	9.80	9.12 $\frac{1}{2}$
Cube, Nos. 1 & 2 ...	455	14.40	13.00
Gutta Percha, 1st quality ...	...	300.00	240.00
Medium ...	...	240.00	120.00
Lower ...	...	80.00	12.00
Gutta Jelotong ...	...	8.50	6.25
Nutmegs, 110's ...	...	16.70	16.50
80's ...	...	21.50	21.00
Mace, Banda ...	...	100.00	76.00
Amboina ...	...	77.00	66.00
Black Pepper ...	1,690	12.12 $\frac{1}{2}$	11.35
White Pepper (Sarawak) ...	512	21.00	18.50
Pearl Sago, Small ...	70	4.00	3.50
Medium ...	...	...	...
Large ...	...	...	...
Sago Flour, No. 1 ...	6,763	3.30	2.90
No. 2 ...	370	1.25	1.18
Tapioca Flake, Small ...	781	5.30	4.80
Medium ...	...	...	...
Pearl, Small ...	514	6.20	4.27 $\frac{1}{2}$
Medium ...	791	5.00	4.55
Bullet ...	40	7.50	7.00
Tin ...	3,160	68.55	65.80

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FEDERATED MALAY STATES.

No. 9.]

SEPTEMBER 1909.

[VOL. VIII

FEDERATED MALAY STATES.

REPORT OF THE DIRECTOR OF AGRICULTURE FOR THE YEAR 1908.

The fourth annual report of the Department of Agriculture, Federated Malay States, records a year of satisfactory progress in agriculture, especially in regards to rubber cultivation.

No outbreak of serious pests or diseases has to be chronicled, and good growing weather prevailed all the year round.

The Department of Agriculture has progressed in equipment and staff. The Government Entomologist, Mr. H. C. Pratt, has been transferred to the staff, an addition of much gain to agriculture, since he can now devote his entire time to problems of insect pests on cultivated crops and demonstrate the best methods for preventing such attack and for treating a disease when it has begun its injuries. The importance of such work in a country possessing large acres of valuable cultivations cannot be overestimated.

The Government Entomologist gives a detailed report of the work he did since joining the department in September. He has, after investigating on estates in different districts the habits of the *Termes gestroi*, the white ant attacking rubber, commenced a series of experiments with various curative and preventive measures, some of which

have already shown their value, and it is very probable that in a short time he may be able to enunciate methods of combating this serious pest, which will enable the planter to reduce the evil to a very great extent.

With all diseases, whether due to fungi, insect, or environmental causes, the "plant doctor"—*i.e.*, the Mycologist or Entomologist—cannot be expected to wield a magic wand at whose touch the disease disappears. These investigators, by their knowledge of the nature of the evil which is attacking the plant, are in a position to devise the best means to attack the fungi or insects, and prevent their having an easy prey, such measures generally and continually carried on result in the gradual decrease of the evils dealt with, and often their complete extermination.

Mr. Gallagher, the Government Mycologist, has, in addition to much useful work at the fungal diseases of cultivated plants, investigated carefully the question of the damage done to padi by rats, and has evolved a method of dealing with this pest by means of carbon bisulphide, which is both practical and effective. Malayan cultivators have been instructed in the method of using this vermin-killing fluid so as to do as much damage as possible to the rats, and arrangements will be made for a regular supply of this substance from different centres in padi-growing districts.

The Government Mycologist gives in his report, which follows, a detailed account of the work he has done during the past year; and his remarks should be carefully studied by the planter, and they contain information of much practical value on the question of keeping estates free from disease.

In addition to this pathological work, Mr. Gallagher, as Assistant to the Director, has been of much service in the general technical work of the department.

The climate of Malaya is exceptionally favourable for rapid and healthy plant growth; but these conditions of constant humidity and heat are also favourable to the insects and fungi, which cause nearly all the diseases to which plants are liable, and for this reason neglect to take all precautionary measures that are possible, and dilatoriness in combating the evil when it has come, are more culpable and dangerous than in countries where alternate dry and wet seasons are in themselves deterrent to plant enemies.

The Government Chemist is so busily employed in medical, legal and health work that little or none of his time is available for agricultural questions, and this important branch of the scientific work of an Agricultural

Department remains in abeyance except what may occasionally have to be done by the other scientific officers.

CHANGES IN STAFF.

Mr. T. W. Main, the Superintendent, Government Gardens, Taiping, who had done excellent work in Perak, was transferred to Singapore as Assistant Curator of Gardens, and his place was filled by the appointment of Mr. F. R. Long from the Kew staff. Mr. Long has already done good work both on the Hill and in the Taiping Gardens. He is now engaged in laying out ornamental gardens for the town of Ipoh, which promise from their situation on the banks of the river in the centre of the town to add considerably to the amenities of the mining capital.

Mr. G. S. Hope was appointed Assistant Inspector of Coconuts and stationed at Kuala Kangsar, being in charge of the coconut preservation work in Perak.

EXPERIMENT STATION.

The work of the Experiment Station is detailed in the report by Mr. J. W. Campbell, the Superintendent, Experiment Plantations. Some little time must elapse before any conclusive data in various experiments are obtained, but considering the short space of time since the land was felled, cleared and laid out for experiments the progress is very creditable. The land is all much poorer than jungle land taken up by planters for rubber and other cultivations, and to some extent this may detract from the results obtained, but the fact of its being at the same place as the laboratories, library and officers, make it easy for the technical officers to control and observe the details of the various experiments, and this is a great advantage. The nurseries, in which many plants of economic interest are to be seen, as well as the larger areas of more important plants, have been visited frequently by planters and others; the various leguminous and other plants which are suitable for "cover plants" cause much interest. These plants are carefully observed, their habit, and rate of growth, and it is highly probable that one or other of them will be found more suitable than any of those at present in use for covering and protecting the land in rubber and other cultivations.

STATISTICS IN AGRICULTURE.

The collection and compilation of the agricultural statistics of the Malayan Peninsula becomes yearly a more

arduous task. Forms are sent out in English and Chinese to all planters, except those occupying small holdings; the information on each form being considered as confidential, only the totals, averages, etc., being published.

Kelantan appears for the first time in the agricultural statistics of this report; some 2,000 acres, with over 300,000 trees, being planted in that State during 1908.

The progress in Johore was more rapid last year than in any other part of the Peninsula, the acreage under rubber in that State being more than doubled during the twelve months ending the 31st December, 1908.

This feat was also performed by Pahang, but the comparative inaccessibility of that State has prevented land being chosen for rubber there, and it is therefore responsible for a very small acreage in proportion to the other states.

AGRICULTURAL ACREAGES IN THE FEDERATED MALAY STATES,
1907 AND 1908, EXCLUDING PADI AND HORTICULTURE.

	SELANGOR.		PERAK.		NEGRI SEMBILAN.		PAHANG.		TOTAL.	
	1907.	1908.	1907.	1908.	1907.	1908.	1907.	1908.	1907.	1908.
Coconuts	21,321	23,169	57,776	61,086	18,000	18,779	15,463	15,463	112,567	118,697
Rubber	61,552	82,246	46,167	56,706	17,656	27,305	869	1,791	126,235	168,048
Coffee	7,595	6,009	756	641	2,382	1,781	100	..	10,839	8,431
Other cultivations, chiefly Tapioca ..	1,604	286	10,270	13,397	261	10,853	..	10	12,135	24,546
Total	92,072	111,710	114,969	131,830	38,299	58,718	16,423	17,464	261,703	319,722

COCONUTS.

The "Consols of the East" have again had a prosperous year. No serious outbreak of disease occurred, and the crops from mature palms were equal to the average of recent years. The relatively poor quality of the copra prepared in the Native States is a question which is receiving attention. The constant rainfall of Malaya makes it often impossible to properly dry the copra without artificial heat and renders it very liable to attacks of moulds and bacteria which damage its marketable value. It is possible to improve the quality by putting up light roofs which can be quickly placed over the copra being dried when rain is coming.

Arrangements will be made for the Coconut Preservation Staff to instruct small-holders as to the advan-

tages of such methods in preparing their product for the market.

Another factor which in some cases reduces the profits which should be obtained by the coconut grower is the practice of taking the nuts from the tree before they fall. It is not easy to see the advantage of this method, and it has always seemed to me curious that the Malay, with whom dislike to unnecessary work is no less a trait than in other races, should so frequently adopt it. If a nut is plucked unripe the amount of copra it contains is less than if it is left on the tree; and we have no data to show that any decrease in that amount of copra or the oil it contains takes place if the nut is kept a little time after it is ripe. When the nut is fully ripe it falls from the tree and can be collected from the ground with considerably less trouble than if it has to be picked from the top of the tree, and with the additional advantage that it contains its maximum amount of copra.

Further observation seems to point to the fact that the thorough drying of copra is more easily effected in the case of ripe nuts which have fallen from the tree than with those picked, many of which are not fully ripe.

The arguments I have heard adduced in favour of the practice of climbing the trees and plucking the nuts are that the copra is darkened in colour, that the other nuts still unripe on the bunch are improved by the excision of the ripe ones before they fall, and that the prevention of theft is more difficult. None of these reasons seem to me to weigh seriously against the probable increase in the crop of copra and the saving in labour which gathering the nuts from the ground ensures.

The coconut planter, like other tropical cultivators, is conservative in his methods, but such an easy method of improving his cultivation should at least be the subject of careful experiment before its adoption is refused.

Coconut cultivation, while not offering the possibilities of profit which the growing of rubber shows, is an extremely safe and profitable industry, and many areas of accessible land, especially on the Coast, are much better suited to the coconut palm than the para rubber tree.

The acreage under coconuts in the Native States at the end of 1908 was 118,697, an increase of over 6,000, or five per cent., since the same date in 1907, when there were 112,550 acres.

The value of the coconut land planted in the Federated Malay States cannot be less than some \$23,000,000.

PADI.

The cultivation of padi, the only large agricultural industry in which the European takes little or no part, during 1908 was successful. Good crops, except in a few cases, being realised. Experiments in regard to methods of improving the cultivation on the artificially irrigated area were again carried out at Parit Buntar, the District Officer, Mr. L. McLean, and Mr. F. G. Finch, Assistant Engineer, Public Works Department, being responsible for their control and the accuracy of the data recorded, and thanks are due to those gentlemen for the interest they have shown in this matter.

The damage done by rats in many padi-growing districts has been the subject of careful investigation and experiment by Mr. Gallagher, the Government Mycologist, and the methods he had laid down for the extermination of this pest will in the future considerably reduce the annual loss it causes.

The value of the irrigation in increasing the yield continues to be very marked, and the damage done by eelworm and other insect pests is much less within this area; the control of the supply of water enabling the cultivator to prevent attacks of many of these evils which are encouraged by a continuance of dry weather, or by the water standing too long on the fields.

The following table shows the result of the experimental plots:

PADI EXPERIMENTS, KRIAN, 1908.

Plot	Variety planted.	Date of final planting in field.	No. of plants per "perdu,"	Distance between "perdu,"	No. of "perdu" per acre.	No. of plants per acre.	Date of reaping.	Amount of crop per acre in gantang. 1 gantang = 1 gallon.	Weight of crop per acre in lbs.	No. of grains of seed in one gramme.
A	Radin ..	6th-13th October.	31	ft. ins. 1 6	19,360	67,760	February. 1st-18th	384	2,170	48
B	" ..		31		1 0	43,560		152,460	418	2,433	50
C	" ..		34	9	77,440	274,040		324	1,680	54
D	" ..		34	6	174,240	609,840		282	1,589	49
E	" ..		1	6½	148,464	148,464		340	1,728	52
F	" ..		2	9	77,440	154,880		416	2,144	56
G	" ..		5	1 2	32,003	160,015		480	2,486	53

COFFEE.

The area under coffee in the Federated Malay States decreased considerably during 1908, only 8,431 acres being recorded, some 25 per cent. less than the previous year. This decrease is caused by the cutting out of coffee trees in rubber fields, or by their gradual extermination owing to the increasing shade caused by the larger tree.

The cultivation of coffee is still profitable, but the larger return given by rubber prevent the planter, except in a very few cases, from considering the planting or tending of coffee as worth his attention.

TAPIOCA.

The cultivation of tapioca (*Manihot utilissima*) occupies a large area, over 10,000 acres in the Native States, and a still larger area in the Straits Settlements. The low prices which obtained during the year discouraged planting, and in some cases the cultivators did not consider it sufficiently profitable to harvest the crop. It has been used as a catch-crop in conjunction with rubber to a considerable extent, and when so used the gain in the protection and cultivation of soil compensates to a very large extent for the competition in the soil of the roots of the tapioca with those of rubber.

RUBBER IN MALAYA.

The progress of rubber cultivation in the Malay Peninsula continues to be unique in its rapid progress and in the success of the areas already planted, and which has come into bearing.

At the end of 1908 there were 37,440,020 trees as compared with 27,558,369 a year before; 60,636 acres were planted during 1908, an increase of over 33 per cent. on the previous year, giving a total of 241,138 acres of rubber on the 31st December for the whole Peninsula.

The output of dry rubber increased in 1908 by 56 per cent.: 3,539,922 lbs., or 1,580 tons, being produced as against 2,278,870 lbs., or 1,017 tons, in 1907. This 1,580 tons represents probably about $1\frac{1}{2}$ per cent. of the world's supply for last year. The average at which this was sold was not less than 4s. per lb., representing an export of over \$6,000,000 in value or over £700,000; eight years ago the value of rubber exports was about £1,700, a large and profitable industry having been created within that time, which will next year show a return of produce worth more than £1,000,000 or \$8,500,000.

RUBBER STATISTICS, MALAYA, UP TO THE 31ST DECEMBER, 1908.

—	Federated. Malay States.	Straits Settlements and Kedah.	Johore.	Kelantan.	Total.
No. of estates ...	300	81	27	9	417
Acreage in possession. ...	455,596	158,553	127,959	20,300	762,408
Acreage planted up to 31st December, 1908 ...	168,048	50,121	20,944	2,025	241,138
Acreage planted during 1908 ...	41,813	7,255	10,818	750	60,636
No. of trees planted up to 31st December, 1908 ...	26,165,310	7,743,322	3,224,388	307,000	37,440,020

RUBBER IN FEDERATED MALAY STATES.

The advance of rubber planting in the Native States was as rapid in 1908 as in 1907: the drop in prices not causing the cessation in opening up and planting that some expected; 41,813 acres were planted during the year as compared with 40,743 in 1907, an increase of 33 per cent., a third more than the total acreage.

On the 31st December, 1908, there were 168,048 acres of rubber, containing 26,165,310 trees, in the Federated Malay States, as against 126,235 acres and 19,628,957 trees on the same date of the previous year.

Within the last ten years the acreage of rubber has increased 100 times, and it has practically doubled during the last two years.

The output of dry rubber increased by 60 per cent.: 3,190,000 lbs., or 1,425 tons, as against 1,980,000 lbs., or 885 tons, in 1907. These figures of output are slightly higher than those given by the Commissioner of Trade and Customs of the amount of rubber exported; this is due to the fact that rubber recorded as produced on the estate before the 31st December is exported later and comes into the export returns for the following year.

There is no better proof at the present time of the energy and grit of the British planter in the tropics than the excellent manner in which this large acreage of rubber in the Federated Malay States has been felled, cleared and planted, and is now in healthy and vigorous condition, and where old enough yielding handsome profits. Great credit is due to the managers of rubber estates and their assis-

tants for carrying out their varied and arduous duties, under conditions frequently unfavourable, with so much success.

RUBBER STATISTICS, FEDERATED MALAY STATES, UP TO THE 31ST DECEMBER, 1908.

	Selangor.	Perak.	Negri Sembilan	Pahang.	Total.
No. of Estates	130	114	42	14	300
Acreage in possession	215,509	140,675	9,625	19,787	455,596
Acreage planted up to the 31st December, 1908	82,246	56,706	27,305	1,791	168,048
Acreage planted during 1908	20,694	10,539	9,649	931	41,813
No. of trees planted up to the 31st December, 1908	12,499,331	8,560,321	4,923,745	181,913	26,165,310

COMPARATIVE TABLES OF RUBBER ACREAGES AND TREES IN MALAYA, 1907 AND 1908.

State.	Rubber acreages.		No. of trees.	
	1907.	1908.	1907.	1908.
Selangor	61,552	82,246	9,648,093	12,499,331
Perak	46,167	56,706	6,648,957	8,560,321
Negri Sembilan	17,656	27,305	3,165,388	4,923,745
Pahang	860	1,791	166,590	181,913
Malacca	36,946	41,324	6,019,940	6,556,792
Province Wellesley	5,920	8,797	767,276	1,186,530
Johore	10,126	20,944	1,142,196	3,224,388
Kelantan .. .. .	..	2,025	..	307,000
Total	179,227	241,138	27,558,440	37,440,020

In Province Wellesley is included two estates in Singapore, eight estates in Peneng and five estates in Kedah. These figures are approximate.

YIELDS OF DRY RUBBER PER TREE.

It is difficult to decide whether it is better to record yields per acre or per tree; both methods are in some ways misleading. The yields having been given in my last report per tree this seems to me to be the better way to continue.

The average yield per tapped tree all over the Peninsula has risen from 1 lb. 12 ozs. to 1 lb. 15 $\frac{3}{4}$ ozs., an increase of 11 per cent. Considering that the majority of the trees tapped are in their first year of bearing this is a most encouraging figure, and shows that the yields estimated in looking forward to the future production of rubber trees have, as a rule, been extremely moderate if not unnecessarily small.

$\frac{10}{206}$

The average yield of tapped trees in Negri Sembilan amounted to 3 lbs. 2½ ozs., which, being the average of nearly one million trees, is an extraordinarily high figure. This State has much higher yields per tree because the proportion of trees in their first tapping period is much less than in the other States, but this high figure is interesting as pointing to the averages which may be looked for in trees after two or three years tapping.

An interesting tapping experiment with eight 17-year old trees growing round the churchyard at Parit Buntar, in the Krian District of Perak, has given after one year's tapping every other day an average of 28½ lbs. of dry rubber per tree. The average girth of the trees was 54.87 inches at three feet from the ground, and they had been growing in unweeded land containing lalang and other grasses.

COMPARATIVE TABLES OF RUBBER CROPS, MALAYA,
1907 AND 1908.

State.	No. of trees tapped.		Rubber yields.		Average yield per tree.	
	1907.	1908.	1907.	1908.	1907.	1908.
			lbs.	lbs.	lbs. ozs.	lbs. ozs.
S.S. F.M.S. { Selangor	772,656	1,172,383	1,131,086	1,846,384	1 7 ½	1 9 ½
{ Perak	132,556	251,613	272,804	383,073	2 1	1 8 ¾
{ Negri Sembilan ...	240,401	306,376	586,864	963,253	2 7	3 2 ½
{ Pahang ... ..	...	...	...	...	...	...
{ Malacca	12,455	56,846	23,490	52,980	1 14	...
{ Province Wellesley	48,000	65,100	82,131	92,600	1 11	...
{ Johore	94,159	101,772	182,495	201,632	1 15	1 15 ¾
{ Kelantan ... ..	...	...	...	...	...	...
Total ...	1,300,227	1,954,090	2,278,870	3,539,922	...	...

In Province Wellesley is included two estates in Singapore, eight estates in Penang, and five estates in Kedah.

THE PASSING OF *Ficus elastica*.

Four years ago the question of the relative advantages of planting *Hevea braziliensis* (Para rubber); or *Ficus elastica* (Rambong), was considered an open one, and the fact that the latter was a native tree and grow freely in Malaya induced some to prefer it to the Brazilian plant.

There are various difficulties attending the treatment of *Ficus* in regard to pruning it or allowing it to form its aerial roots unchecked, in relation to tapping and preventing of entrance of boring insects and fungi into the wounds; also the direction and shape of the branches and stems make the collection of latex no easy matter. The yields of dry rubber from rambong are larger than from Para and market prices excellent. The symmetrical stem of the Para, the facilities for running the latex into the single cup at the base of the tree, regularity of its growth and its reaction to a wound, have especially commended this tree to the rubber grower, so that rambong is no longer considered as an alternative on equal terms, and no further estates have been planted with the native plant. From a practical planter's point of view this choice must perhaps be considered wise, but it is to be regretted that a tree yielding so well and suited to local conditions should have been entirely abandoned.

I have been carrying on experiments for some two years past in regard to the proper methods and instruments for tapping *Ficus elastica* (Rambong), and consider that a rotary pricker in which the pins are at such a distance apart that the latex which runs from the puncture joins that from those adjoining is a more practical way of extracting the latex than the making of a cut with a knife. If the rubber which flows from the various punctures made with the roller pricker all over the surface of the stem and branches is pulled off directly it has coagulated, it will be found that the flow will occur again and a second crepe-like film of coagulated latex can be pulled off. The absence of wound prevents the attack of borers and the tree can be again pricked after a short time has elapsed. When the flow from the punctures is too great to allow of it coagulating and it runs down, it can be caught at the base of the tree by means of a rubber band or a metal ledge round the tree to lead the latex into a cup or other receptacle.

If a flow of latex is preferred to the crepe-like scrap I have described, then an application of water by a brush or spray will run the latex down to the base of the tree where it can be caught.

These questions are, however, becoming of minor importance in the Federated Malay States, as the passing of *Ficus elastica* has begun, and each year sees less of this interesting and profitable tree cultivated. On some estates the trees are being actually cut out to make way for its more desired rival, Para.

MARKET PRICES.

The market price of rubber during 1908 showed an extraordinary variation, dropping in the beginning of the year to the lowest price previously paid for good plantation Para—viz., 3s. per lb. From that point the price steadily recovered, until before the end of the year it had reached 5s. 9d. per lb., an increase of almost 100 per cent. in nine months. This recovery showed that the drop in the price of rubber, as was stated in my last year's report, was not due to any alteration in the ordinary "supply and demand," but was an effect of the financial depression which existed at that time, chiefly in America, and which led to a cessation of purchases by manufacturers of rubber in that country.

The average price per lb. of rubber sold from the Malay Peninsula during 1908 was about 4s. 3d., while the cost of production was between 1s. and 1s. 6d., so that the industry in passing through the worst year it has experienced, was at the same time exceedingly fortunate in a very large margin of profit.

RUBBER TAPPING.

The Rubber Curing house was completed during the year, and machinery for curing rubber, consisting of an oil engine, a roller and a hydraulic press, have been obtained.

There are 900 trees of over nine years old, on which a series of experiments will be made and all data recorded. Many problems of great economic importance await solution. The climate of Malaya differs so greatly from that of Ceylon and other rubber growing countries that the results of experiments carried on there cannot with safety be used as giving reliable information for treatment of trees in this country.

The whole question of tapping requires careful investigation. The results given by thin paring of cuts at an angle to the axis of the tree are so good that planters are apt to consider the matter solved, but it is not improbable that punctures instead of cuts may yet be found to give as good or better yields and involve less skilled labour. All the "prickers" which have up to the present been exploited are instruments not for making a puncture but a short deep cut, and consequently damaging relatively more cells of the tree than a cylindrical or sharply conical pricker. There is a large field for ingenuity and careful experiment; and the next few years should produce an instrument which will be a marked improvement on the present weapons.

Excellent work with regular shavings, as thin even as 20-25 to the inch, have been done with the gouge, the Farrier's knife, and with more modern specially adapted tapping knives.

It is important to make certain of the periods which should be allowed to elapse between tappings in order to get maximum yields. After having collected figures of yields on a large number of estates it is difficult to lay down an absolute rule as to the procedure which experience shows to be the best.

Carefully kept data on some estates show that after a period of some three months alternate days' tapping the amount of latex per tree decreases to an amount which is of less value than the cost of tapping, but after a rest of two months the tree again on the fourth or fifth tapping yield the maximum, which after some 40 tappings begins to rapidly decrease.

The reverse of these observations is to be found on other estates where accurate figures of yields show that after continuous tapping for some two or three years, the amount obtained varies only slightly, never steadily decreasing. The variation is caused by climatic conditions, short periods of little or no rainfall reducing the yield and periods of excessive rainfall producing somewhat the same result. This is due to the relatively less active functioning of the roots owing to drought or excess of water.

Many planters believe in stopping when the trees are leafless, a period of some three weeks each year. The experiments which have been continuously carried on for some 18 months by this department on 17-year old trees at Krian show a slight decrease of yield during the leafless period.

The notion is also prevalent that tapping should be discontinued during the fruit bearing period. The figures obtained at Krian show a decrease during the time the trees were in fruit, but no sufficient decrease to seriously increase the cost of tapping. The figures relating to these tapping experiments will be published in the "Agricultural Bulletin."

Careful records have been kept of the weight and bulk of latex each day from each tree, and the ensuing weight of dry rubber.

The question of how far it is advisable to refrain from tapping rubber trees after a period of tapping is one upon which planting opinion differs very greatly. On some estates, after a period of some weeks or months of tapping,

a period of about equal length is allowed to elapse without tapping. On others and the majority of places tapping is continued without cessation, in some cases trees having without any reduction of yield been tapped for $3\frac{1}{2}$ to 4 years every other day without cessation. On the question of daily or alternate days' tapping planters are also divided, and experience of yields points somewhat to the advantage of the latter practice.

There is no physiological reason why the tapping should cease during the leafless or fruit-bearing period; the cutting of the small portions of the bark which tapping implies being in the case of a tree of 20" or more in girth so slight an injury as to be negligible.

The best and simplest criterion for deciding how long to continue tapping is found in keeping a record of the amount of latex from each tree from 1,000 trees or from a field. If these figures show no serious and continuous decline there is no reason to stop tapping. On the other hand when, after a series of tappings, say 40 or 50, the amount of latex obtained decreases in a marked manner and this decrease is constant, the yields being less and less, then it is advisable to stop for a period of a month at least, and not to begin again until by an experimental tapping it is found that the flow is again large.

On one estate the tapping for a number of cuts was habitually stopped when the yield had attained the maximum, and after some weeks tapping again produced less yield which increased till the arbitrary time of ceasing. The method, which is adopted to a great extent from fear of using too much bark, is most unprofitable as it leads to stopping before the best yields have been obtained.

It is naturally wise to so arrange tapping operations that it will not be necessary to retap renewed bark for some considerable period, but we do not yet know by experiment in the Malay States what length of time is necessary for a healthy tree, carefully tapped, to produce new bark containing a large number of well-filled latex vessels. The time of four years has been arbitrarily fixed by some planters and their tapping schemes are arranged in relation to that period. That four years, three years, or two years are necessary for the formation of bark suitable for tapping cannot yet be definitely stated, but it is highly probable from isolated cases where such experiments have been made that four years is unnecessarily long.

Experimental work and observations on tapping and yield of rubber made in Ceylon are unfortunately of little value for Malaya. The climate of Ceylon rubber districts, with its periods of dry weather, is not comparable with the conditions in Malaya, where rubber trees are in active growth of root, leaf and other tissues practically every day of the year, and where, even when they are leafless, the growth of trees is not entirely stopped.

On one estate in Perak the yield of dry rubber per acre was 800 lbs., a little less than 4 lbs. per tree, even though the tree were crowded together 220 to the acre; this rubber was sold at an average price of some 4s. per lb., thus realising about £160 gross profit per acre, of which more than 50 per cent. must have been net profit.

PREPARATION OF RUBBER FOR THE MARKET.

There is still no agreement as to the best form in which to prepare rubber for the home market; block, crepe, sheet and biscuit are made by different planters for different reasons.

One reason which makes it difficult for the producer to make up his mind as to the best form in which to make his rubber is that it is not easy to find what the broker and the manufacturer like best. A big price for a break of crepe gives the impression that this form is desired and will fetch a better price than block or sheet. Shortly after a purchase of block rubber at a price higher than the rest on the market seems to imply that this kind of rubber is wished for.

The leading brokers, buyers, and manufacturers themselves when asked as to their opinions are found to differ, and so for the present it must remain an open question whether block, crepe, or sheet will get the best reception on the European Market.

Light colour and uniformity all through the sample are beginning to be considered as qualities to be aimed at, though the former character is probably only desired by the manufacturer for a class of goods which can never consume a very large quantity of raw rubber, and, therefore, if all prepare to this standard too much may be supplied.

All who have studied the matter, or who have technical knowledge and experience, are agreed that the most important quality to be arrived at in plantation rubber is

“nerve,” “fibre,” “pull,” “strength,” or whatever other terms may be used for the possessions of elasticity and resilience to a high degree. If this character of Malayan plantation rubber is continued and improved, there is no reason to doubt that the manufacturer will in a short time begin to set a value on it equal and perhaps better than that given to the wild Para of Brazil.

The exclusion of all latex which may contain too much viscine, resin, etc., since it is obtained from young trees, when “bulking” latex is strongly to be recommended; there is always a market for poorer values of rubber by themselves, and the inclusion of a small quantity of inferior latex may considerably reduce the value of the whole break, and at the same time do harm to the good name of the estate for sound rubber.

Block rubber has great advantages over the other forms, in that it is less bulky and costly for storage and transport, less liable to any damage by damp or heat in transit. Many leading manufacturers and technical experts in Europe consider that the block rubber possesses more of the desirable qualities of the Prazilian Para than crepe or sheet; and the only objection which any of them make to block is the fact that it cannot always be examined for internal impurities without cutting each block. This drawback is obviated if the blocks are made only 1 to 1½ inches thick, when they are transparent and any opaque object included in them can be detected by holding them up to the light.

RUBBER SEED.

The question of the sale of rubber seed for oil purposes should be carefully considered by every careful planter. The crop of seed in the Peninsula was probably not less than 300,000 or 1,200 tons in weight, valued to the London market over \$100,000. This amount of available seed will increase annually very rapidly, and in five years time more than 3½ times this will be produced. The following figures show that there is a fair profit for the collection and export of these seeds, even at the rates which are at present offered for decorticated seed, and it is not improbable that when a sufficient quantity is placed on the market a higher price will be obtained.

WEIGHT OF HEVEA BRAZILIENSIS SEEDS, COTYLEDONS AND SHELL.

NUMBER.	TOTAL WEIGHT.	SHELL.	COTYLEDONS.	PERCENTAGE OF COTYLEDONS TO TOTAL WEIGHT.
	Gr.	Gr.	Gr.	Per cent.
1	3.18	1.69	1.58	50
2	5.14	1.84	3.28	66
3	4.26	1.63	2.61	62
4	4.41	1.70	2.70	61
5	4.19	1.33	2.86	68
6	4.46	2.05	2.41	52
7	3.50	1.65	1.85	53
8	3.86	1.96	1.89	49
9	3.14	1.41	1.73	55
10	3.21	1.48	1.72	53½
11	3.26	1.35	1.90	58 28
12	4.65	1.89	2.49	53 54
TOTAL AVERAGES	47.286	19.88	27.02	...
	3.938	1.656	2.25	59 7

The following will enable an estimate to be made of probable profits from this source:

111 Para rubber seeds = 1 lb.
 12,432 " " " = 1 cwt.
 248,640 " " " = 1 ton.

The kernel—*i.e.*, the decorticated seed—is 60 per cent. of the total weight of seed, therefore 414,400 seeds will make a ton of decorticated seed. At 400 seeds—*i.e.*, 133 fruits to the tree—414,400 seeds will be the crop of 1,036 trees, which at 193 trees to the acre—*i.e.*, 15 feet apart—is the produce of 5.4 acres. One acre will therefore give 3 cwt. 79 lbs., value £1 17s. or \$15.88.

Cost of putting on market:

Freight, 40s. per ton (say \$18)	\$ c. 18 00
Collecting at 4 cents per 1,000, per ton	18 64
Decortivating, per ton	2 50
Packing, per ton	15 00
	54 14

Value on market £10 to £12 (say \$93.50— <i>i.e.</i> , £11	93 50
Cost of putting on market	54 14
	38 36

Total net profit per ton, \$39.36—that is 5.4 acres gives \$39.36 profit—*i.e.*, \$7 per acre.

SYNTHETIC RUBBER.

Reports of rubber substitutes and synthetic rubber during 1908, as in previous years, continued to alarm greatly and frighten many faint-hearted believers in rubber cultivation; but the end of the year brought us no nearer the production of a substance which will take the place of rubber at a cost less than the present market price. Rumours of rubber to be made from peat, resin-bearing woods, wheat and other substances are current periodically, but each case, causing great alarm at the time, in a few months is forgotten, and the fears of the timid investor in rubber planting are calmed until a new paragraph on the daily paper suggests to him that at last the much-dreaded catastrophe has come. Those who can best judge of the probabilities of rubber being manufactured synthetically at such a price as to make it a commercial success—chemists and physicists—still consider it most improbable. The rubber planter continually finds his trees giving increased yields, and with the cost of production becoming less and less, the price at which it will pay to make synthetic rubber gradually sets below the horizon of profit.

HEALTH ON ESTATES.

The average health of coolies on estates has during 1908 shown a marked improvement, and with medical aid and hospitals, which have been built in all planting centres, the coolie is well looked after.

The health of the managers and assistants did not show the same improvement. Malaria is in some cases constant, and the fact that this is so makes the excellent condition of estates and their labour forces the more creditable.

The period of rapid opening of estates in order to get a large area planted in the shortest possible time has to some extent stopped, and this has led to improvements in the working of estates in many details.

Every practical planter realises that for the future prosperity of his estate, to obtain healthy conditions for master and coolie is as necessary as to plant and tend carefully the rubber trees, and monies spent in such sanitary measures are as profitably expended as in purely agricultural operations.

LABOUR.

There are about 80,000 coolies employed on rubber estates in the Malay Peninsula, and of these over 50,000 are Tamils, some 15,000 Chinese, 7,473 Javanese and 4,416 Malays being employed. On estates where I have seen Chinese employed in tapping there has been every reason to be satisfied with the skill of their work. The supply of Chinese is unlimited, and if it is found that they can be used as labour generally on rubber estates this will relieve to a great extent any anxiety about future demands for labour.

The Immigration Commission have now got into their stride, and it is becoming generally recognised that such a body, with a continuous and recognised policy, will be of great use in the future.

ESTATE LABOUR, FEDERATED MALAY STATES, 1908.

—	SELANGOR.	PERAK.	NAGRI SEMBILAN.	PAHANG.	TOTAL.
Tamils ...	26,103	13,635	3,443	334	43,515
Javanese ...	1,662	2,276	1,023	38	4,999
Malays ...	627	995	260	79	1,961
Chinese ...	1,121	3,126	2,203	145	6,595
TOTAL ...	29,513	20,032	6,929	596	57,070

ESTATE LABOUR, MALAY PENINSULA, 1908.

—	Federated Malay States.	Straits Settlements and Kedah.	Johore.	Total.
Tamils ...	43,515	6,476	1,418	51,409
Javanese ...	4,999	1,336	1,138	7,473
Malays ...	1,961	1,724	731	4,416
Chinese ...	6,595	5,849	2,624	15,068
Total ...	57,070	15,385	5,911	76,366

PREVENTION OF DISEASE AND PESTS.

The Department of Agriculture has now a staff of Scientific Officers who are investigating the causes of disease and experimenting with methods of prevention and cure.

All efficient measures for the preservation of health rest upon exact knowledge of the causes of disease and the effects they produce in their victims, and we have now an immense number of instances of accurate tracing by observation of the cause of plant diseases.

These have been accompanied by experiment, and it needs no argument to convince anyone in the least acquainted with inductive science that experiment is as essential as observation. During the past twenty years, the discoveries in plant doctoring have made almost a revolution in agriculture, though this is seen more in Europe and America than in tropical countries.

The general laws of sanitation for plants do not differ to any great extent from those laid down for man and animals. They consist in the removal and destruction by burning of all dead plants and dead parts of plants, the prevention of conditions which favour the progress of the disease, and the isolation by means of trenches of plants whose roots are diseased.

These methods cannot be adopted without an intelligent watching for the appearance of disease. And the importance of a stitch in time is in nothing more evident than in the fight against plant diseases.

A case was brought to my notice of an outbreak of a caterpillar which had taken some time to entirely destroy all leaves on the "belukar" adjoining a rubber clearing, and only when the caterpillars, which were in immense numbers, had been driven to eat the rubber was any action taken.

The aid of the technical experts of the Department of Agriculture should be sought as soon as any pest is observed, but the destruction of as many of the caterpillars, insects, larvæ, cocoons, etc., which can be found should be at once put in hand.

Every properly equipped estate should possess the means of combating as early as possible all diseases and pests, and should possess implements for pruning back the branches of big trees. For this purpose handy machines are made at the cost of a few dollars which easily cut at

a height of 30 feet branches three or four inches in circumference.

Efficient spraying machines should be found always in working order in every estate store, just as the fire apparatus in a gallery of valuable pictures. The cost of even the most expensive steam power spraying apparatus capable of reaching trees of eighty feet or more in height, bears an infinitesimal proportion to the value of the trees on even a small rubber estate.

The materials for spraying should also be kept in stock so that no delay is experienced when such work has to be done. My experience of over ten years' eastern planting has been that the delay caused in getting weapons to fight the disease has often caused the task of getting rid of the pest to be much more difficult and expensive than it would have been had the estates been forearmed.

Fifty years ago the conditions favourable to the rapid spread of disease caused by insect, fungi, or bacteria were not so great as at the present day, and the presence of 35,000,000 trees in an area of some 26,000 square miles is in itself a danger, but the weapons which the planters of that day possessed for an intelligent fight against these organisms were of little use and yielded without confidence. In India the loss by wheat rust was some time ago estimated at £91,000,000, and in Ceylon the leaf disease of coffee caused the extinction of that industry, a loss of at least £15,000,000. The work done by sanitation and preventive medicine in preserving human life are now historical facts; 200 years ago the mortality of London was 80 per 1,000, it is now about 20. Until a few years ago contagious pleuropneumonia and foot-and-mouth disease caused immense losses of cattle, estimated at 2,000,000 per annum, worth probably £30,000,000; they have now been almost exterminated. Plant sanitation and preventive measures, can, if invoked, do so much for the preservation of cultivated plants, and with the knowledge we now possess it is impossible that any disease could so seriously damage a big agricultural industry as has been the case in the past.

DISTANCES BETWEEN TREES.

The average number of trees per acre on rubber estates in Malaya in 1908 was 168, or 16 feet by 16 feet apart; the statistics for 1907 showed that on the 31st of that year the average was 153, or 17 feet by 17 feet apart.

This, for many reasons, is an improvement. It is to be regretted that the cultivation of rubber is too young an

industry to have sufficient experience of old trees planted at different distances apart to judge of this important question.

The reasons against close planting in rubber—*i.e.*, 12 feet by 12 feet, or 302 per acre, or closer—are:

That it prevents the tree from growing with full vigour and to the greatest possible size, forcing it to run up to the light and giving it no room for lateral branches.

That it increases the cost of collection of rubber, since a larger number of trees have to be tapped for the same amount of rubber. That if it is found necessary to give the trees more room, the cutting out of a portion of them is fraught with much danger to the remainder, inasmuch as each dead rubber tree, root or portion of root, is a potential centre of root disease, and may harbour white ants.

That the spread of fungal and insect disease is helped by the crowding together of the trees.

The advantages claimed for close planting are:

That it gives for the first years of tapping a much larger yield of rubber. There is not a great amount of evidence on this point, but such evidence as there is seems to point to it being true that a larger yield of latex and of dry rubber can be obtained at any rate in the first three or four years of tapping. It is also claimed that the closeness of the trees more quickly produces shade over the ground and so prevents the growth of weeds. The whole question of weeding is being considered at the present time, and if it is believed that to cover up the ground with a green manure is the best method of cultivation, then the fact that close planting reduces the cost of weeding is of no value.

That in order to compensate for the casual losses of trees, which in the course of time must necessarily occur, more trees should be planted than are wanted. The answer to this is that where trees are planted at large distances, 30 or more feet apart, supplies come on without difficulty, and it is only in crowded estates that difficulty is found in replacing casualties.

To plant more rubber trees than it is intended to permanently keep on the estate, and afterwards by cutting out to reduce the number, is a dangerous policy. No one acquainted with diseases in plants would deny that to leave the dead roots of trees of the same species in close proximity to the roots of living trees is most likely to encourage root fungus and insect pests, while the cost of removing the roots, even if the trees are cut out when quite young, is prohibitive. If a planter finds it necessary to give more

growing room—*i.e.*, space for the branches and leaves of some of his trees—it is preferable to pollard some of the trees, and allow them to grow slowly underneath the branches of the unpruned trees, rather than to leave the decaying roots of dead rubber trees, which he has cut down, dotted all over his fields.

COVER PLANTS INSTEAD OF CLEAN WEEDING.

The question as to the relative advantages of clean weeding and the use of cover plants (the use of which has been advocated in my annual reports for the last three years) is gradually being seriously considered by the practical planter, and many thousands of acres of rubber, certainly not less than 15,000, are now cultivated with various cover plants.

It needs but little observation of rubber clearings to decide that an immense amount of top soil, containing a large proportion of humus, has been washed away from sloping land to the detriment, both present and future, of the rubber. An examination of the water in the drains of flat land, which is dark-coloured when the clearing is first opened and gradually becomes clearer when many tons of water have passed through the soil, will show that this same process of exhaustion of the soil is going on very rapidly on clean weeded flat lands though not to the same extent as on the hillsides.

Most practical planters have observed that the roots of plants in the tropics grow more quickly and vigorously when the earth where they are growing is shaded from the sun, and for this reason the surface of nurseries is covered with a thatch of grass or other convenient covering.

These arguments seem in themselves sufficient to induce a trial of cover plants; but the additional argument that the process of clean weeding is continuous and the most costly of all the work on a rubber estate before it comes into bearing should be a further reason for the adoption of the system of cover plants.

Various cover plants have been used on acreages varying from 400 acres, and practically in all cases with successful results.

It is unfortunate for the increase in the belief in this method of rubber cultivation that a large number of the planters who tried cover plants did so on the weediest and worst-drained parts of their estates. It would be as fair to test a food, which is recommended for supporting working men, on emaciated and abnormally weak persons, and

when it did not produce the results hoped for, deeming it a failure.

Another reason for some planters not finding the use of cover plants so perfect a substitute for weeding as they hoped was that the cover plant (very often *crotalaria*) was sown broadcast, and it has been found by experience over large areas that this method of planting cover plants is wasteful and very much less effective than sowing the seed by dibbling, planting in furrows, or similar methods. The loss may be due to the exposure of the germinating seed to the sun, or to its being washed along when the tender rootlets are beginning to form, or birds may eat the seed, but whatever is the cause it is always found that the proportion of seed producing plants is very small indeed.

On the other hand, the planting in lines, the seed being slightly covered, results in 80-100 per cent. of the seed producing healthy plants.

In planting cover plant on steep land it is imperative that the lines should follow the contour of the land; when they are made to run up and down the hillside the seed will be washed down with the loosened earth. This results in the seeds being massed in one place, and the young plants growing closely together in clumps at the foot of the lines.

The use of cover plants in place of clean weeding is now, after three years' constant advocacy, very generally considered as an economical and practical practice, which I have no doubt will greatly increase when the benefit to the rubber and the saving in expense have been proved on a large number of estates.

The relative advantages of various plants as cover plants for rubber clearings is an important question to decide before proceeding to lay down fields with one or other. Leguminous plants possess the property of increasing the amount of available nitrogen in the soil by means of bacteria living in their roots which obtain nitrogen from the air, and in this respect should be preferred to other plants.

The chief thing to consider in laying down a cover plant is rapidity and cheapness in thoroughly establishing it, and if a plant is found to quickly take possession of the soil and cover it to the exclusion of all others, the fact of its not being leguminous should not weigh against it.

The ideal plant for the purpose of protecting rubber land and eliminating or reducing very considerably the weeding bill is a plant which grows not more than a foot to 18 inches high, is permanent or persistent for three or four

years, producing shade over the ground, growing so luxuriantly as to exclude weeds without forming a thick turf, is leguminous, has no thorns or spikes to interfere with coolies working, has no leaves, fruit, or flower which will attract vermin or other animals.

None of the plants at present in use, or being tried in the experimental plots of the Agricultural Department, fulfil absolutely all these requirements, and it is probable that a plant will yet be found better than any at present tried.

The conditions on different estates in Malaya do not vary very greatly, but the differences are sufficient to make some places specially favourable to one cover plant and other places to other plants.

In different districts on sloping and flat land with different soils and some estates it is found that in some passion flower will thrive and rapidly cover the land where the sensitive plant of *crotalaria* do not grow vigorously. On other places the *crotalaria* or sensitive plant may do much better than passion flower.

It is easy to decide as to the most suitable plant by planting one or two trial plots. The following plants all have advantages in different ways, and if any one of them can be made to entirely cover the ground in a short time, say four or five months, its acquisition will be a great gain to the estate in improving the growth of the rubber and in reducing the wages bill.

Abrus precatorius, a native of India, where it is used for cover, is leguminous with a free creeping habit; it grows about one foot above the ground and the branches from one plant will spread to 15 or 20 feet from the main stem. The pods contain 6 or 8 seeds. The seeds are bright vermilion, about the size of buckshot, with a small black mark at one end; they are used as the karat or standard weight for precious stones and metal in India.

Passiflora fœtida (passion flower creeper), a creeping non-leguminous plant having purple white flowers and yellow fruits about the size of a walnut, grows very freely on nearly all soils and smothers many other plants of a less vigorous habit. This creeper never gets more than about nine inches to a foot high, and very quickly covers the ground. It has to be kept from twining round young rubber plants, but as it is very soft this can be done at extremely small cost. It is a native plant and common all over the Peninsula.

Crotalaria striata and another species of the same genus, *Crotalaria incana*, are leguminous plants, possessing usually very numerous and large bacterial nodules, and growing freely, when not cut, to 7 or 8 feet high. It (*C. striata*) has a yellow flower and a light green leaf, and affords a good cover if not allowed to grow high and scraggy. It should be kept cut to a height of about 2 feet 6 inches. The cutting is not a costly process as it is only necessary to slash over the tops, leaving the cut part to remain as a mulch on the soil. The seed is obtainable in almost any quantity as a large acreage is already planted.

Tephrosia purpurea and *T. candida* are both vetch-like leguminous plants which grow freely on almost any soil, and give perhaps a better cover than *crotalaria*. They must, however, be slashed over at a height of 2-3 feet, and not allowed to run up, otherwise the light, and with it the weeds, will gain an entrance.

Mimosa pudica, the "sensitive plant," a leguminous plant with red spherical flower heads and spiny fruits, is in many ways the most suitable plant as yet tried for cover. The chief reason which makes it disliked by planters is the presence of thorns on its stems which are unpleasant to coolies walking through it.

The habit of this plant of shutting its leaves in heavy rain and at night is an advantage as no rain is lost and dew falls on the ground. It never grows more than about two feet high; it persists and makes a dense cover over the ground when the leaves are not shut—i.e., when the sun is shining and the plant is not disturbed. It is, though a native of S. America, common in all the planting districts and one of the first plants to take possession, and keep possession, of the roadsides.

In addition to these plants I have recently been shown a creeping leguminous plant which was found by Mr. H. F. Browell of Damansara Estate. It is a species of *Vigna*, having dark green leaves and making a dense cover which refuses to allow any weeds to exist. I have seen a patch of about half an acre on Damansara Estate, and there it appears to be the best plant for the purpose of cover that has been used in the Federated Malay States.

THE FUTURE OF RUBBER.

The Federated Malay States produce about three-fifths of the tin supply of the world, and in a few years time Malaya should supply a very large proportion of the world's demand for rubber.

In 10 years (1919) presuming that 25,000 acres are planted annually during the next five years (a very reasonable estimate, considering that over 40,000 acres were planted during the year in both 1907 and 1908), the rubber trees of the Federated Malay States should yield not less than 50,000 tons of dry rubber, which at 3s. per lb. represent a value of \$144,000,000. This amount, should the demand for rubber increase at the rate it has been annually rising for the last nine years, will probably at that time be less than 25 per cent. of the world's consumption.

It is 70 years since the discovery of vulcanisation by Goodyear made rubber available for economic purposes. It is now a necessary of civilised life, and it is only by means of rubber that we can solve the difficult problems of transport and communication. Without it electric wire insulation for telegraphy and lighting, pneumatic and cushion tyres, and the air brakes of railways would all be impracticable; and in the purposes for which it is used in medicine and surgery it is an absolute essential. The optimistic view that the demand will before long exceed the supply is not more unlikely than the more usual view of the pessimist that the continued planting of rubber will result in a supply larger than the demand and consequently a considerable drop in prices.

That the market will be overstocked with rubber is still a haunting fear of the owner of rubber property, but as each year brings new uses for rubber, and increases the amount used in directions where its value is already known, the possibility of over-production seems less probable.

Many expert authorities expect that developments in the direction of rubber street-paving, covering for decks of ships, etc., may be looked for in the near future. Some two or three years ago, when I was looking into the question of rubber pavement, I estimated that two inch-thick rubber of the quality which the London and North Western Railway had so successfully used in the rubber pavement at the entrance of Euston Station if used for paving the streets of London, which are at present laid with wood or asphalt, would require about 90,000 tons of crude rubber.

If the prophecies so frequently made by experts as to the increase in the use of motor cars are fulfilled, we have another large and increasing demand for rubber of good quality, and wherever the future possibilities of expansion in the rubber market is studied it is found to be more than hopeful. The purposes for which rubber can and will be used economically are unlimited, and we may look forward

to a coming rubber age on which all the most suitable rubber planting areas of the world, of which Malaya can claim to be the best, will be required to supply a firm and increasing demand.

Malaya possesses the finest climate in the world for the rapid and healthy growth of Para rubber, and, since millions of acres suitable for this cultivation are still available, there is every probability that this country will be in the future one of the largest producers of rubber in the world.

The fear of over-production is to some extent pardonable on examining the magnitude of the figures relating to rubber planting in Malaya, but a consideration of the possibilities of the world's future requirements takes the student into figures besides which those of Malaya are but small.

ANNUAL AGRI-HORTICULTURAL SHOW.

The fifth of these Shows, which are held in various centres in turn through the Straits Settlements and the Federated States, took place in Kuala Lumpur in August and was most successful and well-attended. The exhibits, on the whole, showed progress in agricultural and horticultural methods. Mr. J. W. Campbell, the Honorary Secretary, who was responsible for making all the arrangements and carrying them out, introduced various changes which added to the smooth working and efficiency of the Show.

An interesting and instructive exhibit of jungle produce was made by the Conservator of Forests and his staff.

SCIENTIFIC AND OTHER VISITORS.

Among the scientific and technical visitors who have come during the year to the Federated States and made use of the department for information or advice are Mr. E. Hose, of Sarawak; Mr. E. Y. Miller, Governor, Palawan, Philippine Islands, who wished to investigate our rubber and coconut industries; Dr. Herbert Winkler, Professor of Botany at Breslau; Professor Von Romburgh, of Utrecht; Sir John Murray, K.C.B., F.R.S., the Naturalist of the Challenger Expedition and exploiter of Christmas Island; Mr. F. W. Foxworthy, Botanist of the Bureau of Science, Manila; Mr. C. B. Pratt (brother of the Government Entomologist), who was on his way to lead an expedition into New Guinea; Mr. R. R. Richmond, of Manila.

A good many directors of rubber companies and owners visited the estates with which they were connected

with a view to obtaining knowledge as to planting methods in the Federated Malay States. Messrs J. L. Shand, T. C. Huxley, G. C. Alston and T. S. Ruys (Rotterdam) and others making use of the Department of Agriculture, Federated Malay States, which is becoming more widely known as a source of information in regard to agricultural and botanical questions; and its foreign correspondence has increased to a considerable extent.

This report has been written rather hurriedly, as I am leaving the Federated Malay States, being transferred to the West Indies, and I take this opportunity of thanking my colleagues in the department, many planters and others who have helped me in my work.

I regret extremely leaving Malaya with its unique climatic advantages, where agriculture has such a prosperous future in store.

My work of organising and equipping an Agricultural Department has been most interesting and not entirely without success.

The Department of Agriculture is now becoming organised and is a working wheel in the mechanism of the country.

The future of Agriculture in the Malay States is a bright one, and the Department of Agriculture will have a large share in helping on the prosperous career of rubber, coconuts, rice and many other profitable cultivations, both existent and to be.

J. B. CARRUTHERS,
Director of Agriculture
and Government Botanist, F. M. S.

REPORT OF THE GOVERNMENT MYCOLOGIST FOR THE YEAR 1908.

Para rubber (*Hevea braziliensis*), the principal cultivation owned by Europeans, has been fairly free from fungi during the past year, except of a disease which attacks the root, finally killing the tree. This is wide-spread. There was probably not an estate free from it, some suffering more than others; but the percentage of trees affected is everywhere comparatively small. The disease is caused by *Fomes semitostus*, and is reprobated as much for the extra labour demanded to suppress it as for the actual loss in trees it causes. I published a paper in the "Agricultural Bulletin," for November, 1908, describing the disease

and advising measures for its prevention. It is viewed with alarm by many planters, but if the directions I have laid down for its treatment are followed, it will ultimately be stamped out. In fact I believe that its method of infection combined with the energy which most planters are exhibiting in grappling with it, if strenuously continued, will ensure its disappearance from all plantations before the trees are four years old.

EXCRESCENCES ON BARK.—On old Para trees three types of excrecence make their appearance on the lower four or five feet of the stem:

Firstly, small nodules, usually called "peas," because they are generally first noticed when they are such a size, and found on trees of three years and older, both tapped and untapped. They have a sharp fang-like "root," which comes from the wood through the cambium. The "peas" are easily knocked out with a chisel or the back of a knife, and the wound soon heals over. Most planters have special coolies detailed off to remove these excrecences.

Secondly, large outgrowths of all sizes up to four or five feet long, a couple of feet wide, and of various thickness up to six inches, occur on tapped trees and on tapped areas. These can usually be prized back, and break off, exhibiting a "root" of a few square inches, and continuous with the wood of the tree. They look like much malformed branches and may arise from dormant or from adventitious buds. Some planters say they are due to bad tapping. Numbers of the nodules already mentioned often occur on these outgrowths. As they grow over the original bark and cambium, they are amenable to treatment. If broken off, the true cambium soon regenerates a new bark, and only the "root" remains uncovered, and this heals over in time. I always advise covering the "root" with tar. There are many indications that these larger growths are the "peas" which were not excised.

Thirdly, a less common form appears as a swelling of the stem of the tree and cannot be removed like the others.

My investigations have not succeeded in associating a living organism, insect, bacterium or fungus with these outgrowths. It seems not improbable that the third form, at any rate, is due to some derangement of the internal economy of the tree. Many of the individual cells of the swelling are much beyond the ordinary size, and frequently an excessive flow of latex occurs round the edges of the outgrowths.

WOUND-FUNGI.—Many trees were lost through wound-fungi which obtained an entrance through a wound made where a branch was broken or cut off, or where a wound has been made in some other way. Most planters now recognise the danger of bare wounds and cover such with tar, but the practice is unfortunately far from universal.

SOIL ACIDITY.—Many complaints of diseased plants were found to be due to excessive acidity in the soil. This source of trouble is fairly common on the humus-rich peaty soils of the Coast districts. I referred to it in my 1907 report. Coffee suffers also. Good drainage and the application of lime usually neutralises the soil sufficiently. Experiments to reduce this acidity by means of Christmas Island phosphates are being carried on; pending the results of these, I recommend the application of lime to such soils.

Coffee seems to be even more susceptible to soil acidity than rubber. Coconuts appear to be little affected. Both these crops have been put in on soil found to be "too peaty"—*i.e.*, too acid—for rubber, but coffee has not been a success.

Fungi have been found on numerous native products but in no considerable degree. Rice and coconuts are particularly free from fungal disease.

Tomatoes are attacked by three distinct fungi. One attacking the stem and leaves; the other two live on stems, leaves and fruits. As tomatoes are usually grown in small quantities and the property of Europeans, the best thing is to burn out the crop completely.

In the "Agricultural Bulletin" for January, 1908, I published a paper entitled "Plant Life and Disease," intended to give a general view of plant hygiene, an idea of the inter-relations of a parasite and its vegetable host, and of the behaviour of a plant to its environment.

Most planters are fairly quick to report disease, and some hints to enable them to send useful specimens, and to describe the appearances the unhealthy plant presents, have been published in the "Agricultural Bulletin" in the past year.

MANURIAL EXPERIMENTS.—Queries occasionally reached the department regarding the application of manure to rubber trees. The soil concerned had generally been worn out by coffee or tapioca, and frequently had suffered much from wash. To gain some information on this point, I began early in the year experiments on two estates with artificial measures. Results have been accumulated but they are not complete enough yet for publication.

RATS IN RICE FIELDS.—I did a considerable amount of work on this investigation. Reports appear in the "Agricultural Bulletin" for May and November, 1907. It is now satisfactorily demonstrated that carbon bisulphide is a cheap, simple, and effective method of getting rid of rats in padi fields. I am still collecting information about the habits of the padi-rat, and hope to publish a full report in an early number of the "Agricultural Bulletin."

LECTURES TO PLANTERS.—I have begun series of lectures to planters on the build and nourishment of the Para rubber tree, the production of latex, the relation of the plant to the soil, the general treatment of plant diseases, and other matters of agricultural interest.

The lectures are intended to be of an elementary but practical nature, illustrated by diagrams, blackboard demonstrations, and microscopic slides. I hope to deliver further lectures during the year, visiting the various District Planters' Associations.

W. J. GALLAGHER,
Government Mycologist.

REPORT OF THE GOVERNMENT ENTOMOLOGIST FOR THE YEAR 1908.

The following report dates since my transference from the Institute for Medical Research to the Agricultural Department on the 1st September, 1908. During the past three months the increase of entomological work is about 100 per cent., and there is a great deal to be done in studying the life history of those insects which have been sent to the Agricultural Department as pests of major or minor importance. Only those which have been doing considerable harm will be mentioned in this report. Since my transference I have been chiefly engaged in a study of *Termes gestroi* on the Para rubber tree. The life history of this insect will be published in one year to 18 months, while a paper for the planters on the best methods for eradicating the evil has been written and will be published as soon as the blocks of the sketches already sent to Calcutta are returned.

The important question of rendering houses white ant proof has been discussed, and with a view to obtaining reliable information in connection with this, a series of experiments have been commenced. Four hundred pieces of wood of four kinds have been treated with various chemicals

of different strengths and in different ways. These have been buried near the Golf Course in Kuala Lumpur with 150 controls. Termites of various species are known to be abundant in this land, in fact I should estimate that two-thirds of the ground wherein these woods are buried is undermined by termites. It is proposed to take up these woods at periods of 2, 6, 9 months, 1, 1½, 2, 2½, 3, 3½ and 4 years, after which time a certain number of pieces will still remain. In all, there are 37 experiments, and for each experiment 10 or more pieces of woods have been treated. The first series of these woods, after two months burial, have been taken up, and it is hoped that these together with the second lot can be exhibited at the Agricultural Show to be held at Penang during 1909.

Negotiations are in progress with Government for the treatment on a large scale of the timber to be used in the construction of houses in Kuala Lumpur.

RUBBER PESTS.

Eumeces squamosus (a weevil) has been sent in from the managers of some 10 estates in the Federated Malay States, who report that at times it does considerable harm to the young rubber trees by eating away the older leaves and young shoots. Collecting the beetles by hand has proved to be effective. The beetle is practically omnivorous, and it is not likely to confine its attacks to rubber, but will continually appear and attack small areas of the young rubber trees. A report on this insect, under the name of *Astycus lateralis*, appeared in "Perak Museum Notes," Vol. II., pt. I., p. 61, by Wray.

Towards the latter end of the year several complaints were received relating to a small borer in the rubber trees. An examination of the insect proved it to be closely allied to the shot hole borer of Ceylon, but as I have no technical description of this insect, which belongs to a family composed of closely-allied species, I am not certain of its identity. I am under the impression that it is *Xyleborus parvulus*. Be the insect *Xyleborus fornicatus* (the shot hole borer) on any other species there is not the slightest doubt why it has gained a footing in some places. Several estates have lately adopted pollarding, and it is invariably on these pollarded trees that the insect commences to be destructive. Transference of the insect to those healthy rubber trees planted near pollarded ones is rare, although this does occur, and the only word of warning necessary

is to abandon pollarding, which after all is not remunerative. When thinning out is necessary the tree should be completely done away with. When apparently healthy trees are attacked the borer usually makes its entrance into the tree on the tapped surface, although I have seen on one occasion a tree affected below a side branch.

The majority of these insects are caught in the latex and killed, their presence may be detected by latex exuding from the tree, and running down the bark in thin strings.

The question of lopping must also be noted. Where it is necessary to do this it will be well to place tar on the wound immediately after the branch is cut. It is useless waiting a couple of days, one cooly, with the tar, should follow each man who is lopping and the application should be made immediately.

Three species of *Lepidopterous* larvæ have been reported to this department as defoliators of rubber. In places they have done considerable harm, but I have been unable to make personal observation in connection with these pests. No specimens were sent, and I therefore know nothing more than the fact that they were caterpillars. Here it can be pointed out that it is essential for planters to send specimens, and when possible alive. They may be placed in a cigarette tin, in which is punctured a few holes, with the leaves they are feeding on. Do not keep them in this tin for several days before despatch as they will arrive dead, and very likely in a putrefying condition, but send them off immediately. Where living specimens cannot be sent place a few in spirit. Observations should also be forwarded. These defoliators will have to be studied during 1909, should they reappear.

A species of *Acridium* (grasshopper) is reported from two estates as eating the Para rubber leaves. As both of these places are planted up with crotalaria I was inclined to think that this plant encouraged the pest, and from the following letter it appears that this cover plant may do so: "The height of the crotalaria varied from 3 feet to 7 feet according to whether it had just been topped or not. The rubber was planted in May last and crotalaria put in in July, the trees which got away well and have their heads above the crotalaria are badly eaten as per specimen sent. Again those trees which are more backward have no leaves at all, simply the straight stem with a very small shoot on top. The grasshopper does not, as far as I can see, feed on the crotalaria but only the rubber leaves."

COCONUT DISEASES.

A Zygaenid moth is commencing to give considerable trouble to some of the coconut plantations in the Federated Malay States and Straits. A report of its life history, damage, and remedies is ready for publication. I would advise the managers of coconut plantations to acquaint themselves with this pest, and as soon as they observe it on their plantations to take stringent methods to prevent spreading. Otherwise they will find that in the course of eight months from the date of its appearance it will have spread over the entire estate. After it has run its course the trees present an appearance resembling that which would be caused by a fire, and the nuts frequently drop.

Erionota thrax (a banana pest) is a sporadic pest of the coconut trees in the Federated Malay States. Its work is totally different from the above insect. The Zygaenid moth mines the leaves, whereas *Erionota thrax* devours the whole of the leaf in a regular manner from the mid-rib, thus skeletonizing the trees. It is advisable to mention here that some steps should be taken to rid the native coconut plantation from the scale insects with which they are often so badly infested. It cannot be expected that good fruit can be obtained from trees seriously attacked by *Coccida*, and this matter should be explained and demonstrated to the natives.

TAPIOCA PESTS.

Brachytrypes achatinus has been reported as attacking rubber and tapioca, the latter crop seriously. A note has been sent to the "Agricultural Bulletin" and a remedy has been given there—viz., Carbon bisulphide. Even though costly, the small amount used for the purpose of ridding a field from these crickets places the method well within the reach of even natives.

COFFEE PESTS.

A species of *Apogonia* has been found attacking coffee and durian leaves. The insect responsible for this damage is identical with the one found on roses in this country. It has the same habit as *Serica assamensis* on tea. On coffee it mines the under-side of the older leaves and young shoots, causing the former to wither and the latter to continually die back. A knowledge of where the insect is found will prevent this damage. Owing to its habit of hiding itself during the day-time and feeding at night its presence in the

vicinity of the trees is often unsuspected. The beetles may, however, easily be caught. They hide themselves during the day-time just below the surface of the ground around the base of the coffee tree. A few coolies instructed to dig away the earth near each tree with a trowel will collect all the beetle in a few days. There is no necessity to dig deeply as the depth to which the beetle bores is but 1-3 inches.

PADI.

It is reported from the British Residency, Pahang, that the padi in Pahang has been severely attacked by *Nonagria inferens*, the same insect that was responsible for the damage at Krian during 1906. On account of the lack of an irrigation scheme the cultivation of padi in Pahang can hardly be as good as that of Krian, and a return of the insect may be expected in 1909; it has been impossible to deal with all these pests since my transference to the Agricultural Department and it will take some time before a thorough knowledge of these insects can be gained. I hope to study the padi pests during 1909. It is likely that the section of resistant kinds of padi and better cultivation will improve matters, but it will be necessary for observation to be made on the ground.

Attacus atlas has given considerable trouble to the Superintendent of the Government Experiment Plantations as has also a Pyralid moth, *Agathodes ostentalis*, on the Dadap (*Erythrina*). Both of these insects are under observation and remedies for them will be given later.

A series of lectures to the various District Associations are being commenced. The first of these will be on the methods that must be adopted by the planters in order to deal effectively with the white ant attacking rubber. Discussions will follow the lectures and diagrams and demonstrations will be given.

H. C. PRATT,

Government Entomologist.

REPORT OF THE INSPECTOR OF COCONUT PLANTATIONS FOR THE YEAR 1908.

The area under coconuts in the Federated Malay States I estimate, approximately, at 118,697 acres, made up as follows:

Perak	.. .. .	61,086	acres
Selangor	.. .. .	23,169	„
Negri Sembilan	.. .. .	18,779	„
Pahang	.. .. .	15,663	„

of which about two-thirds are probably in bearing, and the whole, in my opinion, may be valued at \$23,000,000.

INCREASE.—Six thousand one hundred and forty-seven acres were opened up and planted during the year throughout the States. Although this shows some decrease as compared with 1907 I think on the whole the extension may be considered satisfactory. By far the greater portion, as in the previous year, must be credited to the native community. At the same time it is gratifying to state that my anticipations as expressed in my last report with regard to the Europeans taking a keener interest in this cultivation have certainly been realized, for I find that of the increase above recorded 1,600 acres must be apportioned to them, the largest area yet opened up by Europeans in any one year since my appointment.

The principal European-owned estates are: In Perak, Bagan Datoh, 1,623 acres; Strathmashie, 917 acres; Gula, 573 acres, and Gapis, 305 acres; and in Selangor, Jugra, 797 acres; Klanang, 507 acres; Bukit Rajah, 400 acres, and Permatang, 350 acres.

I may mention that the yield from the trees that have come into bearing on these estates, which are well maintained, has been quite satisfactory.

STAFF.—Mr. G. S. Hope, Settlement Officer, Kuala Pilah, was appointed Assistant Inspector of Coconuts on the 8th April and stationed at Kuala Kangsar.

Raja Omar, Sub-Inspector of Coconuts, Kuala Lumpur, was transferred from the department and appointed Settlement Officer, Telok Anson, on the 1st November. Hamzah bin Abdullah, Clerk to the Director of Museums, succeeded him and took up his duties on the 1st December.

With these exceptions the staff was the same as in the previous year.

I now refer to the four States in regular order.

STATE OF PERAK.

CULTIVATION.—I estimate 61,086 as the approximate acreage under coconuts in the State at the end of 1908, an increase of 3,320 acres as compared with the year before. Of this increase 539 acres were planted up by Europeans.

These figures are made up from the various districts as follows:

District	Increase	Total Area.
Lower Perak	483 acres	31,104 acres
Kuala Kangsar (Upper Perak)	246 "	6,165 "
Matang and Larut	166 "	6,939 "
Krian, Selinsing and Selama	1,712 "	11,852 "
Kinta	550 "	4,000 "
Batang Padang	163 "	1,026 "

LOWER PERAK.—Of the 483 acres planted up with coconuts during the year 150 acres were opened up by Europeans.

The crops throughout the district continued to be good and the upkeep of the plantations generally is satisfactory.

Wild pigs did considerable damage to the kampongs during the year, but these animals are gradually decreasing in numbers.

KRIAN, SELINSING AND SELAMA.—One thousand seven hundred and twelve acres were opened up in these districts during the year, mostly in Krian. The estates and native holdings are well tended and in good condition.

KUALA KANGSAR AND UPPER PERAK.—Two hundred and forty-six acres were planted up with coconuts during the year, including 20 acres on Gapis Estate. With the exception of a few abandoned kampongs in Upper Perak, which are overgrown with lalang and blukar, the state of the cultivation in these districts is satisfactory and the beetles and other pests have caused little or no trouble. The trees are healthy and bear well.

KINTA.—Five hundred and fifty acres were planted up with coconuts during the year in this district. The plantations are well maintained, though the natives have to contend against the ravages of wild pigs and tame buffaloes, which do considerable damage to the kampongs.

The State Inspector reports that in the mukim of Sungei Rajia the silt from the mining operations in the Ulu is gradually driving the natives from their holdings, in the vicinity of the stream, which is to be regretted, as they are driven out of their homes without being able to obtain compensation.

I regret to report that at Pusing Bharu, in the Sungei Trap Mukim, a large number of the coconut trees were again attacked and defoliated, early in the year by a species of *Lepidopterous* larvæ (belonging to the family *Tineida*)

which has previously occurred in 1906. Fortunately on this occasion it appeared in a less severe form and the trees are now beginning to recover. Mr. Pratt (the Government Entomologist), who has written the life history of the insect, says in his report that the best means to eradicate the pest would be spraying the leaves with kerosene emulsion, which not only effectually kills the pest, but also destroys the scale insect with which the leaves are so frequently infested. This remedy, if applied on the appearance of the first brood, while the caterpillars are confined to a small number of the trees, would not be costly and would prevent the trees being injured by those subsequent broods which would have appeared had no measures to prevent its increase been taken. The number of eggs present during the first brood is so small that it is out of the question on a large and high tree to detect their presence, but the larva hatching from these eggs may be detected with the aid of a pair of binoculars. At a latter brood, when eggs are exceedingly abundant, it is naturally easier to detect them, but the increase of individuals between the first and this later brood would render remedies at the later stage of the disease a most costly procedure.

BATANG PADANG.—One hundred and sixty-three acres were opened up with coconuts in this district during the year. There are a number of abandoned kampongs in the mukims of Bidor, Slim and Sungkai, which are quite overgrown with blukar, otherwise the plantations are well cared for. A few isolated trees were attacked by beetles and these are receiving attention.

MATANG AND LARUT.—During the year, 166 acres were planted up with coconuts, including 100 acres opened up by Europeans. The plantations in these districts show considerable improvement, due mainly to the regular issuing of notices and summonses for failing to comply with the same.

STATE OF SELANGOR.

CULTIVATION.—I estimate 23,169 as the approximate acreage under coconuts in the State at the end of 1908, an increase of 1,848 acres as compared with the year before. Of this increase, 1,060 acres were opened up by Europeans.

These figures are made up from the various districts as follows:

District	Increase	Total area.
Kuala Selangor and Bernam	79 acres	10,000 acres
Klang and Kuala Langat ..	1,649 „	9,409 „
Kuala Lumpur, Ulu Selangor and Ulu Langat	120 „	3,760 „

KUALA SELANGOR AND BERNAM.—A considerable improvement is noticeable in the condition of the plantations in these districts. The native owners are being encouraged to plant the passion flower creeper (*Passiflora foetida*) in order to kill out lalang which so much retards the growth of the trees.

The abandoned plantations on the Klang-Kuala Selangor road was attended to as often as possible, and though they are overgrown with lalang and blukar the beetles have been kept in check. As regards the Bernam District I have received great assistance from the Assistant District Officer stationed there.

KLANG AND KUALA LANGAT. *Klang*.—The plantations in this district are, on the whole, maintained in a satisfactory condition. The native here also have been induced to plant the passion flower creeper to combat lalang.

The abandoned holdings in these districts were kept free from beetles during the year, but with the limited number of coolies at our disposal it was impossible to take any steps with regard to the lalang and blukar with which they are overgrown.

At Damansara Village a few trees were badly attacked by beetles and were cut down and destroyed.

Kuala Langat.—The plantations generally in this district continue to give excellent returns and are well maintained. There are a few abandoned holdings in the Bandar Mukim, the owners of which are in other parts of the States and have no houses on their kampongs. It is therefore very difficult to take any action against them for the improvement of their plantations.

In these districts 1,060 acres were brought under coconut cultivation by Europeans.

KUALA LUMPUR, ULU SELANGOR AND ULU LANGAT.—The plantations in these districts continue to show good progress and there is a very noticeable improvement in the trees at Pudu, Ampang and the Race Course at Kuala Lumpur. The beetle pest is now well under control and constant supervision is now all that is required to prevent it again becoming troublesome.

The small plantation at Rawang, which was so badly attacked by beetles during the early part of 1907, has since

been purchased by a European who resides on the property, and owing to his careful treatment the trees are now in perfect condition and most of them in bearing.

Our coolies periodically visited outstations to attend to Government trees and also to assist and instruct the native owners, to which fact much of the general improvement in the conditions is attributable.

STATE OF NEGRI SEMBILAN.

CULTIVATION.—The approximate area under coconuts in this State at the end of 1908 I estimate at 18,779 acres, an increase of 779 acres over the preceding year.

The figures are made up as follows:

District	Increase	Total area.
Seremban and Jelebu	458 acres	5,648 acres
Tampin	27 "	5,600 "
Kuala Pilah	223 "	5,256 "
Coast	71 "	2,275 "

SEREMBAN AND JELEBU.—During the year the plantations in these districts were well maintained and their condition continues to be satisfactory.

TAMPIN.—The kampong throughout this district are well cared for and their condition is still improving.

KUALA PILAH.—The general condition of the kampongs here is good and the beetle pest has been effectively dealt with.

COAST.—In this district the beetles are well under control, but the kampongs do not receive as much attention from their owners as I would wish.

STATE OF PAHANG.

CULTIVATION.—The approximate area under coconuts in this State at the end of 1908 I estimate at 15,663 acres, an increase of 200 acres over the preceding year.

I visited Raub and the surrounding districts in the early part of September, and during the latter part of the same month and the beginning of October I made a tour of inspection down river from Kuala Lipis to Pekan, returning *via* Singapore.

I was satisfied with the upkeep and condition of the kampongs generally. Between Kuala Lipis and Chenor the plantations are exceedingly well maintained. Further

down and at Pekan they were not quite so clean but this was on account of the owners being lately at work in the padi fields.

At Kuala Pahang the plantations were not altogether satisfactory, and the Sub-Inspector was instructed to give these kampongs strict and more frequent supervision.

Towkay Loke Yew's plantation is much improved, but the soil is very poor, and the trees must be thoroughly manured before they can make any really good progress in growth. This, I am glad to say, is now being done.

At Kuantan the upkeep of the kampongs was satisfactory.

The dry disease, referred to in my previous reports, has not been very serious this year. It resembles very closely the "Coconut Bleeding Disease" as in Ceylon. The Sub-Inspector sent up parts of one of the affected trees to the Government Mycologist for examination, but from these specimens he could arrive at no definite conclusion, and states that it will be necessary to examine the trees on the spot, which he will do on the first available opportunity.

COPRA.—I am indebted to the Commissioner of Trade and Customs for the following statement giving the export of copra from the States during the year:

Perak	..	..	..	49,016	pikuls
Selangor	..	..	..	20,879	„
Pahang	..	..	..	659	„
Negri Sembilan	..	..	..	285	„
Total				70,839	

an increase of over 21,000 pikuls as compared with 1907.

Quotations for the articles have varied from \$6.50 to \$8 per pikul during the period under review, and I should say that \$7.25 per pikul may be taken as the average price.

The copra manufactured on the European-owned estates was of excellent quality and fetched top prices in the market. On the other hand, I regret to say, that the copra produced from the native holdings was very inferior and appears to be going from bad to worse. This may be accounted for to some extent by the fact that the Malays in some localities are converting the nuts into copra themselves, instead of selling them to the Chinese, as formerly. The latter are by no means adept in the trade, but they certainly are not so slovenly or careless in the process as the Malays. Perhaps the worst feature of the case is that the Malays, in order to get as much produce as possible,

often use unripe nuts, from which it is quite impossible to make even decent copra.

At the request of Government I have already made representations on the subject, and suggested a scheme which I believe, if experimented with, will go a long way to arrest the evil complained of. The coconut trees in the Federated Malay States compare favourably, both in yield and size of nuts, with those of any other country, and in my opinion there is no reason, except bad process of manufacture, why the copra made from the fruit should not be as a rule, of good, even standard. At present, as I have before stated, the outturn of copra from the native holdings is inferior in quality.

GENERAL.—I am satisfied that my staff have carried out their duties thoroughly and with discretion, and by their efforts steady progress has been made. No severe measures have been adopted where persuasive means would effect the same purpose, and all districts were strictly supervised with the object of getting the natives to improve their holdings. The eradication of all pests to which the coconut tree is subject has had particular attention. The natives have also been impressed with the necessity of planting young trees between the old ones to replace the latter when they eventually cease to bear, and cases are reported in nearly every district of this being done.

The introducing of the wild passion flower creeper (*Passiflora fatida*), known amongst the natives as "Buah Lutup," to kill down the lalang which interferes so much with the growth of the trees, has been encouraged, and the results in many kampongs have been very beneficial—more especially in the lower lands.

In several localities near the Coast the trees suffer from being waterlogged, and the influx of the tide brings up crabs which attack and eat the young roots, and affect the bearing of the tree. Better drainage is required to remedy this evil, especially in the Kuala Selangor and Bernam Districts which adjoin one another. A good system of drains and sluice gates, which is beyond the means of the native owners, would very materially improve the trees on the plantations in these districts.

The works which are being carried out by Government in Lower Perak in the way of roads, drains, and bridle-paths in the mukims of Bagan Datoh, Rungkup and Utan Melintang, when completed, will open up a large area particularly suited to coconut cultivation, and I look forward to a considerable extension in these localities.

PRICES.—The price of coconuts in the various districts during the year was as follows:

Batang Padang	6 to 8 cents each
Kuala Lumpur, Ulu Selangor and Ulu Langat	5 to 8 "
Krian and Selinsing	5 to 6 "
Kuala Pilah	4 to 6 "
Kinta	3 to 8 "
Lower Perak	3 to 6 "
Kuala Kangsar and Upper Perak	3 to 5 "
Larut and Matang	3 to 4 "
Klang and Kuala Langat	3 to 4 "
Pahang	2 to 16 "
Kuala Selangor and Bernam	2 to 6 "
Seremban and Jelebu	2 to 6 "
Coast	2 to 3 "
Tampin	2 to 6 "

PROSPECTS.—The prospects of the industry appear to me to be still hopeful and encouraging, and I look forward to a steady development in the cultivation, both by Europeans and the native community, during the current year.

At the Agri-Horticultural Show, held at Kuala Lumpur in August, the coconut industry was well represented both by the Colony and the Federated Malay States. The exhibits of coconuts, copra, coconut oil, etc., were exceptionally fine, and the States carried off nearly all the prizes in this particular section.

L. C. BROWN,

Inspector of Coconut Plantations, F. M. S.

REPORT ON EXPERIMENTAL PLANTATIONS FOR THE YEAR 1908.

The chief work of the year has been the development of the Kuala Lumpur Experiment Plantation.

EXPENDITURE.—The total expenditure for 1908 on the Kuala Lumpur and Batu Tiga Plantations, exclusive of establishments, was \$13,420.75, which shows a saving on the estimates of \$1,279.25.

LABOUR SUPPLY.—The supply of coolies has been very satisfactory, and the health, on the whole, good. Towards the end of the year there was a considerable amount of malarial fever amongst the coolies at Kuala Lumpur.

Batu Tiga is now worked entirely by Javanese, they work well and seem to suffer less from fever than the Tamils.

DRAINING.—The contour drains, for the protection of the steep slopes, have now been completed and remain in good order.

ROADS.—The plantation is now also well opened up by roads and paths, which make any part easy of access. About 120 chains have been traced and cut during the year including a path through the arboretum.

CROPS.—The various experiments, initiated in 1907 and in the present year, have made good progress.

Rubber in all stages is doing well. Fruit trees have in most cases made fairly good growth. Green manures or cover plants have been largely experimented with during the year; details of which are furnished below.

RUBBER.—*Hevea braziliensis* (Para rubber). The old rubber trees have remained in good health, three trees were lost through white ants and one tree was attacked by a fungus which caused large quantities of latex to exude. This disease has been referred to the Government Mycologist for investigation. No tapping was done owing to the delay in equipping the Curing House which was not ready at the end of the year.

SELECTED SEEDS.—The plot, $3\frac{1}{2}$ acres, planted in 1907 with stumps, the result of seed from specially selected trees, has done well, all trees have made good progress, the average height is 11 feet $5\frac{3}{4}$ inches, average girth at three feet from the ground $3\frac{3}{8}$ inches.

SEEDS SOWN AT STAKE.—The experiment, initiated in 1907, of planting seeds at stake and from nursery at various ages was continued, and further batches were put out during 1908 as per plan detailed in my report for last year.

The seeds sown at stake are making excellent progress and show clean and healthy growth.

It looks at present as if the trees from seed sown at stake would reach a tappable size at least a year earlier than stumps transplanted from nursery buds.

The averages of height and girth are as follows:

Experiment 2/07 A.—Seeds sown at stake, October, 1907. Average height, 10 feet 6 inches; average girth, $3\frac{9}{16}$ inches.

Experiment 2/07 B.—Seeds sown in nursery, October, 1907. Planted out in December, 1907. Average height, 9 feet $3\frac{1}{3}$ inches; average girth, $2\frac{9}{16}$ inches.

Experiment 2/07 C.—Seeds sown in nursery, October, 1907. Planted out in April, 1908. Average height, 5 feet 9 inches; average girth, $1\frac{1}{16}$ inches.

Experiment 2/07 D.—Seeds sown in nursery, October, 1907. Planted out in November, 1908. Not measured. Stumps cut down to 18 inches.

Experiment 3/07.—Close planting. This plot shows very fine progress as a whole. The plants have not yet become crowded enough to have any bad effect on their growth. A large number of the plants have shot ahead of their neighbours, but whether they will maintain this lead, and kill out the weaker plants, remains to be seen. The average height is 10 feet $6\frac{1}{2}$ inches; average girth, $2\frac{7}{16}$ inches.

PURPLE MANICоба RUBBER (*Manihot* sp.).—The plot of this plant, put out in November, 1907, has made good growth during the year.

The plants have now grown into strong bushes, averaging 12 feet $2\frac{1}{2}$ inches in height, the stem measuring $5\frac{1}{2}$ inches at 3 feet from the ground.

JIQUE RUBBER (*Manihot dichotoma*).—Seeds of this rubber, recently discovered in Brazil, were received from the Royal Botanic Gardens, Kew, in October, and sown both at stake ($1\frac{1}{2}$ acres) and in nursery beds.

The seeds germinated freely and the plants appear to be very similar to the Purple Manicoba rubber received last year.

ROMANSO RUBBER (*Manihot piauhyensis*).—Seeds of this species, also from Brazil, and discovered at the same time as the above, were received from the Royal Botanic Gardens, Kew. They were sown under conditions similar to the "Jique" variety, but many of the seed failed to germinate. I have, however, got about 50 plants which will be put out in this year.

The young seedlings of this rubber are thicker and more sappy in appearance than those of *M. dichotoma*.

These new Manicoba rubbers belonging to the same family as the Ceara rubber (*Manihot Glaziovii*) but are said to be much superior to the latter species in every way. They grow naturally in drier and less fertile land than the Para rubber (*Hevea brasiliensis*).

RAMBONG (*Ficus elastica*).—The two acres of this rubber put out in 1907 are now well established and the plants have begun to grow freely, about a dozen vacancies were supplied.

MEXICAN RUBBER (*Castilloa elastica*).—An area of about 2½ acres of this rubber was put out in March. The plants have made fair progress, but received a check through having become infected with Mealy bug. The pest has been suppressed with a solution of kerosene oil, soft soap and water.

Kicksia elastica.—Seeds of this West African rubber have been obtained from Kamuning Estate and were sown in nursery. A trial plot will be put out in this year.

CAMPHOR.—The camphor trees in Batu Tiga remain in good health and have made vigorous growth during the year. The largest trees measure now some 26 feet in height and are 14 feet through the base. I regret to have to report that another year has gone by and no distillation has yet been made to determine the actual yield of camphor, and until this has been done it would not be safe to recommend its cultivation on any large scale.

The young trees in Kuala Lumpur, planted in September, 1907, have made good progress.

This plot was divided into three parts and treated as follows:

- A. Clean weeded;
- B. Planted with mimosa;
- C. Planted with crotalaria.

The object being to determine the effects to clean weeding and the use of cover plants or green manures on the growth of the camphor trees.

The trees were all planted at the same time, and at the time of the commencement of the experiment all three plots were about even. The average height and breadth of the bushes in each plot at the end of the year were as follows:

	Average height		Average breadth 18 ins. from ground	
	ft.	ins.	ft.	ins.
A.	5	5¾	4	5
B.	4	7½	3	5
C.	5	9¼	3	5¾

Plot A was weeded four times during the nine months (cost \$2.80). Plot B was weeded once after planting (cost 70 cents). Plot C was weeded once after planting and was cut over twice (cost \$1.05).

Some 300 plants were distributed for trial to different estates in the early part of the year.

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In December, a large quantity of seed was received from Japan and it is hoped to have a further supply of plants available for distribution this year.

TAPIOCA (*Manihot utilissima*).—The manurial experiments with tapioca, initiated in June, 1907, were completed during the year with the following results:

I.—MANURED WHEN PLANTS HAD COMMENCED TO GROW FREELY.

Plots	Planted	Manured	Manure applied	Distance between plants	Weight of green tops	Weight of stems	Weight of roots	No. of failures	Roots per acre (say)
				Feet.	lbs.	lbs.	lbs.		Tons.
A	17-6-07	15-7-07	N.	$5 \times 2\frac{1}{2}$	503	833	1,381	Nil	$7\frac{1}{4}$
B	17-6-07	15-7-07	N.P.	$5 \times 2\frac{1}{2}$	663	1,155	1,511	„	$8\frac{1}{4}$
C	17-6-07	...	Control	$5 \times 2\frac{1}{2}$	731	928	1,413	„	$7\frac{1}{2}$
D	18-6-07	15-7-07	N.P.K.	$5 \times 2\frac{1}{2}$	450	664	1,142	„	$6\frac{1}{4}$

II.—MANURED 14 DAYS BEFORE PUTTING IN CUTTINGS.

G	22-7-07	...	Control	$5 \times 2\frac{1}{2}$	462	1,309	2,947	20	$9\frac{1}{4}$
H	22-7-07	8-7-07	N.	$5 \times 2\frac{1}{2}$	494	1,134	1,657	35	$7\frac{1}{4}$
J	22-7-07	8-7-07	N.P.	$5 \times 2\frac{1}{2}$	403	1,092	1,281	60	$5\frac{1}{4}$
K	22-7-07	8-7-07	N.P.K.	$5 \times 2\frac{1}{2}$	524	689	919	85	$4\frac{1}{4}$

PLANTING EXPERIMENTS.

E	18-6-07	...	Control	$2\frac{1}{2} \times 2\frac{1}{2}$	524	749	1,049	Nil	$5\frac{1}{4}$
F	18-6-07	...	„	5×5	488	521	1,145	„	$6\frac{1}{4}$

MANURED 14 DAYS BEFORE PUTTING IN CUTTINGS.

L	29-7-07	12-7-07	N.P.K.	$2\frac{1}{2} \times 2\frac{1}{2}$	647	2,456	2,284	Nil	$10\frac{1}{4}$
M	29-7-07	12-7-07	„	5×5		Destroyed by Monkeys.			

The manure used, with the rate of application per acre, were as follows:

No. 1, marked N., 80 lbs. of sulphate of ammonia, containing about 20 per cent. nitrogen.

No. 2, marked N. P., 80 lbs. of sulphate of ammonia, 100 pounds concentrated superphosphate, containing about 40 per cent. phosphoric acid P². O⁵.

No. 3, marked N. P. K., 80 lbs. of sulphate of ammonia, 96 lbs. concentrated superphosphate, and 160 lbs. sulphate of potash containing about 50 per cent. potash $K^2 O$.

Of the remaining plots, four were used as controls and in four the planting distances were varied.

NOTES ON EXPERIMENTS.

After manuring plots A, B and D, and after planting plots G and K, exceptionally hot dry weather was experienced, although planting in the case of the latter was done after rain.

2. In most cases plant grew very patchy. B was the most even plot as regards growth in the first series and L in the second series.

3. In the plots J and K there were 60 and 85 failures, respectively, out of a total of 340 plants in each plot, this accounts for the very small yields in both cases.

4. Plots in the first series were lifted in the first week in April, those of the second series in the first week in May. Taking the results of the above experiments it would not yet be safe to recommend or condemn any of the manures tried, a further series of experiments of the same nature is being carried out in Batu Tiga but results are not yet available. A second series was started in Kuala Lumpur early in the year, results of which, it was hoped, would be published in this report. The plots were, however, destroyed by monkeys (a gang of about 40), who seem to like the soft green part of the stems for food.

COCONUTS.—The collection of coconut varieties, obtained at Kuala Kangsar Show, was planted in its permanent quarters in March, each plant is labelled, and with the exception of three plants are doing well. It was only possible to get one variety this year. This has been put in the nursery and will be planted out next wet season.

PISANGS OR BANANAS (*Musa sapientum*).—The collection of pisangs, some 64 varieties, obtained towards the end of last year, were in October planted in lines, 30" × 30", in the fruit plots and all permanently labelled. As they fruit each variety will be described and a drawing made of the fruit in order to determine the actual varieties. Several applications for suckers were received during the year and supplies will be distributed as soon as stocks are available.

COFFEE.—The plantation of coffee on the hill, near the Superintendent's bungalow, was manured during the year

and consequently shows now much better growth. A fresh plantation of young seedlings (*liberica* and *robusta*), about two acres, was made in April.

PEPPER.—As mentioned in my last report a piece of ground had been cleared and planted with shade trees for pepper cultivation. Plants of the best Trong variety were received and planted in December and are at the time of writing getting established and growing.

COCOA.—The shade trees, Dadap (*Erythrina indica*), planted on the cocoa plot, have, I regret to say, done badly. They have been persistently attacked by caterpillars and defoliated time after time. They have now been interplanted with Munkudu (*Morinda tinctoria*) and will be eventually replaced by them. A supply of cocoa pods was received from Ceylon, but unfortunately through some mistake or neglect the cases lay 21 days at Port Swettenham, and as a result all the pods had become heated and the seeds destroyed.

Arrangements have been made to get a fresh supply in the present year.

GRASSES.—The grass plots have all been lifted and replanted during the year. There was some demand for citronella grass (*Andropogon Nardus*) during the year and 900 plants were sent out.

FIBRE PLANTS (*Musa violascens*).—In addition to the plots mentioned in my 1907 report, experiments have been initiated and are being carried out with a view to ascertaining the value of the "Wild Banana" or pisang (*Musa violascens*) as a fibre plant, also for the purpose of finding the best means of extracting the fibre. The plant is one which grows freely all over the Federated Malay States, there must be large quantities of it in the jungle that would pay for collecting. On some estates it comes up thickly after the jungle has been felled. It should, I think, form a valuable catch-crop, and, in addition, act as a good cover plant and so help to prevent wash on steep lands.

A variety of *Musa sapientum*, known as "Pisang Bengala," is also being tried as a fibre-producing plant.

This variety attains a good size, grows quickly, and produces an abundance of shoots or suckers. It is therefore, if only for the latter reasons, a desirable plant for fibre purposes.

I have seen a sample of the fibre of this plant, prepared by Mr. A. Hale, Taiping, which appears to be of excellent quality.

KABU-KABU (*Eriodendron anfractuosum*).—A plot of about two acres of this plant was put out, the seed having been obtained from Ceylon. The plants are now established and doing well.

FRUITS.—Special attention has been devoted to the fruit plots and a very considerable addition was made in species and varieties during the year. Notably, a collection of grafted mangoes, also avocada pears, chikus and mango-steens. Several Ceylon fruits have also been introduced. A large number of fruit trees were distributed towards the end of the year. The following is a list of fruits already in cultivation here. Every effort will be made to add to it as opportunity occurs:

1. Aehras sapota	.. ..	Sapotaceæ	Chiku or sapidilla plum
2. Anona muricata	.. ..	Anonaceæ	Soursop or Durian Blanda
3. " reticulata	.. ..	"	Bullock's heart
4. " squamosa	.. ..	"	Custard apple
5. Artocarpus integrifolia	.. ..	Urticaceæ	Jak
6. Canarium commune	.. ..	Burseraceæ	Java almond
7. Carica papaya	.. ..	Passifloreæ	Papaya
8. Chrysophyllum cainito	.. ..	Sapotaceæ	Star apple
9. Citrus aurantium	.. ..	Rutaceæ	Orange
10. " decumana	.. ..	"	Pomelo
11. " limonium var acida	.. ..	"	Lime
12. " medica	.. ..	"	Citron
13. " limonium	.. ..	"	Lemon
14. Clausena Wampi	.. ..	"	Wampi
15. Durio zibethinus	.. ..	Malvaceæ	Durian
16. Elæocarpus serratus	.. ..	Tiliaceæ	Ceylon olive
17. Eugenia malaccensis	.. ..	Myrtaceæ	Malay apple
18. " Michellii	.. ..	"	Brazil cherry
19. Feronia elephantum	.. ..	Rutaceæ	Wood apple

20. <i>Flacourtia cataphracta</i>	..	Bixineæ	Rukam
21. " <i>inermis</i>	..	"	"
22. <i>Garcinia mangostana</i>	..	Guttiferae	Mangos- teen
23. " <i>Livingstonei</i>	..	"	"
24. " <i>dulcis</i>	..	"	Mundu
25. <i>Hibiscus sabdariffa</i>	..	Malvaceæ	Rozella
26. <i>Lansium domesticum</i>	..	Meliaceæ	Langsat Queens- land nut
27. <i>Macadamia ternifolia</i>	..	Proteaceæ	land nut
28. <i>Mangifera indica</i>	..	Anacardiaceæ	Mango
29. <i>Morus alba</i>	..	Urticaceæ	Mulberry
30. <i>Nephelium lappaceum</i>	..	Sapindaceæ	Rambutan
31. " <i>chryseum</i>	..	"	Pulassan
32. <i>Passiflora laurifolia</i>	..	Passifloreæ	Water lemon
33. <i>Ananassa sativa</i> (Kew var.)		Bromeliaceæ	Pine apple
34. <i>Persea gratissima</i>	..	Laurineæ	Avocado pear
35. <i>Psidium guava</i>	..	Myrtaceæ	Guava
36. <i>Sandoricum indicum</i>	..	Rubiaceæ	Sentol
37. <i>Tamarindus indicus</i>	..	Lythraceæ	Tamarind
38. <i>Punica granatum</i>	..	Leguminosæ	Pome- granate
39. <i>Vangueria edulis</i>	..	Meliaceæ	
40. <i>Cicca acidissima</i>	..	Euphorbiaceæ	Chermei

DRUGS, DYES, ETC.—A piece of ground (about 2 acres) was opened up and a collection of plants yielding drugs, dyes, etc., planted, including *Erythoxylon Coca* (Cocaine), *Brucea sumatrana*, *Croton Tiglium* (Croton oil), *Ricinus communis* (Castor oil).

BALSAM OF TOLU *Myroxylon Touliferum* (*Toulifera balsamum*).—Seeds of this tree were received from Ceylon and a plot of 50 plants was put out in November.

NUTMEGS (*Myristica fragrans*).—Seeds and plants of this important product were obtained through the Botanic Gardens, Penang. A plot of 150 plants was put out, the plants are now established and doing well.

WEST AFRICAN OIL PALM (*Elæis guineensis*).—There are some 35 plants of this valuable West African palm planted in Batu Tiga plantations. They are all of good size, being about 24 feet high and 7½ feet round the stem at the thickest part. The plants, which are about 6 years old, have not yet shown any signs of flowering, but judging from their size and growth they ought to flower shortly.

VEGETABLE PLOTS.—During the year a number of vegetable plots were prepared on which it is proposed to commence a series of experiments in the improvement of native vegetables and in the introduction of new sorts. There is plenty of room for improvement in this direction. The work is one, like that of the improvement of fruits, which will require a considerable amount of careful and patient work, in order that progress may be made, and some time must elapse before any results are visible.

ARBORETUM.—Most of the trees planted in 1907 are doing well, and any sickly or dead plants have been supplied. All remaining trees were manured.

The ground is now entirely under grass, which is regularly cut, and a good portion of the ground has been stumped.

Planting was carried out during the year, when a further 38 species were added to the collection, the plants having been obtained from the Royal Botanic Gardens, Peradeniya, and also from the Forest Department, Federated Malay States, who supplied plants and seeds of several useful native timber trees. The following is the list of species added during the year:

No.	NAME.	NATURAL ORDER.	LOCAL OR COMMON NAME.
1.	<i>Castanospermum australe</i>	Leguminosæ	Australian chestnut
2.	<i>Heritiera littoralis</i> ...	Sterculiaceæ...	Looking-glass tree
3.	<i>Hura crepitans</i> ...	Euphorbiaceæ	Sand box tree
4.	<i>Enterolobium calycocarpum</i>	Leguminosæ...	
5.	<i>Erythrina umbrosa</i> ...	"	Bois immortelle
6.	" <i>indica</i> ...	"	
7.	" <i>ovalifolia</i> ...	"	
8.	" <i>picta</i> ...	"	
9.	<i>Terminalia belerica</i> ...	Combretaceæ	Bulu
10.	<i>Cananga odorata</i> ...	Anonaceæ ...	(Ilang-Ilang) kanaga
11.	<i>Mesua ferrea</i> ...	Guttiferae ...	Iron wood tree or penga bunga
12.	<i>Bombax malabaricum</i> ...	Malvaceæ ...	Red silk cotton
13.	<i>Gmelina arborea</i> ...	Verbeniaceæ	
14.	<i>Ochroma Lagopus</i> ...	Malvaceæ ...	Jamaica cork tree
15.	<i>Pterocarpus dalbergioides</i>	Leguminosæ...	
16.	" <i>marsupium</i> ...	"	
17.	" <i>echinatus</i> ...	"	
18.	<i>Parkia biglandulosa</i> ...	"	
19.	" <i>Roxburghii</i> ...	"	
20.	<i>Barringtonia speciosa</i> ...	Myrtaceæ ...	Mudilla
21.	<i>Calyophyllum inophyllum</i>	Guttiferae ...	
22.	<i>Crescentia cujete</i> ...	Bignoniaceæ...	Calabash
23.	<i>Parmentiera cereifera</i> ...	"	Candle tree

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|--------------------------------------|----------------------|-----------------------|
| 24. <i>Sapium indicum</i> ... | ... Euphorbiaceæ | Kiri makulu |
| 25. <i>Sapindus laurifolius</i> ... | ... Sapindaceæ ... | |
| 26. <i>Spondias mangifera</i> ... | ... Anacardiaceæ | |
| 27. <i>Harpullia eupauioides</i> ... | ... Sapindaceæ ... | |
| 28. <i>Embelyia ribes</i> ... | ... Myrsineæ ... | |
| 29. <i>Dendrocalamus giganteus</i> | Gramineæ ... | Giant bamboo |
| 30. <i>Fagrea speciosa</i> ... | ... Loganiaceæ ... | Tembusu tembaga |
| 31. <i>Ochanostachys amentacea</i> | Olacineæ ... | Petaling |
| 32. <i>Melannorhea Maingayi</i> ... | ... Anacardiaceæ | Rengas |
| 33. <i>Shorea meranti</i> ... | ... Dipterocarpeæ | Meranti |
| 34. <i>Pithecolobium saman</i> ... | ... Leguminosæ ... | Inga saman, rain tree |
| 35. <i>Eriodendron anfraetuosum</i> | Malvaceæ ... | Kapok-kapok |
| 36. <i>Stereulia Balanghas</i> ... | ... Stereuliaceæ ... | |
| 37. <i>Randia macrantha</i> ... | ... Rubiaceæ ... | |
| 38. <i>Imbricaria coriacea</i> ... | ... Sapotaceæ ... | |

NURSERY.—The year under review has been a busy one in the nursery, chiefly owing to a very large consignment of plants and seeds received from the Royal Botanic Gardens, Peradeniya. Every available inch of ground was put in use when propagating started, and the nursery had to be enlarged by making two new long beds at the back.

Some 3,000 plants of various kinds were distributed, in addition to the large numbers planted both in the Experimental Plantations and in the Public Gardens.

COVER PLANTS.—The question of a substitute for weeding continues to attract a good deal of attention. Several experiments have been carried out with a view of finding suitable plants for this purpose, the best way to plant them, etc.

CROTALARIA.—This is probably one of the most popular cover plants at present, as not only does it cover the ground but it also enriches it by adding nitrogen, and, when cut, renders a good deal of material available for mulching.

Early in the year a portion of steep slope, about half an acre, was planted with crotalaria. The seeds having been planted as follows: Every 15 inches in all directions a mamotti of soil was turned over and broken, and in places so dug up a small hole was made and two or three seeds dropped into each. The result is that the slope is well covered, no weeding has been done on this portion for eight months. The plants have been cut over three times, the green tops having dropped through are allowed to remain as a mulch; this I have found to be the cheapest and best way to plant hard-backed slopes.

The cost per acre for planting works out at 20 coolies per acre per day.

SOWING BROADCAST.—A large area was sown broadcast with *crotalaria* seeds on hill lands in Kuala Lumpur plantation, it was a complete failure, but on the flat moist land at Batu Tiga it was quite a success. A trial was made with sowing *crotalaria* in shallow lines on hill land but was only successful where the soil was fairly soft. On hard ground the seeds germinated but only grew an inch or two high and died off. An experiment was carried out to find the best method of sowing *crotalaria* on ordinary flat or gently undulating (not moist or wet) land, and the quantity of seed required per acre was as follows:

- (a) Seed sown broadcast, 4 lbs. per acre;
- (b) " " " " 2 " " "
- (c) Seeds dibbled in 1 foot apart 1 inch deep;
- (d) " " 6 feet " "
- (e) " " 18 " " "
- (f) Seeds sown broadcast and raked over.

The plots were each a tenth of an acre, and were those of that which had been used previously for tapioca experiments and were therefore in good condition for seed sowing. The best results were obtained in plots (c), (d) and (f). The best methods for planting appear to be, judging for experiments carried on during the year;

- (1) For hill lands or any ground with hard surface, holes cut one changkol deep, about 15 inches apart, and seeds dibbled in;
- (2) For ordinary slightly undulating land, seeds dibbled in one foot apart;
- (3) On flat land with loose surface, seeds sown broadcast (2 lbs. per acre) and raked in;
- (4) On wet lowlying land, broadcast (2 lbs. per acre).

There are two very marked varieties of *crotalaria* in general use on estates—viz., *Crotalaria striata* and *Crotalaria incana*.

CROTALARIA STRIATA.—The plant generally known as *Crotalaria striata*, is a quick growing variety, which has small leaves and runs to seed quickly. This plant never makes a really good cover plant.

CROTALARIA INCANA.—This plant is a much stronger grower than the above, the leaves are much larger and the plant is slow to run to seed, it therefore serves its purpose as a cover plant for a much longer period, and gives, when cut over, much more material for mulching.

MIMOSA PUBICA.—A good deal of attention has again been given to this plant and several experiments have been carried out with it, both with regard to its value as a cover

plant and as a green manure. In Batu Tiga about six acres of it have been planted up. The plants have made a dense cover and have succeeded in keeping in check all weeds except lalang.

This pestilent weed, which was in the ground or in the immediate neighbourhood before the experiment started, seems to take complete possession of the plots wherever it comes up. The ground in which lalang patches were growing was dug up and the roots picked before the plants were put in.

The mimosa had made good headway before the lalang got up, but once the latter began to get away it grew and spread rapidly, and now looks like killing out the mimosa, which was at one time a dense mass over a foot high. On the other hand, in some places where there was no lalang before planting, none has come up.

Except where it encroaches from an adjacent lalang patch it is possible that if the ground were covered up as soon as burnt off, and before lalang had time to get in, that it might then act as a preventative and keep lalang out; but of this we have as yet had no opportunity of judging.

Three plots of mimosa, each a tenth of an acre, were cut over to six inches above the ground once during the year and the fresh cutting weighed with a view to finding the amount of mulching material rendered available by this process.

The plots cut over were about 10 months old and well covered, the average total of mulching material worked out at 2,950 lbs. per acre.

DESMODIUM TRIFLORUM.—This plant which gave some promise last year, and which, if established, would make an ideal cover plant, has been given up owing to its liability to attacks of insect pests. The difficulty of establishing it would also make it impracticable for estate work.

TEPHROSIA.—Two species of *Tephrosia* (*candida* and *purpurea*) have been tried during the year, both of which are very much alike in habit. The plant grows about 15 to 30 inches high. It has the advantage over *crotalaria* in that it is dwarfer in habit and therefore better adapted for planting in young clearings.

TEPHROSIA CANDIDA.—A small supply of seed of this plant was received and sown in September. The seeds germinated well and were up in a week, the plant grew quickly to a height of about 15 inches, after which upward growth was slow and the side growths began to develop. The ground was well covered about two months after sow-

ing. At the end of the year the plants showed no signs of seeding.

TEPHROSIA PURPUREA.—The remarks referring to *Tephrosia candida* may also be said to apply to this plant in every detail. The only difference noticeable so far, is that within three months of sowing the plants of this species flowered and carried a fair crop of seed.

In this way the former plant possesses an advantage over the latter, as the longer the fruiting season of green manure or cover plant is delayed, the better suited is the plant for its purpose.

PASSIFLORA FETIDA.—Several experiments with this plant, which has the reputation of being able to kill out lalang, have been commenced during the year.

In Batu Tiga a field of old lalang was taken up and rentices six feet wide were cut through, changkollod, and planted with passiflora, six feet of lalang was left between each rentice. It is hoped that the passiflora will be able to eventually smother down the lalang. Records of progress in this direction are being kept.

Early in the year a plot of one acre of hilly lalang land was changkollod over and planted with passiflora about two feet apart every way, the plants all struck and appeared quite healthy, but subsequent growth was very slow, and the result, on the whole, disappointing; at the end of the nine months the ground was not nearly covered. Another acre was tried on clean hilly land with a view of testing its suitability for preventing weeds and stopping wash in rainy weather. In this case also the plants made poor progress.

My experience of this plant is that on lowlying land, continually moist, it make rapid progress, but that in places where the ground is at all hard and it is subjected to occasional period of drought, its growth is so slow that it is not worth while planting it, especially when subjects like crotalaria or tephrosia (the latter for preference) are available.

Plots of various peas, bought from Tamil kedais, were also tried for green manure purposes, but results were not satisfactory, chiefly owing to the seed being too old and having lost its germinating power.

ABRUS PRECATORIUS.—Still another cover plant which has been under observation during the year is *Abrus precatorius* (crabs-eye), a leguminous plant of prostrate or climbing habit, the plant lies close to the ground when there is no support, but quickly climbs over any support it comes in contact with. In structure the leaves somewhat re-

semble mimosa and are of a light green colour. The plant sembles possesses an advantage over mimosa in that it is devoid of thorns and therefore makes it quite easy for coolies to go amongst it, up to the present we have only had a small nursery plot of this plant; it, however, seeds freely and a large area will be put out as seeds ripen.

The only disadvantage with this plant (that a serious one) noted up to date is that as soon as it comes in contact with the stem of a plant it quickly climbs, and if not watched would soon smother out plants growing amongst it.

WEEDING EXPERIMENT, BATU TIGA.—Four 1-acre blocks planted with Para rubber—*i.e.*, seedlings two months old from nursery—were treated as follows to show the difference between clean weeding, the use of cover plants and not weeding:

- Plot A. Planted with mimosa and not weeded after the mimosa had got established;
 „ B. Clean weeded;
 „ C. A circle three feet round each plant is weeded, rest of field unweeded;
 „ D. Not weeded.

The results were:

	Average height.		Average girth.	No. of failures.
	ft.	ins.		
A.	13	4 $\frac{3}{4}$	5	35
B.	19	4 $\frac{3}{4}$	6 $\frac{3}{4}$	3
C.	16	10 $\frac{3}{4}$	4	34
D.	14	9 $\frac{1}{4}$	4	26

NOTES ON ABOVE.—It will be noticed that the clean weeded plots shows the best results.

The mimosa plot would show much better results were it more even, many of the trees have attained a height of over 20 feet, two each 24 feet and one 25 feet high. Most of the failures in this plot are, I consider, due to the plants being smothered by the mimosa.

ERADICATION OF LALANG (*Imperata arundinacea*).—Early in the year a series of experiments was initiated for the eradication of lalang by spraying and by mechanical means, in each case the plots treated were one acre.

The working plan was as follows:

- Plot A. Control;
 „ B. Sprayed $\frac{1}{10}$ solution arsenite of soda;
 „ C. „ $\frac{1}{20}$ „ „
 „ D. Ground changkollod over;
 „ E. „ and planted with passiflora;

- Plot F. Sprayed $\frac{1}{10}$ solution arsenite of soda;
 " G. Treated $\frac{1}{10}$ solution arsenite of soda applied
 through carpet machine;
 " H. Changkollod and roots picked.

NOTES ON ABOVE.—Plots B and F were treated alike, they were sprayed on ten occasions and burnt over twice.

The effect of two sprayings was spoiled by rain coming on soon after the spraying was finished. The lalang appears to have weakened in growth considerably, but looks as if it would still take some time to kill out, and if left alone for a short time would again grow vigorously.

Plot C shows very little difference from B and F, but is if anything less affected by the treatment, it has been noted that if a shower of rain happens to come after spraying, the mixture has much less effect than in the case of those sprayed with the stronger solution.

Plot D.—In this plot the ground was changkollod over on three occasions, in March, April and May, at a cost of \$33.90 per acre, coolies being paid 35 cents per day. After three turnings the ground was practically clear of lalang and with ordinary weeding could have been kept clean.

The ground was wet from July to December without any attention whatever, it was then turned over once more at a cost of \$9.80 per acre, the lalang even then was well in hand.

This appears to me to be the best and most practical means of eradicating this pestilent weed, not only are the weeds disturbed, but, in addition, the ground receives the benefit of cultivation. The cost would probably be very considerably cheapened if large areas were treated and plough and harrow used in place of the ordinary changkol.

Plot E.—The ground was changkollod over once, at a cost of \$16.75 per acre, and then planted with the wild passion flower (*Passiflora fœtida*), the ground being high and somewhat dry at times; the growth of the passion flower was extremely slow and cannot be considered at all a success.

Plot F, see Plot B.

Plot G.—This plot was treated with one-tenth solution of arsenite of soda, applied as follows:

A box containing the solution, mounted on wheels, and a blanket saturated with the solution, with one end in the box, was dragged slowly over the grass in both directions. The device when tried on level ground acts very well and results in a considerable saving of solution. But for prac-

ticable purposes it has proved a failure and has been abandoned.

Plot H.—This plot was changkollod over and the lalang roots picked up. The cost per acre, \$61.10, would probably be prohibitive. The work done was good, a few pieces came up and were removed after the first month (cost 35 cents, included in above), and for six months no lalang appeared. The difference in cost, however, between clean picking and changkolling or ploughing over, should most certainly commend the latter as the most economical and practical means of eradicating lalang known at present.

BATU TIGA.—The Batu Tiga plantation has been maintained in good order throughout the year. No further extensions have been made, but the part already opened has been kept in order. Some vacant spaces were planted with Para rubber, and all available ground has been used for green manure experiments, chiefly with mimosa pudica and passiflora. Details of these experiments will be found under their respective headings.

J. W. CAMPBELL,

*Superintendent Experimental Plantations,
Selangor, F. M. S.*

AGRI-HORTICULTURAL SHOW 1909.

HIS EXCELLENCY THE GOVERNOR SIR JOHN ANDERSON, G.C.M.G.
OPTIMISTIC ON RUBBER IN THE F. M. S.

Important speech at Penang.

The Ceremonial opening of the 6th annual Agricultural-Horticultural Show took place at Penang on August 12. His Excellency the Governor in his opening speech made some very important remarks on the Rubber industry. The Resident Councillor, Penang, (Mr. Bland) said:—

MR. BLAND'S INTRODUCTION.

I have the honour to ask your Excellency to perform the opening ceremony. This is the sixth of the annual series of shows for British Malaya and the second held in Penang. The shows were inaugurated under the patronage of your Excellency in 1904, and I may say that Penang is not less ready to welcome your Excellency on this occasion, than in the year 1905. It is not in the nature of events

probably that you will open another show in Penang, and I am confident that your name will be greatfully remembered, in connection with each show you have opened here, as that of the promoter of a permanent and valuable institution. There can be no doubt as to the value of these shows. The use of them may not be immediately apparent to all of us, but there is no doubt that their tendency is a most useful one. The conditions vary a little—for instance the fruit season has come and gone before the date fixed for the opening of the present exhibition, and some of the native industries are better represented than others because the site of the show this year is more convenient for those exhibitors. I ask your Excellency to declare the show open.

SPEECH BY HIS EXCELLENCY.

The Governor said:—Mr. Bland has referred to me a great show-opener and has prophesied that I should not have the opportunity of opening another show in Penang, and I ought therefore to make the most of the present occasion. As Mr. Bland said, it is four years since I opened the last show in this place, and certainly the intervening four years have taught the committee in charge of the arrangements a lesson which they have been very apt to learn. Going round this morning, it was impossible to avoid comparing this show with that held here four years ago, and in every respect I am sure you will say, when you go round the various buildings, that this present exhibition shows a distinct improvement not only in the arrangements made for the convenience of visitors, but also in the variety and character of the exhibits. These arrangements reflect the greatest credit on the committee, but I am sure the committee will all agree that the greatest part of the credit is due to their indefatigable secretary, Mr. Fox. Mr. Fox has furnished me with some figures which will enable you to understand the advance which this show exhibits on that of 1905.

A FEW FIGURES.

The area covered by the buildings this year is 75,000 square feet, as compared with 45,000 square feet in 1905. That shows, as I think the calculating boy would work it out, an increase of 75 per cent. The cost of the building works out at \$4,000 as compared with \$3,460, so that you get 75 per cent. more building for 25 per cent. less money. This is distinct progress, especially when money is so scarce, but I think it reflects the greatest credit on those

who framed the estimates and supervised the contractors. Then again in 1905, there were 1500 exhibits and this year they are 1874, which is an increase of 25 per cent. The only sad feature is that in 1905 the public subscriptions were \$5,000, and this year they are only \$5,600, an increase of nearly 12 per cent., and no doubt if there is a deficit the guarantors will come forward and wipe it out.

TIMES OF BOOM.

The circumstances that we meet under to-day are very similar to those under which we met four years ago. Then, as now, we were in the middle of a great boom, and the subject of both booms is rubber. At that time, I daresay some of you remember, I uttered a word to warning on the subject of booms, and especially in connection with company promotions. I am astonished, and not a little alarmed, that what I had said then had actually been remembered, because I found that a very witty personal friend of mine was talking of the subject in another place, and there he quoted an extract from my speech. It was very gratifying—if somewhat alarming—to find that what I said four years ago was remembered by some one. The present time is one of boom, and this boom seems to be very more acute than it was last time, and you find not only the price of rubber extremely high, but the prices of rubber shares very high. It seems to me there is very great danger in that aspect of the industry, if you look at it—as those representing the Government of the country must look at it—from the point of view of the country and the industry. There is danger, with a commodity which fluctuates so rapidly and to such wide extremes, as well as the shares in companies which produce that commodity—there is serious danger that such an industry will cease to be regarded as a permanent investment, and may become merely a speculative counter. I think there can be nothing more deplorable, in the interest of the country, than that this should come to be so with rubber. If shares in rubber companies become like shares in gold mines, fluctuating, instead of being able to rely upon the permanent investor, who is content with a small return, and who after all ought to be the backbone of your capital supply, and if you have to rely upon this speculator, you will find that you will have to pay a great deal more for your money, and in times of difficulty you will not be able to get it at all. That is a condition of things which those who wish well of the country, and especially of the rubber industry, cannot view without some misgiving.

ANOTHER DANGER.

There is another danger of the boom in prices, and that is perhaps aggravated by the climate in which we have to live. It is this—that men who find money coming in so easily may be in danger of getting a little slack, and less careful in their husbandry. If there is one industry more than another which calls for continuous hard work, observation and application, and the best intelligence that men can bring to bear upon it, it is the planting industry. A man finds that the returns from his trees are so good that if a tree drops out from some cause here or there he says to himself that he will not bother about it—he is getting eight shillings a pound, he has thousands more trees and what does it matter? The difficulty is that the one tree may matter a great deal. The destruction of that one may reveal, after careful observation, the causes at work that would bring about the death of many more trees. The Government has provided experts, but after all these gentlemen are limited in their observations, because they are not able to observe details of soils, situations, rainfalls, and many other conditions which affect agricultural products.

GRAVE PERIL.

If all this work is to be left to the Government's scientific observers, I am afraid that the future of the industry is really in grave peril, because the essence of the industry is that it starts with a most violent interference with the ordinary course of nature. It is the essence of the industry that those engaged in it should be constantly watchful of the health of the plants from which they expect to get their returns. The opportunities which the Government observers have are limited in every direction, and unless those who are in contact with the production throughout the whole country are on the watch, and ready to call attention to anything unusual, I am afraid that the little the Government observers can do will not be of very much avail. I think that not only should we expect, but we have right to expect, that planters should themselves constantly observe what is going on in their plantations. I think it is in the interest of those on the other side, who are deriving handsome incomes from the produce, that they should devote some part of these large dividends to safeguarding the future of the industry.

A USE FOR DIVIDENDS.

If you consider what is necessary, I think you will see that what you require, at any rate in every large district, is a really independent scientific observer who can cooperate with those employed by Government; and I cannot conceive any better reserve fund, in which part of the large dividends now being derived from rubber can be invested, than in providing additional rubber experts under the direction of the Planters' Association (hear hear). I believe that no better permanent reserve fund can be formed, because after all in the most ordinary way rubber every year is taking something from the soil. What are you doing to replace that something?

SCIENTIFIC STUDY.

Of course, in nature something is being taken from the soil by rubber in such places, as the virgin forests of the Amazon, but by means of the white ant that constituent is being restored to the soil which has been depleted by the rubber. Here you look after your labour and your weeding, but the fact remains that you cannot go on taking certain constituents from the soil. You at last come to the time when your rubber, as with the gold streaks in quartz, begins to pinch out. This is another argument in favour of the scientific study of the industry by the Government and by those who are more immediately interested in the matter. I am afraid that I have talked to you a long time, but I think it is necessary at a time when everything is looking very promising, and people are inclined to be optimists.

OPTIMISM.

I myself am an optimist in regard to rubber and a great many other things, and that optimism is founded on a firm belief in the intelligence and resources of my countrymen. I think it is the only thing which justifies the optimism because there is no doubt there are a great many dangers surrounding the agricultural industry of this country—dangers that are far more numerous than any of us have any idea of—but I feel assured that my countrymen will face that condition of things with the spirit and the courage that characterises them on such occasions, and that they will strive to make agriculture a permanent source of employment and riches to this country and the community.



POINTS OF INTEREST.

There are many other things which I should like to talk about in connection with this show. I have been specially interested in seeing the exhibit of the entomological department of the Federated Malay States Government and I hope that those of you who are practical men will not only look at it, and read the fascinating pamphlets which are obtainable, but that you will make use of the instruction given. There are other things in the show which point to the fact that we can, if we wish, have more than one string to our bow. There is a magnificent exhibit of coconuts and essential oils, for all of which a large market might be found were it not for the fact that rubber pays so much better; and there is a very interesting new exhibit of fibre, which I am sure may yet come to be of some importance to us. There are other things I cannot mention, but I am sure you are all very hot and uncomfortable. I thank you for the patience with which you have listened to me, and have great pleasure in declaring the show open (applause).

Reprinted from "Straits Times," Singapore, August 12, 1909.

THE PALMETUM

Botanic Gardens, Singapore.

PLATE IV.

The collection of Palms growing in the Botanic Gardens, Singapore, is one of the most complete in existence. Probably the only other more rich in species is that of the Buitenzorg Botanic Gardens Java. The Singapore collection now contains upward of 95 genus and 270 species and these numbers are increasing yearly. Unfortunately the soil on which the Palmetum is formed is very poor and considerable care and expense is entailed in keeping the collection in a healthy condition.

Our illustration (Plate IV) is a view of a section of the Palmetum near the Herbarium and gives a fair idea of the decorative effect of this most useful family of plants. The chief charm of all tropical gardens is due to the grandeur and beauty of many of the plants of this order. Palms under glass, however spacious the accommodation allowed them, fail to impress the mind as do the same subjects planted out of doors in tropical climates.

The uses of Palm-trees and of their products, to natives of tropical lands, are far beyond what it is possible for residents in temperate regions to conceive and I know of no other family of plant that has so many useful qualities to recommend it to the Economist and lover of plants alike. (For articles on the uses of Palms see our *Bulletin* No. 7 Vol. III, 1904).

T. W. MAIN.

**JOHN HADDON & CO. SPECIAL
PRODUCE LETTER.**

London, 9th July, 1909.

STRAITS REPORT.

- ALOES** Generally the market has been steady with a fair business passing, the better qualities selling at 85/-to 90/-per cwt, and common to good from 27/-to 65/-per cwt.
- BEESWAX** Supplies of ordinary to good yellow Wax have met with good competition, and full prices paid; value £6 to £7 per cwt according to quality.
- CAPSICUMS** Fine Beans have been scarce. Arrivals will sell well; value 50/-to 75/-per cwt. Common to good common value 25/-to 40/- per cwt.
- CHILLIES** Market quiet. Zanzibars and Mombassa's continue to sell at high prices, but other descriptions move off slowly.
- COPRA** A large business has been done, all descriptions marking an advance of 30/-to £2 per ton since our last report. The demand is more from speculators, hence, so rapid an advance is rather a surprise, but the position appears to be strong, but it seems to be favourable opportunity for Sellers.
- GUM BENJAMIN** The demand has continued quiet-holders have had to give way.
In recent sales Sumatra, good fair to good seconds sold at £6.7.6. to £7.10. good thirds 70/-to 73/-per cwt. Siam, pea size, part blocky, £9; block, dust 97/6 per cwt. Privately ordinary to fair Palembang in tins selling at 42/-to 45/-per cwt.
- GUM COPAL** There is practically no demand, market extremely flat. In the Sales barely 10 % of the offerings found buyers. Sambas, pale scraped selling at 70/-. Macassar, scraped, small pale and amber weak 29/6d. Nuts, palish pipey 26/-to 28/-. Chips, pale clean 23/6d to 24/-. Small. specky and dusty at 20/-, dark, blocky sorts 17/-per cwt,

- GUM DAMAR Also lower. Penang sorts pea size sold at 27/- to 27/6d, dust 22/6d, amber pickings 30 -, hard block 18/6 to 21/- per cwt.
- GAMBOGE Market slow. Siam-Pipe, fair mixed dark sold at £14.5.0., pickings at £9.7.6. per cwt.
- INDIA RUBBER The past month has marked a material advance in Plantation Para. Some Estates have taken the opportunity of selling their output during 1910 and 1911. Medium grades have been in fair demand, but have not appreciated to any marked degree.
In Sales Lanadron, block sold at 6/10d per lb. Crepe, pale 6/4½d, to 6 9½d, palish 6/2d to 6/8d, mottled 5/7d to 6/6d, brown 5/3d to 5/6¾d. Biscuits and Sheets 6/2¾d to 6/7d, Smoked sheet 6/10d to 7/-. Scrap 4/10d to 5/3½d per lb.
- ISINGLASS There has been a slow demand. Saigón, long leaf, fair to good stout pale selling at 5/2d to 5/10d. Tails, fair pale 1/6d. Purse, fair stout but wormy 1/-. Penang, round leaf, fair pale 4/-, middling 3/6d, part thin and rough 2/3d to 3/1d, pickings 1/3d to 2/-, Tongue, fair pale 4/1d to 4/2d, pale and reddish 3/5d to 3/10d, small ditto 3/1d, pickings, low 6d, long, fair pale 2/10d, floats, fair 1/7d. Purse, small dark to fair pale 6½d to 1/1d per lb.
- MACE Unchanged. Pale reddish to fine 1/11d to 2/4d, ordinary to fair 1/8d to 1/10d. Java, ordinary to good pale 1/7d to 2/10d per lb.
- NUTMEGS Quiet. 43 cases of Penang offered and partly sold, fair gargled 110's selling at 4½d to 4¾d per lb.
- PEPPER BLACK: Market has ruled firm. Speculators have advanced prices to 3½d for Jan/March, 3 1/8d for Oct/Dec. and 3 5/8d for Sept/Nov, but recently with such support withdrawn prices have fallen back fully 1/8d.
White Singapore: In sympathy also improved, and for near positions 4 1/8d to 5d was paid, July/Aug. 3 5/8d to 4 1/8d, and Aug/Oct. 16 4 5/8d to 4 7/8d, but is now cheaper.
Near 4 1/8d and Aug/Oct 4 5/8d per lb.
- SAGO Very little business has been done. In sales the offerings have had to be put back. The value of fair small on the spot is 11/6d per cwt., medium 14/- to 15/-, and large 15/- to 16/- per cwt.
FLOUR--Market very quiet. On the spot a good pinky to white, value 8/9d to 10/- per cwt.
- SHELL M.O.P. 24 packages of Macassar sold well.
Country assorted, A, medium shells, part thin, many yellow £7.2.6. ; B, medium, part stout, part slight grubby, many yellow £8.15. ; C, heavy bold shells, part grub-

by, many yellow £9.17.6. ; D, pickings, part fair bold, many yellow £7.12.6. ; E, pickings badly grubby, part inferior £6.5.0.

Green Snail :—420 packages offered and 310 sold rather dearer, Mergui and Penang, bold, good color 41/- to 52/6d ; medium 41/- to 47/- ; small 25/- to 30/6d ; grubby pickins 21/- to 31/-. Macassar, bold 30/- to 34/-.

TAPIOCA

Business has been very quiet and difficult, the tendency of prices in buyers favour.

Business in fair Flake from $\frac{1}{3}\frac{3}{4}$ to 1 $\frac{3}{4}$ d, medium Pearl fair Singapore at 12/6d to 12/.

Penang, Seeds at 11/3d to 10/7 $\frac{1}{2}$ per cwt.

VANILLOES

369 tins were offered and sold at good prices ; fine quality at 1/6d to 2/- advance, medium ditto and brown foxy and split ends 1/- to 1/6d dearer.

Mauritius—123 tins offered and sold. Fair to good, 8 to 9 inch at 16/-, 8 to 8 $\frac{1}{2}$ inch at 15/-, 7 $\frac{1}{2}$ to 8 inch at 12/- to 13/-, 7 to 7 $\frac{1}{2}$ inch at 11/6d to 12/6d, 6 $\frac{1}{2}$ to 7 inch at 13/-, 7 to 7 $\frac{1}{2}$ inch at 11/6d to 12/6d, 6 $\frac{1}{2}$ to 7 inch at 9/9d to 11/6d, 4 $\frac{1}{2}$ to 6 $\frac{1}{2}$ inch at 8/3d to 11/-.

Fine splits 8/6 to 9/9d, common 7/9d to 10/6d.

Seychelles:— Of 182 tins about 135 sold. Fair to good 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ inch at 13/6d, 7 to 8 inch at 11/- to 13/-, 3 to 7 $\frac{1}{2}$ inch at 8/3d to 11/-, common 7/3d to 8/6d.

Madagascar:— 34 tins offered and sold. Fair to good 6 $\frac{1}{2}$ to 7 $\frac{1}{2}$ inch at 10/9d, 6 $\frac{1}{2}$ to 7 inch at 9/9d to 10/6d, 5 to 6 inch at 9/- to 9/6d, common 8/3d to 8/6d.

Mexican :—1 tin sold. Good 7 to 8 inch at 16/6d.

Australian :— 6 tins sold. Fair to good 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ inch at 9/6d, 6 to 7 $\frac{1}{2}$ inch at 8/6d, common 8/3d.

Bourbon :— 4 tins sold, 4 $\frac{1}{2}$ to 5 $\frac{1}{2}$ inch at 8/3d.

Zanzibar :— 8 tins sold. Common 4 $\frac{1}{2}$ to 7 inch at 7/9d to 8/3d.

Java :— 7 tins sold. Common 5 to 7 inch at 8/3d.

Ceylon :— 2 tins sold. Common at 7/-.

Penang.

Abstract of Meteorological Readings in the Prison Observatory for the month of July, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	F°	F°	F°	F°	F°	F°	F°	F°	F°		Ins.	Ins.
Prison Observatory.	29.915	142.2	81.1	90.0	74.7	15.3	77.8	.910	75.6	85	S.	6.86	1.41

PRISON OBSERVATORY, PENANG.

10th August, 1909.

A. H. KEUN.

Medical Officer.

10/23

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of July, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, K. Lumpor	29.862	142.9	81.3	89.3	70.4	18.9	76.1	.804	73.1	75	S.W.	3.67	1.48
Pudoh Gaol „	3.84	1.91
District Hospital „	2.75	2.00
„ Klang	1.59	0.46
„ Kuala Langat	89.8	73.5	16.3	..	..	..	..	..	4.74	1.45
„ Kajang	2.72	0.95
„ Kuala Selangor	88.1	75.3	12.8	..	..	..	..	..	5.56	1.65
„ Kuala Kubu	91.1	69.2	21.9	..	..	..	..	..	5.52	1.20
„ Serendah	93.0	70.5	22.5	..	..	..	..	..	2.82	1.21
„ Rawang	90.8	70.1	20.7	..	..	..	..	..	5.74	3.40
Sabak Bernam	1.80	1.10

OFFICE OF SENIOR MEDICAL OFFICER,
Kuala Lumpur, 23rd August, 1909.

G. D. FREER,
Senior Medical Officer Selangor.

Perak.

Abstract of Meteorological Readings in Perak for the month of July, 1909.

461

DISTRICT	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taipeng	...	156	83.17	94	69	25	77.27	860	...	75	...	2.64	1.00
Kuala Kangsar	81.04	94	70	24	75.98	828	...	78	...	3.17	.70
Batu Gajah	...	155	80.94	96	70	26	75.80	825	...	78	...	1.26	.70
Gopeng	80.84	92	61	31	74.73	780	...	73	...	2.30	.95
Ipoh	81.67	94	69	25	75.75	812	...	74	...	2.44	1.89
Kampar	81.10	93	68	25	76.18	840	...	78	...	4.06	2.55
Teluk Anson	81.35	93	69	24	76.76	861	...	80	...	2.72	1.04
Tapah	81.62	92	62	30	76.11	828	...	77	...	6.83	1.76
Parit Buntar	82.43	92	70	22	77.35	874	...	79	...	4.34	1.45
Bagan Serai	82.07	91	70	21	77.27	874	...	80	...	3.82	1.07
Selama	82.19	93	71	22	76.78	851	...	77	...	3.85	1.06

STATE SURGEON'S OFFICE,

Taipeng, 12th August, 1909.

M. J. WRIGHT,

State Surgeon, Perak.

12/27

The Duff Development Company, Limited. Kelantan.

Abstract of Meteorological Readings in Kelantan for the month of July, 1909.

462

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lebir	Mean 90.1	Mean 72.3	Mean 17.8	...	...	...	...	..	1.98	.80
Kuala Kelantan	83.77	73.64	10.13	...	...	...	...	...	3.08	1.25
Kuala Pergau	89.0	72.0	17.0	...	...	...	...	...	5.01	1.30
Taku Plantation	3.73	.92

SURGEON'S OFFICE,

August, 6th, 1909.

A. G. H. SMART.

Surgeon.

The Duff Development Company Limited, Kelantan.

Abstract of Meteorological Readings in Kelantan for the month of July, 1909.

463

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours	
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.				
				Mean	Mean	Mean								
Kuala Lebir	88.76	73.53	15.23	...	...	...	...	...	7.28	2.43	
Kuala Kelantan	83.33	73.16	10.76	...	...	...	...	...	4.36	.91	
Kuala Pergau	4.58	1.46	
Taku Plantation	5.88	2.04	

SURGEON'S OFFICE,
July, 10th, 1909.

A. G. H. SMART,
Surgeon.

10/238

Negri Sembilan.

Abstract of Meteorological Readings in Negri Sembilan for the month of July, 1909.

464

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Seremban Hospital		137.6	80.6	87.4	69.8	17.4	77.4	.869	75.4	84.4	N.W.	4.83	2.05
Mantin "												3.64	2.36
Tampin "												1.66	.35
Kuala Pilah "												2.46	1.63
Jelebu "												3.19	2.50
Port Dickson Town Hospital												4.13	2.62
Port Dickson Beri-Beri Hospital												4.27	2.25

STATE SURGEON'S OFFICE,

11th, August, 1909.

S. LUCY,

Medical Officer, in Charge.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of June, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Mean Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis	79	93	67	17.6	78	...	...	...	...	6.46	2.33
Raub	77	95	69	18.2	74	...	...	...	...	9.26	4.00
Bukit Fraser	8.00	1.54
Bentong	79	91	69	18.9	76	...	...	...	...	9.16	3.28
Temerloh	90	72	19.9	...	...	...	...	...	3.01	1.20
Pekan	82	91	70	14.8	78	...	...	...	...	6.28	2.60
Kuantan	84	92	68	18.2	77	...	...	...	...	4.12	1.65
Sungei Lembing	83	69	...	...	...	...	...	...	10.90	3.75

OFFICE OF THE SENIOR MEDICAL OFFICER, PAHANG.

S. C. G. Fox.

Kuala Lipis, 10th August, 1909.

Senior Medical Officer, Pahang.

Seremban.

Table Showing the Daily Results of the Reading of Meteorological Observation taken at the General Hospital, Seremban, for the month of July, 1909.

DATE.	TEMPERATURE OF RADIATION.						TEMPT. OF RADIATION.		WIND. DIRECTION.		TEMPT. OF EVAPORATION.			COMPUTED VAPOUR TENSION.			RELATIVE HUMIDITY.			CLOUDS 0 TO 10.			WEATHER INITIALS.			RAIN. Inch	
	9 H.	15 H.	Mean.	Maxi- mum.	Mini- mum.	Range.	Sun.	Differ- ence Sun & Shade.	9 H.	15 H.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	21 H.		
1	78	84	81	86	70	16	136	50	N W	N W	72.9	70.7	71.8	810	751	780	84	64	74	3	4	6	N	C	C	0.3	
2	74	80	77	80	70	10	110	30	N W	N W	72.3	71.6	71.9	793	775	784	94	75	84.5	10	10	5	N	N	C		2.05
3	76	82	79	80	68	12	136	56	N W	N W	72.6	7.53	73.9	801	877	893	88	80	84.5	3	4	3	S	S	S	1.05	
4	75	83	79	79	69	10	145	66	N W	N W	73.3	74.7	74	820	856	838	94	76	85	2	2	2	S	S	S		20
5	74	82	78	88	69	19	143	55	N W	N W	72.3	77	74.6	793	926	859	94	85	89	4	2	3	S	S	S	10	
6	78	83	80.5	90	70	20	135	45	N W	S W	71.6	76.7	74.1	810	956	883	84	85	84.5	3	2	2	S	S	S		10
7	80	85	82.5	90	70	20	142	52	N W	N W	71.6	76.4	75.8	775	904	860	94	72	83	2	2	5	S	S	S	10	
8	77	86	81.5	89	70	19	141	52	N W	N W	75.3	76.4	75.8	848	877	862	94	94	94	4	4	10	4	4	4		10
9	76	77	76.5	84	72	12	110	26	N W	S W	74.3	75.3	74.8	848	903	905	94	95	94.5	4	5	5	S	S	S	10	
10	76	80	78	85	70	15	135	51	N W	N W	74.3	78.3	76.3	848	903	903	89	90	89.5	3	2	3	S	S	S		10
11	77	82	79.5	89	70	19	145	56	N W	N W	73.6	78.7	76.1	829	978	889	89	76	82.5	2	2	4	0	0	0	10	
12	78	85	81.5	90	68	22	145	55	N W	N W	74.6	76.7	75.6	857	922	889	89	76	82.5	2	0	0	0	0	0		10
13	81	86	83.5	91	68	23	145	54	S W	N W	77.7	94.7	78.5	947	1,008	977	90	80	85	1	0	0	0	0	0	10	
14	79	86	82.5	91	70	21	141	50	N W	N E	73.9	77.3	75.6	839	955	892	85	76	80.5	0	0	0	0	0	0		10
15	79	84	81.5	88	69	20	138	49	N W	N W	72.3	77.4	74.8	793	938	865	80	80	80	0	0	0	0	0	0	10	
16	79	88	83.5	88	68	20	135	47	N W	S W	70.6	78.2	74.4	749	964	856	75	73	74	0	0	0	0	0	1		10
17	77	86	81.5	87	70	17	132	45	N W	S W	73.6	81.7	77.6	829	1,121	975	89	90	89.5	2	2	3	0	2	2	10	
18	77	89	83	92	69	23	150	58	N W	N W	71.9	80.8	76.3	783	1,054	918	84	77	80.5	2	6	10	S	S	S		10
19	76	88	82	89	69	20	135	46	N W	E	72.6	78.2	75.4	801	964	882	89	73	81	3	2	2	S	S	S	10	
20	79	80	79.5	89	73	16	135	46	N W	N W	73.9	78.3	76.1	839	968	903	85	95	90	2	4	3	S	S	S		10
21	78	86	82	89	72	17	140	51	S W	N W	74.6	81.7	77.6	857	1,121	989	89	90	89.5	6	4	2	S	S	S	10	
22	75	84	79.5	85	70	15	136	51	N W	N W	73.3	80.7	77	820	1,045	937	94	90	92	3	3	3	S	S	S		10
23	78	84	81	88	70	18	142	54	N W	N W	74.6	77.4	76	957	938	897	89	80	84.5	5	5	5	S	S	S	10	
24	78	86	82	89	70	19	140	51	N W	N W	74.6	79.4	77	859	932	89	80	84.5	4	6	5	4	5	4	S		10
25	77	84	80.5	88	70	18	135	47	N W	N W	75.3	77.4	76.3	877	938	907	94	80	87	2	10	5	S	S	S	10	
26	77	84	80.5	84	70	14	138	54	N W	N W	75.3	77.4	76.3	877	938	907	94	80	87	3	2	5	S	S	S		10
27	74	86	80	89	70	19	142	53	N W	N W	72.3	79.4	75.8	793	1,008	900	94	80	87	3	2	3	S	S	S	10	
28	75	84	79.5	89	72	17	140	51	S W	N W	72.3	77.4	76.3	820	938	879	94	80	87	10	8	10	S	S	S		10
29	78	84	81	87	72	15	136	49	N W	N W	74.6	75.7	75.1	857	883	872	89	76	82.5	6	2	7	S	S	S	10	
30	77	85	81	86	71	15	140	54	N W	N W	73.6	75.9	74.7	829	873	851	89	72	80.5	7	4	4	S	S	S		10
31	79	85	82	88	70	18	141	53	S W	N	73.9	73.4	73.6	839	820	832	85	68	79.5	2	4	4	S	S	S	10	
Mean	77.2	84.1	80.6	87.4	69.9	17.4	137.6	50.2	N W	N W	73.6	75.2	75.4	829	909	869	86.6	80.2	84.4								

Highest Temperature 92. Lowest Temperature 68. Greatest Rainfall in 24 hours' 2.05

J. LUCY,
Medical Officer in Charge.

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

No. 10.]

OCTOBER 1909.

[VOL. VIII

RUBBER CULTIVATION ON SO CALLED PEAT SOIL.

BY H. N. RIDLEY.

In many parts of the Malay Peninsula usually in the vicinity of large tidal rivers, we find a somewhat peculiar soil formation popularly known here as peat formation. It consists exclusively of dead timber roots and decayed leaves, to a depth sometimes of as much as twenty feet. Often no trace of clay, stone or other mineral matter is to be seen in it. The formation appears even if deep to be of comparatively modern date, geologically speaking. Before being cleared for planting it is seen to be covered with dense wet forests, in which grow a number of somewhat peculiar or local plants mixed with many trees which also occur on more ordinary soil. A characteristic tree is the Kempas, *Cumpassia malaccensis*, abundant too is the well known red stemmed palm, *Cyrtostachys lacca* and the ground is often covered with an abundance of Gingers (*Scitamineae*) and ground orchids. Walking through these woods one often sinks deeply into a mass of wet decaying leaves, over and through which lie the great roots of the big trees. Below this great mass of decaying vegetation is usually a greasy blue clay lying at various depths and apparently mainly old Mangrove mud and over which this forest has gradually grown. When felled and burnt this so-called peat after a period of exposure commences to shrink, the surface of the ground often soon falling a foot or more. The exposed

surface wood decays and forms at last a brown powdery soil, mixed with fragments of sticks etc. and reminding one of the surface of an old tan yard. The water which fills the drains and streams from this formation is dark brown, resembling the brown peaty water of a Scotch moor, but is by no means safe to drink though it has only a slight peaty flavour as it is apt to produce a violent diarrhoea and has been known to cause much sickness of this nature among the coolies working in such land.

We have not seen any analysis of either water or soil from such ground but it is probable that it contains an excess of humic acid and also of salts of magnesia, sodium and potash.

Not long ago I visited the fibre plantations of the Peneiro estate in Southern Johore, recently floated as a Company. Here *Sansevieria*, *Agave sisalana* and *Fourcroya gigantea* were being cultivated on a large scale for fibre making. I was much struck with the appearance of the sisal hemp, *Agave sisalana*. This plant long in cultivation in the Botanic Gardens in Singapore has never really made good growth, though being a desert plant, such as is scientifically called a *xerophyte*, it had been planted in the driest corners of the Gardens.

In this damp mass of decaying logs and branches, it was growing luxuriantly. The plants were strong and healthy, in fact quite handsome and throwing up suckers in every direction. The suckers growing wherever they happened to be thrown. *Fourcroya* and *Sansevieria*, which however are much easier plants to grow here were also doing well. One would not indeed have been prepared to find a xerophytic plant cultivated successfully in dry sandy places in the West Indian Islands thriving in a strongly peaty damp locality. On exactly similar ground I have seen Para rubber planted on a large scale. Now Para rubber is a typical *hygrophyte*, that is to say, a plant adapted for growth in the wettest regions of the tropics, the region known as the "*Tropical Rain-forest Region*."

For a short time the little rubber plants looked all right, but only for a very short time. The mortality was frightful. The dead ones were replaced in vain. The plants all looked sickly and died, some from attacks of *Fomes*, others perhaps from termites, some from unknown fungi. The dead plants were pulled up were remarkable for their long tap root and for the fact that all the roots descended vertically parallel to the tap root. As every planter knows the Para rubber is a high rooter throwing

its roots out horizontally over a large area. Here the roots were descending vertically as if seeking to reach the clay bed which underlay the peat at a considerable depth. Where the clay came near the surface the plants undoubtedly did better but a depth of 12 feet or even less of the vegetable debris was fatal to them.

It has been shown lately by experiment that a wet swamp of peaty soil, that is one with an excess of vegetable matter is not *hygrophytic* but *xerophytic* and that the plants naturally found there are specially adapted for drought, that is to say, a shortage of water.

The reason for this is that these peaty soils contain in their water an excess of humic acid. This acid has so deleterious an effect on the protoplasm of the plants not specially adapted for growth in such soils that the water which should be taken up by the roots is actually poisonous and cannot be used by them at all. In fact it has much the same effect as sea-water.

Nothing could be more unsuitable for the Hevea which requires a lot of water and requires it good. Plants in soil such as this become weak and very soon succumb to the attacks of fungus. They have no strength to resist any disease. In any case they could never make healthy trees even if there was no fungus about. In ground of this nature I have recently heard of a mortality of 100 per cent, and that the area planted has had to be entirely abandoned. In many parts of the Peninsula there are still left considerable areas of similar soil to this I have described, and planters would do well to avoid this ground entirely for rubber planting.

H. N. RIDLEY.

COTTON IN BARAM, SARAWAK.

Some samples of cotton grown at Baram in Sarawak were forwarded by the Resident of Baram with a request for report as to value. Part of this was sent to Professor Dunstan of the Imperial Institute, whose report is annexed.

Native cotton has not unfrequently been reported on from the Malay Peninsula and Islands. It was formerly cultivated as half wild in Muar. The samples have sometimes proved equal in quality to the Baram sample, that is to say while not of the very best quality, still a perfectly good saleable article. Could the Dyaks be induced to con-

tinue the cultivation and to collect and send the cotton for shipment say to Singapore a trade might be made in this product.

Imperial Institute, London, S. W.

12th July, 1909.

SIR,

I have the honour to enclose a report on a sample of cotton from Baram, Sarawak, which was forwarded for examination to the Imperial Institute by the Director of Botanic Gardens at Singapore with letter dated 22nd April 1909.

I have the honour to be

Sir,

Your obedient servant,

Sd. WYNDHAM R. DUNSTAN.

His Excellency the Governor,
Straits Settlements.

IMPERIAL INSTITUTE.

RESULTS OF THE EXAMINATION OF COTTON FROM BARAM, SARAWAK.

Imperial Institute No. 28983.

Date, 12th July 1909.

Reference.—Letter dated the 22nd April 1909 from the Director of the Botanic Gardens, Singapore.

Number of mark, and weight of sample:—"Cotton from Baram" $1\frac{3}{4}$ oz. Variety of Cotton. Not stated.

Description.—The sample consisted of clean, ginned cotton which was harsh, fairly lustrous and of deep cream colour, with a pale reddish tinge. Some slight brown stains were present in the cotton.

Strength.—Normal.

Length of fibres.—1.1 to 1.5 inch.

Diameter of fibres.—0.0006 to 0.0012 inch; average 0.00082 inch.

Microscopical characters.—A small proportion of immature fibres was present.

Commercial value.—6.50*d* per lb. with "good" rough Peruvian at 7.75*d* per lb. and "good" moderately rough Peruvian at 6.60*d* per lb.

Remarks.—The cotton was rough and similar in character to Peruvian cotton. It was of good quality and would be readily saleable in the United Kingdom.

PADI AND ITS RELATION TO BERI-BERI.

(KEW BULLETIN No. 6, P. 277.)

PADI.—In connection with an investigation which is being carried out, at the Institute for Medical Research, Kuala Lumpur, F. M. S., by Dr. F. Fraser on the subject of Beri-beri, twenty-one samples of rice, collected by Dr. Fraser, were brought to the Jodrell Laboratory early in the year for examination. In the following list particulars of the various samples are given. Sir Patrick Manson, K.C.M.G., F.R.S., at whose instance the examination of these samples was undertaken and to whom a copy of the report on the samples has been communicated, writes that he has been informed that since "cured" rice has been adopted as the only form of rice in use in Government Institutions in the Straits Settlements and Federated Malay States, Beri-beri has disappeared from them. Sir Patrick Manson considers that it is desirable to publish the results of the examination of these samples.

LIST OF SAMPLES OF RICE.

- I. Untreated padi.
- II. Padi after soaking 48 hours. Sent to laboratory wet.
- III. Padi after soaking 48 hours and steaming. Dried in sun.
- IV. Parboiled rice. Indian.
- V. Parboiled rice. Penang.
- VI. Parboiled rice. Asahan.
- VII. White rice. Siam No. i.
- VIII. White rice. Siam No. ii.
- IX. White rice. Rangoon.
- X. Malay rice. Usual Kampong variety.
- XI. Malay rice. "Bras "merah."
- XII. Malay rice. "Bras hitam."
- XIII. Malay rice. "Bras pulut."
- XIV. Padi before soaking—in gum solution.
- XV. Padi after soaking—in gum solution.
- XVI. Padi after soaking, steaming and drying—in gum solution.
- XVII. Parboiled rice. Indian—in gum solution.
- XVIII. Parboiled rice. Penang—in gum solution.
- XIX. White rice. Rangoon—in gum solution.
- XX. Malay rice—in gum solution.
- XXI. White rice. Siam—in gum solution.

A number of rice-grains from the samples left at the Jodrell Laboratory by Dr. H. Fraser, Institute for Medical

Research, Kuala Lumpur, F. M. S., have been examined, with the following results.

Untreated Padi, padi after soaking, and padi after soaking and steaming (Samples I-III, XIV-XVI) show no distinct difference in the amount or destruction of the oil. The aleurone layer contains a considerable amount of oil; in the rest of the endosperm there is very little. Small drops of oil were found here and there in the cells of the outer layers of the endosperm, but usually none deeper than 3-4 layers beneath the aleurone-layer.

In the rest of the samples the aleurone-layer (as well as the fruit-wall, etc.) has been removed to a varying extent, only small remnants of it being left in some of the samples. In some cases (*e.g.* VII) this appears to have been done by some mechanical process, while in others (*e.g.* XI and XII) the partial removal of the aleurone-layer has evidently been effected by mites or weevils (one or both). In No. IV two living weevils and numerous living mites were found, and in some of the other samples living or dead mites were abundant, as well as an accumulation of their excrement. The excrement was specially abundant in Nos. IV and XII, and it appears to contain practically no oil. It seems probable, therefore, that, when rice is stored for some time, a great part of the oil may be removed, in consequence of mites, etc., feeding on the aleurone-layer.

In some of the cases in which the aleurone-layer was fragmentary (X, XI) it was found that a few fungal hyphae were occasionally present in cells of the aleurone-layer, but these hyphae were not abundant, and were probably of no particular significance. In X, XI and XII, of such aleurone-cells as were present, many contained only a very little oil.

One per cent. osmic acid was used to show the distribution of the oil. Chlorophyll solution and alkanna solution were used for comparison, the staining being carried out rapidly to avoid dispersal of the oil by the spirit.

There appear to be four or more varieties of rice among the samples. This might account for different amounts of oil being found, even in samples with intact aleurone-layer

Two suggestions may be made as a result of the examination:—

- (1) Can parboiling be advantageous in killing any mites, etc., present?

- (2) It may be possible that the excrement of the mites contains poisonous compounds, which would be injurious, if the powdery excrement were cooked with the rice.

L. A. B.

THE CULTIVATED CROTALARIA.

The *Crotalaria* now so extensively cultivated as a green-soiling plant in the Malay Peninsula, under the name of *Crotalaria striata*, Dec., has a very different appearance from the common wild plant so common in Coconut estates and waste sandy places generally near the sea. It is altogether a much stouter plant and much more branched. The leaves are larger and deeper green, and the pods contain over forty seeds each instead of the usual twenty-five or thereabouts of our local plant. This cultivated form apparently keeps quite true, and the wild form the true *C. striata* does not under cultivation along side of it show any signs of turning into the cultivated form. What I have called the cultivated form was obtained from Ceylon, where the true slender *C. striata* grows also. In Trimen's flora of Ceylon, a variety from Kandy is described under the name of variety *acutifolia* with "Leaflets larger acute, pods larger with more numerous seeds." This fits the Ceylon plant as cultivated here except that the leaflets can be hardly said to be *acute*, but they seem to have a longer *mucro* or little spike at the end of the leaf, otherwise the description suits the plant. Its stouter and more robust habit and larger foliage make it a very much better plant for cultivation than is the wild plant. It seems too to be less liable to the attacks of the little pea-weevil which often destroys all the seeds in the pods of the wild plant, but of this one cannot yet be certain.

If not the exact form intended by Dr. Trimen under his var. *acutifolia*, it might be termed var. *robusta*.

It may be noticed by planters that the bark of the plant peels off very readily and is tough enough to make a good string, and this fibre is used for this purpose by some of the natives of India.

Ed.

AN AMERICAN VIEW OF AGRICULTURAL EXHIBITIONS.

Here and there we meet with people who hold the opinion that the Agri-Horticultural Shows, held so success-

fully in the Peninsula have done little good in proportion to the work and money expended on them. For such thinkers the following extract from the Philippine Agricultural review is here inserted as giving the opinions of representatives of the nation which has taken the lead in agricultural work above every other.

Speaking of the Kuala Kangsar show he says "The account of these fairs and exhibitions in the Federated Malay States. show how far in advance of us these countries are in Agricultural development and progress. Such exhibitions from the various parts of a province, state or island stimulate local pride in their agricultural progress and these in turn create a desire for better knowledge of agriculture as well as better business, and better means of communication which perhaps are the greatest needs for elevating the standard of living in the country in these islands and for encouraging the organisation of the people of the country into guilds, unions or granges for promoting the different lines of agricultural work in which they are interested. It is hoped that the bill recently introduced into the assembly providing for the holding of provincial industrial and agricultural exhibitions in these Islands (Philippines) or a bill that will meet with the present needs of the country will become a law and that it will meet with a hearty response and its provisions be immediately taken advantage of by the people of the provinces."

Thus it will be seen that the shrewd American has a high enough opinion of the value of these exhibitions to push forward a bill for following our example.

RUBBER AREAS AND PRODUCTION.

It would be interesting to know how a corespondent, writing to a contemporary, arrived at the conclusion that the output of rubber from the present planted area in the Middle East (which he gives with comparative accuracy at 520,000 acres) will aggregate 140,000 tons by 1914, writes the "Financier." If 14,000 tons are obtained in that year from the present planted area no one will have much cause to grumble, and there are those competent to express an opinion on this point who put the output five years hence at just about double that amount. By that time one of two things will have happened. Either the world's consumption of rubber will be enormously increased, and available supplies will be absorbed as they come forward or, through in-

creasing production in South America, Africa, and the Middle East, will have put supply considerably in excess of demand, with the inevitable result—a fall in the selling price of rubber.

Now, it is not the Middle East plantations which have anything serious to fear from a fall in rubber prices, but the wild producers. The latter cannot collect and ship rubber at anything near the Middle East estate costs, and we think our readers by this time appreciate the fact that, with rubber at 2s. 6d. per lb.—a price we do not think the present generation of investors is likely to be permanently established—the plantation companies could and would pay handsome dividends, while the profits of the average wild rubber collector would be practically nil. Meanwhile, however, supply is not likely to overtake demand for some time to come, and Plantation Rubber shareholders can sleep easily o' nights.—*Times of Malaya, Aug. 26, 1909.*

PLANTERS' ASSOCIATION OF MALAY

MINUTES OF A MEETING OF THE PLANTERS' ASSOCIATION
OF MALAYA.

*Held at the Turf Club Buildings, Penang, on August 16th,
1909, at 10-45 a.m.*

Present: For Malay Peninsula Agricultural Association: The Hon. John Turner, Mr. T. N. Symonds, Mr. J. Lamb, Mr. Thos. Boyd, Mr. Geo. Stothard; For Johore Planters' Association: Mr. R. Pears (per his proxy Mr. F. Pears), Mr. W. Gowler; For Perak Planters' Association: Mr. Alma Barker; For Negri Sembilan Planters' Association: Mr. C. M. Cumming, Mr. E. N. T. Cummis; For Kuala Langat District Planters' Association: Mr. C. E. S. Baxendale, Mr. E. Macfadyen; For Batu Tiga District Planters' Association: Mr. P. W. Parkinson, Mr. H. F. Browell; For Kapar District Planters' Association: Mr. C. T. Hamerton; For Klang District Planters' Association: Mr. John Gibson; For Kuala Lumpur District Planters' Association: Mr. E. B. Skinner, Mr. C. Burn-Murdoch, Mr. H. F. Dupuis, Mr. A. J. Fox, Mr. H. C. E. Zacharias; Visitors: Messrs. H. C. Rendle and A. B. Milne. Chairman: Mr. S. M. Cumming. Secretary: Mr. H. C. E. Zacharias.

"I. The Notice, convening the Meeting, having been read by the Secretary, the Chairman rises to address the Meeting as follows:

Gentlemen: Before proceeding to the business of the meeting for which we have met here to-day I suppose it is my duty to say a few words. I shall firstly refer to His Excellency the Governor's speech of yesterday which is probably being read all over the world to-day. We, the rubber planters of the Malay Peninsula, should feel very gratified at such a large proportion of the speech being devoted to rubber affairs. His Excellency has seen fit to speak a little pessimistically about rubber. What he wanted to say really was "Don't get swollen heads." Gentlemen, amongst the older members of the community I do not think this is likely to happen. Most of us have seen very bad times when we could barely scrape a living, and even the greatest prosperity cannot efface the old scars. In His Excellency's speech he talked to us about these awful pests which threaten the rubber industry, and laid it down that it was the duty of the planters to protect their interests by engaging mycologists, chemists, etc., and while I think the planters are fully alive to the fact that it is their duty to contribute, His Excellency seems to have lost sight of the fact that we in the F. M. S. pay an *ad valorem* duty of 2½% before our rubber leaves the ports, and it does not need a calculating boy to tell us that the revenue thus derived must shortly reach many millions of dollars. Therefore the Government of the F. M. S. to-day is one of the biggest investors in rubber. Naturally His Excellency cannot be so well up in planting matters as we are ourselves, and I should like to take him on a tour round the country to-day to show him what a very large amount of money is being expended by the planters in preventative measures to cope with the various pests which are a certainty in all agriculture. It would seem to me that it is the duty of the Government to found a proper agricultural department with a properly equipped staff, and from what I hear in my travels round the country the bulk of the planting community would be ready and willing to contribute towards the expenses. I would refer His Excellency to what is being done in other countries, especially Java and Sumatra. I cannot leave this subject without referring to the very excellent work done by two gentlemen, Messrs. Gallagher and Pratt, and I feel sure you will all be with me when I place on record a hearty vote of thanks to them for their efforts. But of course it is impossible for them to cope with the enormous amount of work involved.

Gentlemen, there is one more subject I must touch on to-day. That is the labour question which to us is of more

importance than any diseases can possibly be, for without a steady and reliable and permanent labour supply at a reasonable rate we should be unable to harvest our rubber or deal effectually with any outbreaks of disease that may occur. The question is such a very, very large one that it is impossible for me to deal with it more than in outline.

Briefly, for the last fifteen or twenty years (and incidentally I was chairman of the first informal meeting called by the few planters of Selangor in the year 1890) the planters have been trying spasmodically to get some sort of legislation whereby it would be possible for them to import labour without the mortification and loss which occurs in seeing such labour, imported, remember, with great trouble and difficulty, drift away to non-importers of labour such as miners, contractors, and other irresponsible persons. The outcome of this work of years has undoubtedly been the passing of the present Tamil Immigration Enactment—the composition of the Committee appointed by the Resident-General, to which I have the honour to belong. This Committee, with the best intentions, have framed certain rules and regulations, their policy being to “flood the country with labour.” To meet the expense of doing this, the Tamil-employing community is assessed at so much per head of working men. This works out roughly at about \$3 odd per acutal head of the Tamil labour employed. These funds are employed by the labour Community in various ways, chiefly in obtaining free tickets by the B. I. steamers for immigrants from India. By the first rules of the Committee it was allowable to recover sums of money advanced in India, speaking from memory Rs. 11 or Rs. 13 per head; this allowed the kangany to advance a fair sum in the villages to intending immigrants which was recoverable at this end, thus allowing the immigrant to leave his village with a quiet mind, knowing that his parents or wife and children would be provided for until such a time as he could remit from his earnings. Owing, I believe, to certain legal technicalities, it was found that no sums of money advanced in India would be recovered here, and, in vulgar parlance, the labour committee was in “the soup.” They watered the soup by substituting what is called a recruiting allowance by which *bona fide* importers of labour, such as many of us are, received from the Department the sum of \$3.50 per head, now increased to \$4.50 per head. Now, gentlemen, I believe that an immense amount of harm has been done by this action, apparently unavoidably, but I have pleasure in informing you to-day that the Chairman of the

Labour Committee has placed it on record that the policy of his Committee is to increase this allowance, as the funds permit, to such an amount as will enable the importer to bring over labour free of all cost beyond the assessment. Gentlemen, this is the position, and I believe if we work together and are enabled to give fair advances in India we shall be able to compete with any country in the world with regard to cheapness of work.

You must not be too hard on the Labour Committee. They have a big contract and are doing, as we are all doing to-day, feeling their way slowly and of course making some mistakes.

Before finishing I wish to say that what I have said does not emanate entirely from myself, but is the result of arguments, conversations, etc., in rambles round the country for six months, and I have only endeavoured to express the general planting opinion. With regard to the Perak Planters' Association, I think we shall all agree that the action of the P. P. A. is a wise one, and the suggestion of District Associations at Ipoh, Krian, Taiping, and Teluk Anson is also a wise one.

Gentlemen, we of the F. M. S. thank the Penang community for their hospitality, and the Show Committee for the very excellent Show. (Applause.)

II. The Minutes of the previous meeting are taken as read and confirmed.

III. INDIAN IMMIGRATION COMMITTEE. The Secretary reads the following letter:

23rd July, 1909.

The Federal Secretary, F. M. S.

Kuala Lumpur.

SIR,—With further reference to your letter No. 1397 of the 25th March, and my reply thereto of the 6th May, I have the honour to point out that this Association agrees with the Resident-General in his belief that the Indian Immigration Committee would never intentionally frame any rule opposed to the interests of the Planting Community.

With regard to the qualifications of the Planting Members, my Association agrees that these Members are amongst the leading and most experienced Planters in the Peninsula.

Differences of opinion were due to the fact that the Planting Members, of the Indian Immigration Committee

were unable to ascertain the views of the Planters' Association of Malaya in regard to impending legislation, not having themselves been given sufficient notice of any contemplated changes.

I have the honour to point out that it would be to the common interest that the Members of the Planters' Association of Malaya should have a preliminary opportunity of thoroughly discussing any changes, especially those of a financial nature.

I have the honour to inform you that at the last meeting of my Association held on the 11th instant, it was unanimously resolved that the following resolution be brought to your notice.

“That the High Commissioner direct the Chairman of the Immigration Committee that no proposal involving a financial change be submitted to the Immigration Committee without two months' notice of such intended change having first been given in writing to the Planting Members of the Committee.”

I have, etc.,

(Sgd.) H. C. E. ZACHARIAS,

Secretary.

IV. TRUCK ENACTMENT. The Secretary reads the following correspondence:

16th July, 1909.

The Secretary to Resident, Selangor,
Kuala Lumpur.

SIR,—I have the honour to inform you that I have been instructed to express to your Government the thanks of this Association for the careful consideration which your Government have given to the Memorandum of this Association on the Amended Truck Enactment and for the promise of support in the matter.

This Association however feels that in the event of circumstances arising to the detriment of the planting community, great loss might be sustained before any alteration of the Enactment could be made to safeguard their interests.

This Association would therefore ask your Government to consider the urgent necessity of making a further amendment to the Truck Enactment in order to fully safe-

guard the interests of the coolies and the Planting community.

I have, etc.,
(Sgd.) H. C. E. ZACHARIAS,
Secretary.

No. (20) in 949/09.

27th July, 1909.

SIR,—I am directed to acknowledge the receipt of your letter dated the 16th July 1909, on the subject of "The Truck Enactment, 1909," and to say that the Resident is not able to add anything further to the information contained in my letter of 8th June ultimo to Mr. E. B. Skinner, in which it was stated that the working of the enactment would be carefully watched, and that if it should be found to cause inconvenience or hardship the proposals of the Planters' Association would receive careful attention.

I have, etc.,
(Sgd.) S. W. McARTHUR,
*Ag. Secretary to Resident,
Selangor.*

To The Secretary,
The Planters' Association of Malaya,
Kuala Lumpur.

Mr. Cumming thinks it would be better to let the discussion of this subject stand over until their next meeting.

Mr. Skinner seconds this proposal, but is of opinion, that this Association should do their utmost to press this matter home.

Resolved to defer further discussion until the next Meeting.

V. MADURA COMPANY, LIMITED. The Secretary reads the following two letters:

Messrs. The Madura Co., Ltd.,
Negapatam.

16th July, 1909.

DEAR SIR,—The Chairman of the Indian Immigration Committee has communicated to me the correspondence passed between him and yourselves during March last on the subject of a suggested reduction in your charges, and I placed this matter accordingly before my Association at the Meeting held on the 11th instant.

I am now instructed to inform you that the Members of my Association are unanimously of opinion that such re-

duction is at present not called for, and I am at the same time to express to you our high appreciation of all the services that you have rendered to the Planting Industry of the Peninsula, ever since the commencement of your connection therewith.

Trusting the pleasant relations existing between our Planters and your goodselves will long continue.

Believe me, dear sirs,

Yours faithfully,

(Sgd.) H. C. E. ZACHARIAS.

16th July, 1909.

SIR,—I have the honour to acknowledge receipt of your letter of May 11th, in re Madura Co., Ltd., which letter was placed before this Association at its Meeting held on the 11th instant.

In reply I am instructed to inform you, that this Association is emphatically of the opinion, that no action regarding the suggested reduction in the existing rates is desirable. The Members of this Association are unanimous in their praise for the way in which the Madura Co., Ltd., have carried out their work and they believe that the remuneration of the said Company is no more than adequate.

I have, etc.,

(Sgd.) H. C. E. ZACHARIAS,

Secretary.

The Chairman,

Indian Immigration Committee,

Penang.

VI. PREVENTION PLANT DISEASES. Mr. Pears on behalf of Mr. Harrison formally moves the following proposition:

“That, in view of the possible danger to the Planting Industry owing to the unreported outbreaks of plant disease, Government be asked to place such power in the hands of the Officers of the Agricultural Department as will enable them to summarily deal with any such outbreak.”

He took it that all that was required, was legislation on the lines of the present Coconut Enactments. A good many planters took a lot of trouble to keep pests down, but others did not; and the latter should be made to. He

thought the proposition really quite uncontentious and recommended it to be passed unanimously by the Meeting.

Mr. Skinner seconds the motion.

Mr. Baxendale supports the proposition and mentions that, if a precedent was required, there are a good one in the Australian Colonies where obnoxious weeds such as Bathurst burr, etc., were legislated against.

Mr. J. Gibson thinks that in bringing up this question he believes Mr. Harrison had had in his mind the native holdings. There was of course a certain amount of disease on European Estates, but that had always been kept well in hand so far. The danger were the small holdings without supervision, that might act as regular breeding places of disease. These were the places that only Government could effectively deal with, and Government should be asked to do this; as for their own Estates, they were fully alive to the necessity of looking after their danger spots.

The resolution is then put to the vote and carried unanimously.

VII. Mr. Pears rises to propose an addition to the motion, just passed, as follows:

“That this Association advise its Constituent Associations to procure the services of a mycologist of their own.”

Mr. Pears considers that most planters were suffering from ignorance. Every one must be taught: managers, assistants, and even head coolies. A mycologist could show them what was wrong and teach them the symptoms of a disease. The only thing was to get immediate knowledge of a thing and stop it at once. By a small initial yearly expense the trouble could be nipped in the bud. After all, the expense of a mycologist was only about £1,000 per annum, which was a mere trifle, compared with the interest at stake. He spoke from experience, as they had had a mycologist of their own on Lanadron, and he would urge them all to follow their example.

Mr. Skinner seconds the motion.

Mr. Cumming agrees that the question was a very important one and involved a great number of interests. No one had had time to think it out except Mr. Pears. They had to consider the shareholders' interests. It was easy enough for the big companies, but it might fall hardly on the small planters. The Department of the Director of Agriculture was doing excellent service, but it was clearly understaffed. With regard to the District Associations, the amount of worry in getting even subscriptions paid was immense, and he did not know what it would be if the sub-

scriptions were enhanced. They might defer consideration of the matter, until they had time to further discuss the whole matter amongst themselves.

The Hon. J. Turner fully supports Mr. Pears' motion and suggests the appointment of a Standing Committee, to carry out the scheme.

Mr. Skinner then proposes, Mr. Parkinson seconds, and it is carried unanimously, that further discussion be deferred until the next Meeting.

VIII. RESEARCH CHEMIST. The Secretary reads out the following letter from the R. G. A.:

London, June 1909.

SIR,—I am instructed by the Malaya Committee of this Association to inform you that rubber producing companies and proprietors in this country possessing Estates in the Federated Malay States have been invited to co-operate in the expense of employing a Research Chemist to conduct experiments with regard to the curing of rubber, for the guidance of those subscribing to the scheme. After careful consideration the Committee have come to the conclusion that this appointment be entirely unconnected with the Government, so that the Chemist's services may be solely engaged for those employing him, and for a special purpose.

The annual cost of the experiment is estimated not to exceed £1,000 per annum, except at the outset, *i.e.*, the first year, when the cost of the establishment including laboratory must be met.

It is suggested that Estate proprietors (Companies and/or individuals) should guarantee to the expenses in equal proportions up to a maximum of £50 per annum. A smaller sum will, in all probability, be required, as soon as it is known how many Estates will join.

It is proposed that the guarantee should be entered into for a period of three years from June 30th, 1909. It is not, however, expected that even approximate finality will be obtained in that period, but the results obtained will probably enable guarantors to judge whether a continuance of their contribution is desirable.

The undernoted have already signed the guarantee form:

Tremelbye (Selangor) Rubber Co., Ltd.
 Batu Caves Rubber Co., Ltd.
 Bukit Rajah Rubber Co., Ltd.
 Federated (Selangor) Rubber Co., Ltd.
 North Hummock (Selangor) Rubber Co., Ltd.
 Seafield Rubber Co., Ltd.
 Highlands and Lowlands Para Rubber Co., Ltd.
 Golconda Malay Rubber Co., Ltd.

I am instructed to say that the Malaya Committee of this Association desire that Estate proprietors in the Federated Malay States should be informed of this movement, and to invite those who should so desire to co-operate in the expense of the scheme and in the advantages resulting therefrom.

I am to express the hope of the Committee that they may have the advantage of your kind offices in making this known, and to add that as soon as the arrangements have been made, all details will be fully notified to you.

I enclose herewith some *forms of guarantee* which are being signed in this country.

I am, etc.,

(Sgd.) C. TAYLOR,

[Enclosure].

Secretary

CURING OF RUBBER.

GUARANTEE FORM.

I/we, the undersigned, hereby undertake to guarantee the sum of Fifty pounds during the twelve months ending 30th June, 1910, Fifty pounds during the twelve months ending 30th June, 1911, and Fifty pounds during the twelve months ending 30th June, 1912 towards the cost of establishing a Research Station and Laboratory in the Federated Malay States and employing a Chemist to conduct experiments with regard to the curing of Rubber. This guarantee is subject to a pro rata call being made upon all guarantors to the fund, and to any call which may be necessary being authorised by the Malaya Committee of the Rubber Growers' Association, which call, however, must not in any

way exceed the amount of Fifty pounds during each of the three periods hereinbefore specified.

Signature.....

Address.....

Date.....1909.

£ : : :

To be returned to:

The Secretary,
RUBBER GROWERS' ASSOCIATION,
1, Oxford Court,
Cannon Street, E. C.

The Hon. John Turner thinks that this matter should be dealt with together with that of the mycologist.

Mr. Cumming thinks that this was another question about which they knew too little at present, and he proposed it should also be left over.

Mr. Skinner seconds this motion, which is carried.

IX. RUBBER DEALERS' LICENCES. Mr. J. Gibson, in the absence of Mr. A. B. Lake, proposes the following motion:

"That it be represented to the Resident-General that legislation for the purpose of licensing and controlling dealers in rubber and guttapercha is considered desirable by this Association."

The object of this was principally to protect themselves against native cultivators. The stealing of latex even from trees was actually taking place and the whole question was becoming more acute, as time went on.

Mr. Skinner seconds the motion.

The Secretary reads out the following correspondence, passed between the old United Planters' Association and the Government of the Federated Malay States on the same subject:

1st February, 1907.

The Federal Secretary, F. M. S.

Kuala Lumpur.

SIR,—I have the honour to inform you, that at the last Meeting of this Association held on the 26th ult. the following two resolutions were passed.

1. "That the Government be at once requested to license all dealers in or exporters of Rubber; that they be required to keep records of all their transactions and to register their source of supply and that no export in cases marked "sundries" be allowed without examination."

2. "That dealers in rubber plants and seeds be registered and compelled to produce, if called upon, certificate of origin."

I have, etc.,

For United Planters' Association,

(Sgd.) H. C. E. ZACHARIAS,

Secretary.

16th February, 1907.

No. 649/1907.

SIR,—I am directed to acknowledge the receipt of your letter of the first of February current, and to say that there is at present no legal power to take the action proposed by the resolutions of the United Planters' Association.

2. I am to point out that within the last three months the scope of the Praedial Produce Protection Enactment has been widened at the request of the Association. If Government is now to legislate for cured rubber it might be difficult to refuse to do so for any article liable to become the subject of theft.

3. Before the matter can be further considered, the Association should submit more precise details of the measures they wish to see adopted, together with some convincing proof of the need for so drastic a step on the part of the Government.

I have, etc.,

(Sgd.) A. R. VENNING,

Federal Secretary.

To The Secretary,
 United Planters' Association,
 Kuala Lumpur.

The Resident General,
 Federated Malay States,
 Kuala Lumpur.

9th February, 1907.

SIR,—I have the honour to bring to your notice the following cases of theft of rubber from factories near Klang, which have occurred within the last month.

January, 6th	Haron and Klang Lands Estates	100 lbs.
" 13th	Beaumont Estate	139 "
" 20th	Haron and Klang Lands Estates	634 "
February, 6th	Beverlac Estate	410 "

In addition to the above a small lot of about 70 lbs. was stolen from Shelford Estate during January.

So far the Police have not been able to discover any trace of the stolen rubber.

I would point out to you that the removal of from 400 to 600 lbs. of rubber at one time can only be done by several men and points to each of the robberies being thoroughly organised from a common centre. I would earnestly ask you to institute such preventive measures as may seem best to you to make such thefts impossible in the future, and would suggest Customs examination of all packages presented for export, and, for some time, a regular patrol of the river, as it is popularly supposed that the stolen rubber is taken down the river at night in Tongkans and taken over to Sumatra.

I have, etc.,

(Sgd.) R. W. HARRISON,
 Chairman, U. P. A.

23rd February, 1907.

No. 977/1907.

SIR,—In reply to your letter of the 9th February current, I am directed to say that the Police have been requested to give the subject their earnest attention, and to use their best efforts to prevent such robberies.

2. I am to add that the Resident-General considers that planters should adopt measures for the safeguarding of an article so valuable and so easily transported as rubber.

I have, etc.,

(Sgd.) A. R. VENNING,

Federal Secretary.

To The Chairman,

U. P. A.

Mr. Cumming agrees that the amount of rubber stealing going on was immense. Their own coolies were doing it. He did not blame so much the coolies, but the man they wanted to get at was the man who was inducing them to do it.

The motion is then put to the vote and declared carried.

X. PRAEDIAL PRODUCE ENACTMENT. Mr. J. Gibson proposes the following motion.

“That the Resident-General be asked to inform this Association what the term “latex” in clause 2 of the Amended Praedial Produce Enactment means, and that, if “latex” be not deemed to cover all known grades of rubber, the Resident-General be asked to have the Enactment amended to cover same.”

Mr. Parkinson having seconded it, Mr. Skinner proposes the following amendment:

“That this Association considers the definition of latex to be “any plant juice which contains caoutchouc or gutta percha,” but would ask the Resident-General to obtain the opinion of the Legal Adviser as to whether this reading is correct, and if not, to have the enactment amended to cover all grades of rubber.”

This is seconded by Mr. Cumming.

Mr. Gibson thereupon withdraws his motion, Mr. Skinner's amendment thereby becoming the substantive motion. The latter is then put to the vote and declared carried.

XI. RECRUITING IN BENGAL PRESIDENCY. The Hon. John Turner wishes to bring up the question of recruiting in Bengal. Three years ago they were recruiting labour from Bengal but the Government of India put a stop to it

then, and restricted the recruiting area of the Malay Peninsula to the Madras Presidency. It would be a good thing if they could now get the Indian Government to rescind the order. He had spoken to His Excellency Sir John Anderson about it, and the latter seemed disposed to deal with the question. The Bengalis were excellent coolies for tapping. He should like to get the weight of the Association behind him.

Mr. Cumming concurs with Mr. Turner and it is agreed that Government should be written to on the subject.

XII. The Secretary reads the following letter from Mr. J. B. Carruthers:

DEAR SIR,—I have to acknowledge your letter of March 12th which I have just received from Trinidad—I do not take up my new duties till September.

Please convey to the Planters' Association of Malaya my sincere thanks for their kind vote expressing their appreciation of my efforts for the advancement of agriculture in the Malay Peninsula. It has given me great pleasure to receive it.

I was most unwilling to leave Malaya and shall a'ways take the greatest interest in the continued progress and prosperity which I am sure lie in the future for rubber and other agricultural industries in Malaya.

If it is in power to do anything in the future for your Association I shall be glad to have the opportunity.

Yours faithfully,

(Sgd.) J. B. CARRUTHERS,

*Director of Agriculture and Government Botanist,
Federated Malay States.*

To The Secretary,

The Planters' Association of Malaya,

Kuala Lumpur.

With a vote of thanks to the Penang Turf Club for the use of their premises, the Meeting terminates at noon.

H. C. E. ZACHARIAS,

Secretary.

LIST OF PRIZE WINNERS.

Division A.

AGRICULTURAL PRODUCE.

Section I. Padi.

Class.	Nature of Exhibit.	Names of Winners	Prizes.
1	Padi, best sample of any named variety.	K. Talib Senggang, K. Kangsar H. Othman, Butterworth, P. W.	1st 2nd
		Che Teh, C. Ahamad, B. Pulau	3rd
2	Pulut, best sample of any named variety.	Sidang Jannil, Pringgit, Malacca	1st
		Hashim b. Salleh, B. Pulau	2nd
		Mohd. b. Abd. Mutalib, B. Pulau	3rd
3	Rice, best sample, prepared by machinery.	Md. Abas, B. Padang	1st
		H. Md. b. H. Abd. Rasid, B. Pulau	2nd
		Ibrahim b. Abd. Hamid, B. Pulau	3rd
4	Rice, best sample, prepared in a lesong.	Syed Mandor, Nibong Tebal	1st
		H. Md. Saman, Penang	2nd
		Ibrahim b. A. Hamid, B. Pulau	3rd
5	Best collection of different Padi in the ear, 10 heads in each sample.	H. Darus b. H. Osman, B. Pulau	1st
		Ainudin b. H. Bahandin, B. Pulau	2nd
		Kamaludin b. H. Bahandin, B. Pulau	3rd
6	Best Padi and Pulut, grown in one Mukim to be exhibited by the Penghulu of such mukim, and so certified by him.	Md. b. Md. Salleh, B. Pulau	1st
		Md. Saman b. Usope, B. Pulau	2nd
		Osman b. Isahak, B. Pulau	3rd
7	Padi, best sample of any named variety (open to Krian only).	Penghulu Gunong Semonggol, Krian	1st
		Penghulu Youp Ibrahim, P. Buntar	2nd
		Peng. P. Md. Ariff, A. Pongsu	3rd
8	Best collection of different Padi in the ear, in each sample.	Peng. Youp Ibrahim, P. Buntar	1st
9	Best Padi and Pulut grown in one Mukim to be exhibited by the Penghulu of such Mukim, and so certified by him.	Peng. Youp Ibrahim, P. Buntar	1st

Section II. Rubber.

10	Para Crepe, best sample.	Mr. T. H. Harvey, Petaling Estate, Selangor	1st
		Mr. J. H. Davis, Taiping	*
		Mr. Maurice Maude, Cecily Estate, T. Anson	*
		Mr. H. de Z. Lancaster, Linggi Plantation	H.C.

Section II. Rubber (Contd.)

Class.	Nature of Exhibit.	Names of Winners	Prizes.
11	Para sheet, best sample.	Mr. A. B. Lake, Batu Minyak Estate, Klang	1st
		Mr. W. R. Rowland	*
		Mr. H. de Z. Lancaster, Linggi Plantation	*
12	Para Biseuit, best sample.	No award.	
13	Para Block dry, best sample.	Mr. W. R. S. Broek, Kapar Lanadron Estate, Muar	1st *
14	Para, best sample ready for shipment. The exhibit to be one case with not less than 50 lbs. of crepe, sheet, and one case of serap.	No award.	
15	Para, best sample of Commercial Rubber.	Lanadron Estate, Muar Petaing Estate Mr. M. Maude, Ceely Estate, T. Anson	1st 1st H.C.
16	Para, best sample of sheet, crepe, biseuit, block and serap.	No award.	
17	Rambong, any form.	Mr. C. T. Hamerton, Selangor	
18	Any other Rubber, plant from which obtained must be stated with each.	No award.	

Section III. Food Products.

19	Coconuts, unhasted, best sample.	Peng. H. Usman, Rungkup, L. Perak	1st
		Peng. Hassan, B. Mertajam, P. W.	2nd
		H. Aminuddin, S. Tinggi, Perak	3rd
20	Coconuts, husked, best sample.	H. Aminuddin, S. Tinggi, Perak	1st
		Taib, Penang	2nd
		H. Ahmad, S. Duraka, P. W.	3rd
		Peng. Hassan, B. Mertajam, P. W.	H.C.
		Mr. Ernest Hogan, Penang	H.C.
21	Coconuts, best bunch.	Peng. H. Md. Nasir, H. Melintang, Lower Perak	1st
		Chuah Chew Suat, Penang	2nd
		Taha b. Lebai Idris, B. Pulau	H.C.
		H. Jusoh b. L. Ngah, B. Pulau	H.C.

N.B.—The names are placed in the order of merit in which the judges placed the Exhibits. No 2nd or 3rd prizes were given for Para Rubber.

The Governor's Cup was awarded to Caledonia Estate.

"H.C." stands for Highly Commended.

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Section III. Food Products (Contd.)

Class.	Nature of Exhibit.	Class.	Nature of Exhibit.	
22	Coconuts, collections of varieties.	Caledonia Estate, P. W.		1st
		Peng. H. Md. Nasir, H. Melintang		2nd
23	Copra, best sample.	Mr. J. Lamb, Bertam Estate, P. W.		1st
		Mr. E. Hogan, Penang		2nd
		Sin Hup Seng & Co., P. Buntar		3rd
		Mr. P. R. Pinhorn, Gapis Estate, Perak		H.C.
24	Copra, best sample.	Mr. Geo. Stothard, Malakoff Estate, P. W.		1st
		Mr. C. S. Baxendale, J. Estate		2nd
		Mr. P. R. Pinhorn, Gapis Estate, Perak		3rd
25	Tapioca roots, best sample.	Mr. Geo. Stothard, Malakoff Estate, P. W.		1st
		Mr. Kee Tek K'wee, Valdor Estate, P. W.		2nd
		Mr. F. R. Hill, B. Asahan, Malacca		H.C.
26	Tapioca, pearl, best sample.	Mr. Geo. Stothard, Malakoff Estate, P. W.		1st
		Mr. J. Lamb, Bertam Estate, P. W.		2nd
27	Tapioca, flake, best sample.	Mr. Geo. Stothard, Malakoff Estate, P. W.		1st
		Mr. Lee Keng Hee, Malacca		2nd
		Mr. J. Lamb, Bertam Estate, P. W.		H.C.
28	Tapioca, flour, best sample.	Mr. Geo. Stothard, Malakoff Estate, P. W.		1st
		Mr. Heap Huat, Penang		2nd
		Sin Hup Seng & Co., P. Buntar		H.C.
		Lean Ah Keow, B. Pulau		H.M.
29	Arrowroot, fresh.	Ahmad, Klang		1st
		Penghulu Telok. K. Langat		2nd
		Caledonia Estate		3rd
		Raja Ali, K. Lumpor		H.C.
30	Arrowroot, prepared, best sample.	Caledonia Estate, P. W.		1st
		J. Jambu, B. Mertajam, P. W.		2nd
		Lean Ah Keow, B. Pulau		H.C.
31	Sago pearl, best sample.	Joo Bee, Penang		1st
		Song Joo, S. Bakap, P. W.		2nd
32	Sago flour, best sample.	Selenan b. Harrun, B. Pulau		1st
		Md. b. H. Abd. Jalil, B. Pulau		2nd
		Suboh b. Bakim, Rembau		H.C.

Section III. Food Products (Contd.)

Class.	Nature of Exhibit.	Names of Winners	Prizes.
33	Maize, best sample.	Uda Mat Esa Bruas, Parit, Perak	1st
		Peng. H. Mohd., Parit, K. K.	2nd
		Mohd. Ali, K. Kangsar	3rd
34	Ginger, best sample.	Loh Hup Shin, B. Pulau	1st
		Nya Dowlah, Penang	2nd
		Penghulu Sun, Malacca	3rd
		Jakayreyah b. Md. Ayob, B. Pulau	H.C.
35	Turmeric, best sample.	Pawanchee b. Tamby, Penang	1st
		Sahid b. Sahaq, B. Pulau	2nd
		Peng. Md. Omar, Bandar, L. Perak	3rd
36	Tuba (akar), best sample.	Mat Jawa b. P. Perak, B. Pulau	1st
		H. Cornelius, Penang	2nd
		Peng. Sleeman, Batu Gajah	3rd
37	Sugar Cane, best sample.	Peng. H. Md. Yasim Likir, L. Perak	1st
		Dowlah b. Shaik Ali, Malacca	2nd
		Man b. Md. Salleh, B. Pulau	3rd
		Chee Teh b. Ahmad, B. Pulau	1st
38	Sugar, Coconut, best sample.	Penghulu Abu, Tangga Batu, Malacca	2nd
		Abdullah, Penang	3rd
		Hashim b. Salleh, B. Pulau	1st
39	Sugar, Nipah, best sample.	Itam b. A. Majid, B. Pulau	2nd
		Peng. Ujang b. Liman, Malacca	1st
40	Sugar, kabong, best sample.	Penghulu Abu, Tangga Batu, Malacca	2nd
		Sidang H. Ma'ali, Tg. Kling, Malacca	3rd
		T. N. Symons, Prai Estate, P. W.	1st
		Zainap, Kuala Lumpor	2nd
42	Coffee, Arabian, best sample.	K. Abd. Latib, Kuala Kangsar	1st
		H. Mohd. b. Abd. Rased, B. Pulau	2nd
43	Coffee, Liberian, best sample.	Mr. E. B. Poir, Klang	1st
		H. Abd. Junus b. A. Rased, B. Pulau	2nd
44	Coffee, any other variety.	Mohd. Daros, Penang	1st
		Abdul Majid, Penang	2nd
45	Cocoa, fresh pods, best sample.	S. Ahmad, Penang	1st
		Ahmad b. Abas, Seremban	2nd
		Peng. Usop b. Abu, Malacca	3rd
46	Toddy, best sample.	Syed Rahmanabdullah, B. Pulau	1st
		Tamby b. Ali, Klang	2nd
		Mr. J. Hawkins, Simpang Lima, Krian	3rd

Section III. Food Products (Contd.)

Class.	Nature of Exhibit.	Names of Winners	Prizes.
47	Rum, best sample.	Caledonia Estate, P. W.	1st
48	Rum shrub, best sample.	Caledonia Estate, P. W.	1st

Section IV. Spices, etc.

49	Bechnuts, fresh, best sample.	Kulop Ahmad, Bruas, Parit Peng. Mat D. Dam, Jasin, Malacca	1st 2nd
50	Betelnuts, dried and split, best sample.	Abdul Waris, B. Mertajam Mohd. Daud, Penang D. Md. Noor, Penang H. Md. Junnus b. H. Abd. Rasid, Balek Pulau	3rd 1st 2nd 3rd
51	Sireh leaves, best sample.	J. Jambu, B. Mertajam Isawak, B. Mertajam Md. Rouse, B. Mertajam	1st 2nd 3rd
52	Cloves, best sample.	Chua Hooi Hong, Penang Cheah Chee Eong, Penang Law Chit Mun, B. Pulau	1st 2nd 3rd
53	Nutmegs, fresh, best sample.	Said Musah, K. Kangsar Abdul Rais, Senggang, Perak Wong Yeok Kooi, B. Pulau	1st 2nd 3rd
54	Nutmegs, dried, best sample.	Mat b. Chee, Penang Law Chit Mun, B. Pulau	1st 2nd
55	Mace, dried yellow, best sample.	Cheah Chee Eong, Penang Khoo Chin Boo, Penang	1st 2nd
56	Mace, dried, red.	Ismail bin Md. Taib, Balek Pulau Mohamood bin Salleh, Balek Pulau Wong Yeok Kooi, B. Pulau	1st 2nd 3rd
57	Pepper, white.	Mr. P. R. Pinhorn, Gapis Estate, Perak Cheah Chee Eong, Penang Md. Abas, Batang Padang	1st 2nd 3rd
58	Pepper, black.	Mr. P. R. Pinhorn, Gapis Estate, Perak Selampai, Ipoh	1st 2nd
59	Spices, best collection.	Bawasah, Penang Md. Salleh, Penang Shaik Pant, B. Pulau	1st 2nd 3rd
60	Patchouli, best sample.	Jelani, Temeloh, Matang Law Chit Mun, B. Pulau Peng. Md. Serajudin, Kg. Gajah, Lower Perak Che Tome binte Kassim, Batang Padang	1st 2nd 3rd H.C.

Section V. Oils, Oil Cake, etc.

Class.	Nature of Exhibit.	Names of Winners	Prizes.
61	Oil, citronella, best sample.	Mr. G. Nevitt Stevens, Cenderiang	1st
63	Oil, coconut, best sample.	Caledonia Estate, P. W.	1st
		Mat b. Chee, Penang	2nd
		Kung Thean Sung, Penang	3rd
		Penghulu Papan, Perak	H.C.
		Shaik Hussain, Penang	H.C.
64	Oil, gingelly, til seed (minyak leng), best sample.	Caledonia Estate, P. W.	1st
		Shaik Hussain, Penang	2nd
		Bawasah, Ayer Etam Road, Penang	3rd
		Kung Thean Sung, Penang	H.M.
65	Oil, castor, best sample.	Bawasah, Penang	1st
		Md. Kassim, Penang	2nd
		Shaik Hussain, Penang	3rd
		M. Naina, Penang	H.C.
67	Oil, Para Rubber seed, best sample.	The S'pore Oil Mill, Singapore	1st
		Caledonia Estate, P. W.	2nd
69	Oil, any other kind, best sample.	The S'pore Oil Mill, Singapore	1st
		Caledonia Estate, P. W.	2nd
		Kung Thean Sung, P. Weld	3rd
70	Oil cake, cocomut, best sample.	The S'pore Oil Mill, Singapore	1st
		Lim Cheng Teck, Penang	2nd
		A. Rengasamy Pandaram, Penang	3rd
72	Oil cake, Kabu Kabu seed, best sample.	A. Rengasamy Pandaram, Penang	1st
		Caledonia Estate, P. W.	2nd
74	Oils, best collection, best sample.	Mr. A. C. Hardouin, B. Tambun, Port Weld	1st
		The S'pore Oil Mill, Singapore	2nd

Section VI. Getahs, Gums, etc.

75	Getahs, best collection of local.	Pandak Brahim, Bruas, Parit	1st
		Piarra Labu, Serambau	2nd
		R. A. Rahman, Selama	3rd
76	Getah taban, best sample.	Yacob Pantai, Serambau	1st
		Md. Yusof, Batang Padang	2nd
77	Gambier, best sample.	II. Sahat, Penang	1st
		Husin b. H. Esahak, Penaug	2nd
		Syed Aboobakar, Penang	3rd
78	Dragon's blood, best sample.	Penghulu Gumong Semanggol, Krian	1st
		P. J. Cornelius, Penang	2nd
		Y. Geok Keat, Penang	3rd

Section VI. Getahs, Gums, etc. (Contd.)

Class.	Nature of Exhibit.	Names of Winners	Prizes.
79	Gums and damars, best collection of local.	Peng. Abd. Jalil, Ulu Langat	1st
		Mohamood b. Salleh, B. Pulau	2nd
		Md. Serajudin, Kg. Gajah, Lower Perak	3rd
		Datok Paduka Raja, P. Tiga, L. Perak	H.C.
		Said Mohd., Kuala Kangsar	H.C.

Section VII. Fibres.

80	Cotton, (Kakabu) best sample.	Mat, Kuala Kangsar, Perak	1st
		Che Abd. Wahab, Temeloh, Matang	2nd
		Mohd. b. H. Ismail, B. Pulau	3rd
81	Cotton, any other variety, best sample.	Sape Ee b. Aboo, B. Pulau	1st
		Ibrahim b. Sahid, B. Pulau	2nd
		S. Kader, Penang	3rd
82	Fibres, best collection.	Khoo Soo Ee, Penang	1st
		Swee Ghim, Penang	2nd

Section VIII. Miscellaneous.

83	Rotans, best collection.	H. Sahad, Penang	1st
		Dato Paduka Raja, P. Tiga, L. Perak	2nd
		Jelani, Temeloh, Matang	3rd
84	Bamboos, best collection.	Md. Abas, Batang Padang	H.C.
		Ngah Md. Said, Kuala Kangsar	1st
		Dato Paduka Raja, P. Tiga, L. Perak	2nd
85	Walking sticks, best collection. (unprepared).	Syed Ahmad, Penang	3rd
		Mohamood b. Salleh, B. Pulau	1st
87	Medicinal plants. (Natives only).	Mun b. Sabat, B. Pulau	2nd
		Haji Hassan b. H. Dulgani	1st
		Govinden, Penang	2nd
		Che Tome binte Kassim, Batang Padang	3rd

Division B.

PLANTS, FLOWERS, FRUITS AND VEGETABLES.

Section I. Ornamental Foliage Plants in Pots.

Class.	Nature of Exhibit.	Names of Winners	Prizes.
88	Aroids other than Caladiums.	R. Young, Penang	1st
89	Caladiums.	Hon. R. N. Bland for Chek Lah Residency	1st

Section I. Ornamental Foliage Plants in Pots (Contd.).

Class.	Nature of Exhibit.	Names of Winners	Prizes.
90	Colens.	Hon. R. N. Bland for Chek Lah Residency	1st
91	Crotons.	L. M. Bell, Penang	1st
92	Dracenas.	No award.	
93	Ferns (any variety) distinct.	O. Schule, Penang	1st
94	Ferns, Adiantum.	O. Schule, Penang	1st
95	Ferns, any variety, best specimen.	Mrs. M. Hawkins, Penang	1st
96	Marantas and Calatheas.	Hon. R. N. Bland for Chek Lah Residency	1st
97	Palms, distinct kinds.	Miss Joan Smith, Penang O. Schule, Penang	1st 2nd
98	Palms, best specimen.	Hon. R. N. Bland for Chek Lah Residency J. Peterson, Penang	1st 2nd
99	Selaginella, best specimen.	O. Schule, Penang	1st
100	Any ornamental foliage plant not included in above,	O. Schule, Penang	1st
101	Foliage plant any kind, best specimen.	O. Schule, Penang O. Schule, Penang	1st 2nd

Section II. Ornamental Plants in Flowers in Pots.

102	Achimenes.	Mrs. A. Linton	(Cup) 1st
103	No entry.	No entry.	
104 to 107	No award.	No award.	
108	No entry.	No entry.	
109	Dahlias, best specimen.	Mr. Lim Khay Hooi, Penang	1st
110	Dianthus (Indian Pinks).	Mrs. Langham Carter, Province Wellesley	1st
111	Eucharis, best specimen.	Mr. Holmberg, Penang	1st
112	Gloxinias, best specimen.	No entry.	
113	Orchid.	S. E. A. Linton, Penang	(Cup) 1st
114	Orchid.	Hon. R. N. Bland for Che Lah Residency	(B.M.) 2nd
115	Phlox.	Mrs. Langham Carter, Province Wellesley	1st
116	Petunias.	No award.	
117	Zinnias.	No award.	
118	Roses.	No award.	

Section III. Plants Whether in Flower or not.

119	Begonia, distinct kinds.	S. E. A. Linton, Penang	1st
120	Begonia, best specimen.	S. E. A. Linton, Penang	1st
121	Group of plants arranged for effect in space not exceeding 9 square feet.	S. E. A. Linton, Penang	(Cup) 1st

Section III. Plants Whether in Flower or not (Contd).

Class.	Nature of Exhibit.	Names of Winners	Prizes.
122	Group of Chinese plant fantastic shape.	Cheang Thye Chong, Penang Canton Club, Penang	1st 2nd
123	Group of flowering Annuals Subscribers.	No award.	

Section IV. Cut Flowers and Table Decoration.

124	Asters.	No award.	
125	Chrysanthemums.	No award.	
126	Dahlias.	Miss Oliverio, Penang	1st
127	Roses.	Gan Teong Teng, Penang (Cup)	1st
128	Cannas.	No award.	
129	Oreheids.	No award.	
130	Cut flowers arranged for effect.	Mrs. Harriet Brown, Penang.	1st
131	Collection of cut flowers not less than 12 kinds.	Mrs. Harriet Brown, Penang Miss Oliverio, Penang	1st 2nd
132	Table decoration.	Mrs. Cleaver, Penang (Cup)	1st

Section V. Fruits.

133	Pisangs (Bananas).	Md. Zain bin H. Sahad, Penang Culop Mohd. b. H. Abd. Wahab. Tanjong Malim	1st 2nd
134	Pisangs, bunch any kind.	Peng. Mohd. Esa, Bruas, Parit Peng. Abd. Jalil, Ulu Langkat	1st 2nd
135	Champedak.	Peng. Janudin b. Abas, Malacca Sid b. Dal, Alor Gajah, Malacca	1st 2nd
136	Jack fruit.	Peng. Esop b. Buang, Malacca Kamaludin b. N. Bahandin, B. Pulau, Penang	1st 2nd
137	Durian.	Mat Salleh, P. Wellesley Brahim Tok Kur, B. Pulau	1st 2nd
138	Melon.	Tan Khee Chong, P. Wellesley H. Osman b. H. Abd. Ja'ib, B. Pulau	1st 2nd
139	Pine-apples (Mauritius).	C. Quah Choo, P. Wellesley	1st
140	Pine-apples (any other variety).	Seng e/o Forest Ranger, Penang	1st
141	Pomeloes.	Peng. Abdul Wahab, Perak	1st
142	Papaya.	Mohd. Lenggeng, Seremban	1st
143	Oranges.	Mr. Kung Thean Sung, Penang Mohd. Mansur, L. Perak	1st 2nd
144	Limes	Peng. Abd. Jalil, Ulu Langkat	1st
145	Lemons.	Peng. Haji Mohd. Jasin, Lower Perak	1st
146	Chiku.	Sidang H. Mohd. b. H. Musa, Malacca	1st
147	Custard Apple.	Sahad b. Hasan, B. Pulau	1st
148	Duku.	Mohd. Naugh, Penang	1st

Section V. Fruits (*Contd.*).

Class.	Nature of Exhibit.	Names of Winners	Prizes.
149	Binjai.	Peng. H. Ahmad Ujang, Malacca	1st
150	Jambu.	Mohd. b. Haji Ismail, B. Pulau	1st
151	Langsat.	Abd. Rahaman b. Md. Akub, B. Pulau	1st
152	Mangos.	Haji Darus b. H. Mat Saman, B. Pulau	1st
153	Machang.	Sidang H. Mohd. b. H. Musa, Malacca	1st
154	Mangosteens.	Sidang H. Mohd. b. H. Musa, Malacca	1st
155	Pulasan.	No award.	
156	Rambai.	Sidang H. Mohd. Musa, Malacca	1st
157	Rambutan.	Sidang H. Mohd. Musa, Malacca	1st
158	Mata Kuching.	Mat b. H. Md. Saman, Penang	1st
159	Durian Blanda.	Sahed b. Hassan, B. Pulau	1st
160	Any fruit not included in above.	Shaik Ibrahim, P. Wellesley	1st
161	Cultivated fruits, best collection, any number of kinds.	Md. Abas b. Md. Ariff, Tapah	(Cup) 1st
162	Wild edible fruits, best collection.	Ismail b. H. Mohd., B. Pulau Mun, P. Wellesley	1st 2nd

Section VI. Preserved Fruits, etc.

163	Preserved fruits, best sample, any method.	Mr. F. Alexander, Kuala Lumpur Oh Geng Hean, Penang	(S.M.) 1st (B.M.) 2nd
164	Chutney, best sample, any method.	Mr. F. Alexander, K. Lumpor	1st
165	Pickles, best sample, any method.	Mr. F. Alexander, K. Lumpor	1st
166	Jellies, best sample, any method.	Fred. Bondrille, P. Wellesley Mr. F. Alexander, K. Lumpor	1st 2nd
167	Honey in comb, best sample, any method.	Mr. F. J. Cornelius, Penang	1st
168	Butter, best sample, any method.	Mr. Kung Thean Sung, Penang	1st
169	Eggs, best collection, fowls, ducks or turkeys.	Mohd. Sabat, Penang Mr. Kung Thean Sung, Penang	1st 2nd

Section VII. Vegetables.

171	No entry and no award.		
172	Benny fruits or chocho.	M. V. Emuang, P. Wellesley	1st
173	Brinjals.	Peng. Hassan, P. Wellesley Md. Salleh b. Ayab, Penang	1st H.M.
174	Radishes.	A. M. Sheriff, Penang	1st
175	Ladies fingers.	Sidang Makesat, Malacca	1st
176	Cucumbers.	Peng. Hassan, P. Wellesley	1st
177	Tomatoes, best dish.	Mrs. C. E. Baxendale, Selangor	1st
178	Beans, best collection.	Arshad b. Abas, Penang	1st

Section VII. Vegetables (*Contd.*).

Class.	Nature of Exhibit.	Names of Winners	Prizes.
179	Cabbages.	Nasarddin Glugor Estate, Penang	1st
180	Lettuces.	Kung Cheng Hun	1st
181	Onions, shallots and garlic, best collection.	Kung Thean Seng, Penang	1st
182	Herbs used in curries and sambals.	Ibrahim b. Abd. Hamid, B. P.	1st
183	Chillies.	Culop Mohd., T. Malim	1st
184	Chillies, best sample, any kind.	Mr. F. L. Bondrille, P. Wellesley	1st
185	Vegetables and herbs for making a salad, best collection.	H. Md. b. H. Abd. Rasid, B. Pulau	1st
186	Vegetables and herbs for making a salad, best collection.	Mrs. Titus, Penang	1st
187	Pumpkins.	Abd. Rahman, Klang, Selangor	1st
188	Water melons gourds, squashes, luffas, etc.	Husin b. H. Eshak, Selangor	1st
189	Yams, Keladis.	Ngah b. Eusop, Selangor	1st
		W. Podasingho, Perak	H.M.
190	Any vegetable not included in above.	No award.	

Special Class.

Darus Malay School, Penang	1st
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Division C.

CATTLES, PIGS, GOATS AND POULTRY.

Section I. Cattle.

Class.	Nature of Exhibit.	Names of Winners	Prizes.
191	Bull (locally bred).	H. Brett, Penang	1st
		Leh, Penang	2nd
197	Champion animal in section.	H. Brett, Penang	1st
198	Best animal for butchers purpose.	Yeam Kee, Penang.	1st
		Tan Tin Bee, Penang	2nd

Section II. Buffaloes.

199	Malay buffalo, bull.	Goh Lian, Penang	1st
		Brahim, B. Pulau	2nd

Section III. Pigs and Goats.

201	Boar.	Umpoo, Penang	1st
202	Sow.	Ah Khoan, Penang	1st

Section III. Pigs and Goats (Contd).

Class.	Nature of Exhibit.	Names of Winners	Prizes.
203	Best pen of 6 pigs.	Yeam Kee, Penang	1st
205	Ewe goat with kids.	Sidang K. Md. Musa, Malacca	1st
206	Sheep Ram.	Nina Mohamed, Penang	1st
		Indian Mutton Trading Co., Penang	2nd
207	Sheep Ewe.	Indian Mutton Trading Co., Penang	2nd
208	Best pen of 6 sheep.	Indian Mutton Trading Co., Penang	1st

Section IV. Poultry, etc.

209	Bantam cock and hen.	Mrs. A. Linton, Penang	1st
		S. S. Alsagoff, Penang	2nd
210	Malay cock and hen.	Man b. Ishak, Penang	1st
		Kamuludin b. H. Bahudin, B. Pulau	2nd
		Ahamad, Penang	Special
211	Malay Game cock and hen.	Md. Hussain, Penang	1st
		Mrs. A. Linton, Penang	2nd
212	Collection of Malay fowls.	Mr. Earnest Hogan, Penang	1st
		Ibrahim C. H. Mohamed Ariff	2nd
213	Collection of Chinese fowls.	L. H. Wemyss, Penang	1st
		Ismail, Penang	2nd
214	Collection of fowls (any breed).	S. E. A. Linton, Penang	1st
		Miss Eileen Starr, Penang	2nd
215	Pair of Muscovy ducks.	H. Abdullah C. H. Md. Shaik, Penang	1st
		Il. Othman, P. Wellesley	2nd
216	Pair of ducks (any breed).	Oh Sin Kay, Penang	1st
		Itam, Sungei Nibong	2nd
217	Pair of ducks hybrid.	H. Abdullah C. H. Md. Shaik, Penang	1st
		Brahim Toh Kar, Penang	2nd
218	Gander and goose.	Mat Taib, P. Wellesley	1st
		Barker, Penang	2nd
219	Pair of pigeons.	L. H. Wemyss, Penang	1st
		L. H. Wemyss, Penang	2nd
220	Best domesticated animal.	H. Mohamed Taib, Penang	1st
		Halujah	2nd
221	Rabbits Buck and doe.	Mrs. B. Macintyre, Penang	1st
		Veerasami	2nd
222	Turkeys.	L. H. Wemyss, Penang	1st
		Mohd. Sahad, Penang	2nd

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Division D.

HORSES AND DOGS.

Horses.

Class.	Nature of Exhibit.	Names of Winners	Prizes.
223	Polo Pony 14-2 or under, to be shown under saddle and tested with stick and ball.	Dr. P. Liston, Penang Mr. G. E. Venning Thomas, Singapore	1st 2nd
224	Gentlemen's Hack, 14-2 and under.	Dr. P. Liston, Penang Mr. J. F. Wreford, Penang	1st 2nd
225	Gentlemen's Hack, 14-2 and over.	Mr. W. W. MacMillan, S'pore Mr. A. F. Goodrich, Penang	1st 2nd
226	Lady's Hack over 14-2.	Mr. W. W. MacMillan, S'pore Mr. A. F. Goodrich, Penang	1st 2nd
227	Lady's Hack, 14-2 and under.	Mr. A. G. Faber, Penang Dr. P. Liston, Penang	1st 2nd
229	Single harness Pony, 14-2 and under.	Mrs. MacCunn, P. Wellesley Mr. Khaw Too Keat, Penang	1st 2nd
230	Single harness Horse over 14-2.	Mr. W. W. MacMillan, S'pore Mr. F. Duxbury, Penang	1st 2nd
231	Registered native bred Gharry Pony.	Ismail Tamby, Penang Mydin Gunnay, Penang	1st 2nd
232	Jumping Pony, 14-2 and under.	Mr. Ward, Kedah Dr. P. Liston, Penang	1st 2nd
233	Jumping Horse over 14-2.	Mrs. C. F. K. Moore Mr. J. MacDonough, Kedah	1st 2nd
234	Double Turnout of any description pairs.	Mr. Chung Thye Phin, Penang Mr. J. D. Kemp, Penang	1st 2nd
236	The Horse or mare over 14-2 winning the highest marks.	Mr. W. W. MacMillan, S'pore	1st
237	The Horse or mare under 14-2 winning the highest marks.	Dr. P. Liston, Penang	1st
238	The best native bred Horse or mare any age over 12 hands.	Mr. Geo. Stothard, P. Wellesley Mr. Geo. Stothard, P. Wellesley	1st 2nd

Dogs.

239	Smooth haired Fox Terrier Dog.	Mr. W. H. MacArthur, Penang Mrs. Kirk, Penang Mr. T. A. Martin, Penang	1st 2nd H.C.
240	Smooth haired Fox Terrier Bitch.	Mrs. W. E. Clearer, Penang	1st
241	Rough haired Fox Terrier Dog.	Mr. W. H. MacArthur, Penang	1st
243	Chow Dog.	Mr. J. Houston, Penang Mrs. E. F. Elliot, Penang	1st 2nd
245	Spaniel Dog.	Mr. Ong Yah Hoe, Penang Mr. C. Guinness, Penang	1st 2nd
247	Irish Terrier Dog.	Mr. J. Harley Sunner, S'pore	1st
248	Irish Terrier Bitch.	Mr. D. A. M. Brown, Penang	1st

Dogs (Contd.).

Class.	Nature of Exhibit.	Names of Winners	Prizes.
249	Best Sporting Dog or Bitch.	Mr. H. S. Kirwan, S'pore	1st
		Mr. John Lamb, P. Wellesley	2nd
		Mr. George Stothard, P. W.	H.C.
250	Dog or bitch any other breed.	Mr. Elton Bell, Penang	1st
		Mr. W. H. MacArthur, Penang	2nd
		Mr. H. S. Kirwan, S'pore	H.C.
Special Litter of Forhound puppies.		Mr. Geo. Stothard, P. W.	S.M.

Division E.

NATIVE ARTS AND INDUSTRIES.

Section I. Metal Work.

Class.	Nature of Exhibit.	Names of Winners	Prizes.
251	Collection of Malay Jewellery.	No award.	
252	Pinding, any metal.	Jelaludin, Brunei	1st
253	Sirih requisites, any metal.	Mohd. Usoff, Brunei	1st
		Abdullah b. Abd. Majid, Penang	2nd
254	Muka bantal, gold, suasa or silver.	Kulop Md. Yusof, K. Kangsar	1st
		Jelaludin, Brunei	2nd
255	Ornamental boxes, any metal except tin.	Abdul Rahman, Brunei	1st
256	Trays and bowls.	Mrs. Neubronner, Penang	1st
		Abdul Rahman, Brunei	2nd
257	Krusang, gold, suasa or silver.	Tuan Chee, Penang	1st
258	Any kind of metal not included above.	Mohd. Usoff, Brunei	1st
259	Kris with sheath.	Abdul Wahab, Sg. Raia, Ipoh	Sp.
260	Tumbok Lada, with sheath.	Mr. A. B. Pell, Upper Perak	1st
		Ahmad b. H. Matsah, Rembau	2nd
		Mohd. Daud, Kuala Kangsar	1st
261	Parang, with sheath.	Pengeran Yacob, Brunei	1st
262	Golok, with sheath.	Quah Chew, Seremban	1st
263	Collection of Tin-ware.	Nam Tong, Seremban	2nd

Section II. Wood-carving, etc.

265	Wood-carving.	Singa b. Amire, Rembau	1st
		Abu Baha, Rembau	2nd
266	Model of a Malay House.	Kulup Md. Eusuf, K. Kangsar	1st
		Mohd. b. Jafar, Penang	2nd
		Peng. Mohd. Mansur, Perak	1st
267	Set of models of snares and traps (land).	Peng. Mohd. Ismail, Perak	2nd
		Peng. Md. Drus, Matang	1st
268	Set of models of fish traps and stakes (sea).	Peng. Usuf, K. Bsar, Malacca	2nd

Section II. Wood-carving, etc. (Contd.).

Class.	Nature of Exhibit.	Names of Winners	Prizes.
269	Set of models of fish traps and stakes (river).	Peng. Mohd. Mansur, Perak Latib b. Usuf, Malacca	1st 2nd
270	Malay children's playthings.	Peng. Mohd. Mansur, Perak Mohd. Arstrad, Seremban	1st 2nd
271	Best collection of Sakai articles.	Pandak Lizin, K. Kangsar Peng. Indut, Tg. Malim	1st 2nd
272	Best collection of Semang articles.	Mohd. Salleh, K. Kangsar Mr. A. B. Peel, Upper Perak	1st 2nd
273	Set of Malay musical instruments.	Kali Jalil, Rembau	1st

Section III. Embroidery and Weaving.

274	Malay embroidery, best specimen.	Peng. Sg. Trap, B. Gajah Mohd. Yatim, B. Padang	1st 2nd
275	Chinese embroidery, best specimen.	John Wi Kim Pong, Penang	1st
276	Embroidered slippers.	Peng. Sg. Trap, B. Gajah Minah, Kuala Lumpur	1st 2nd
277	Embroidered muka bantal.	Mohd. Rashid, B. Gajah Mohd. Omar, Lower Perak	1st 2nd
278	Embroidered mat.	Penghulu Ahmad, L. Perak Raja Permaisuri, wife of Sultan of Perak	1st 2nd
279	Embroidered tudong saji.	Peng. Md. Omar, Lower Perak Datoh Stia, Kuala Kangsar	1st 2nd
280	Malay lace.	Pringgit School, Malacca Penghulu Abdulgani, Malacca	1st Sp.
281	Sarong (silk and gold) Telepok.	Abdul Rais, Kuala Kangsar Abdul Wahab, Ipoh	1st 2nd
282	Sarong (mastuli).	Peng. Md. Omar, L. Perak H. Mohamed, Balek Pulau	1st 2nd
283	Sarong (silk).	Peng. Abdul Majid, Klang Mohamed Salleh, Penang	1st 2nd
284	Silk for Malay bajn, best piece.	No award.	
285	Best collection of varieties of Malay weaving.	Abdul Rais, Kuala Kangsar Pandak Lizin, Kuala Kangsar	1st 2nd
286	Kain Lepas.	Penghulu Abdulrahman, Ipoh, Perak Selayman, Balek Pulau	1st 2nd
287	Kain telepok.	Peng. Abdul Majid, Klang	1st
288	Kain pelangi.	S. H. Aljunid, Penang Mat Taham, Klang	1st 2nd
289	Kain tudong kepala	H. Darus, Balek Pulau Peng. Ahmad, Lower Perak	1st 2nd
290	Kain selendang.	H. Abdullah, Krian H. Junnus, Balek Pulau	1st 2nd

Section IV. Baskets, Mats, etc.

Class.	Nature of Exhibit.	Names of Winners	Prizes.
291	Ornamental baskets (rattan).	Mohd. Yatim, B. Padang	1st
292	Ornamental baskets (mengkuang or pandan).	Jafar b Awang, Malacca Agijah bte. Judin, Malacca	1st 2nd
293	Best collection of articles made from mengkuang.	Mohd. Hassan, B. Pulau Mohd. Hashim, B. Pulau	1st 2nd
294	Hats (mengkuang or pandan).	Peng. Gunong Semanggol, Krian Mohd. b. Salleh, B. Pulau	1st 2nd
295	Mat, plain, house wear.	Peng. Md. Mansur, L. Perak Md. Ismail, Stiawan	1st 2nd
296	Mats, plain, for drying padi, (tikar hampar).	Datok Paduka Raja, P. Tiga, Lower Perak Tunku Senanill, L. Perak	1st 2nd
297	Mats, coloured, house wear.	Majid, Seremban R. A. Rahman, Selama	1st 2nd
298	Mats, fancy varieties.	Majid, Seremban	1st

Section V. Miscellaneous.

299	Kajang.	Peng. Ahmad, Tasir, L. Perak Dato Paduka Raja, Perak	1st 2nd
300	Attaps.	Peng. Mohd. Nasir, L. Perak Raja H. Yahya, L. Perak	1st 2nd
301	Set of cooking utensils.	Omar b. Khamis, Jelutong, Penang	1st
302	Gourd (labu).	Datok Paduka Raja, L. Perak Maq b. Sahad, B. Pulau	1st 2nd
303	Coconut shell, bowl or vessel (gelok).	H. Jusoh, Butterworth, P. W. Sape Ee b. Abu, B. Pulau	1st 2nd
304	Jars, buyong.	Mohd. Zin, K. Kangsar Ngah, Kedai Nasi, K. Kangsar	1st 2nd
305	Ornamental pottery, best collection.	Datok Paduka Raja, L. Perak	1st
306	Industrial earthenware, best collection.	Shaik Hussain, Penang	1st
307	Rope.	Datok Paduka Raja, L. Perak H. Aminudin, Matang	1st 2nd
308	Twine.	J. Stephen, Penang	1st
309	Fishing lines.	Mohd. Jasid, B. Pulau Peng. Mohd. Yatim, L. Perak	1st 2nd

Special Class.

Art Needle-work.	Miss Hogan, Penang	Sp.
Model Boats.	Mohamed Nur, Penang Abbas b. Kassim, Balek Pulau	Sp. Sp.
Pith Work.	V. Samoo, 96 Argyle Road, Penang.	Sp.

Special Class (Contd).

Class.	Nature of Exhibit.	Names of Winners	Prizes.
Model of Kelong.		Peng. Eusuf, Klebang Besar, Malacca	Sp.
Best exhibit in Division E.		Peng. Ahmad b. Saib, Durian Sebatang	Sp.

Section VI. For Malay Schools only.

310	Malay pottery, hand-made.	Pulau Tiga School, Perak	1st
		Kampong Kedah School, Krian	2nd
311	Ornamental baskets.	Sungei Labu School, Krian	1st
		Pasir Panjang Ulu, Perak	2nd
312	Malay mats.	Kampong Kedah School, Krian	1st
314	Model Malay House.	Hutan Melintang School	1st
		Sungei Akar School, Perak	2nd
315	Wood-carving.	Kuala Lumpur Schools	1st
		Batang Karang School, Kinta	2nd
316	Embroidery.	Mohd. Akib, Nebong Tebal	1st
		Girls' School, Bagan Serai	2nd
317	Sarong.	Pengbulu Kulup Jasin	1st
		Kota Lama Kiri School, Lower Perak	2nd
318	Fishing nets.	Kuala Lumpur Schools	1st
		Kota Lama Kiri School, Lower Perak	2nd
319	Collection of miniature of Malay models.	Tanjong Piandang School	1st
		Kampong Repat School	2nd
320	Best article of rattan furniture.	Selangor Schools	1st
		Taipung Boys' School	2nd
321	Collection of models of boats.	Sungei Rusa School, Perak	1st
		Batak Rabbit School, Perak	2nd
322	Embroidered mat.	Girls' School, Kota Lama Kiri	1st
		Batak Rabbit School	2nd

Division F.

Agricultural Implements and Miscellaneous.

Class.	Nature of Exhibit.	Names of Winners	Prizes.
323	Padi Implements (collection).	Peng. Dato Paduka, L. Perak	1st
		H. Abd. Latib, K. Kangsar	2nd
324	Agricultural Implements other than for Padi or Rubber.	Mohd. Abas, B. Padang	2nd
325	Agricultural Implements (Euro- pean made).	J. Leith Wemyss, Penang	1st
		P. R. Pinhorn, P. Rengas	2nd
330	Knives for tapping Rubber Trees.	J. Leith Wemyss, Penang	2nd

Agricultural Implements and Miscellaneous (*Contd.*)

Class.	Nature of Exhibit.	Names of Winners	Prizes.
333	Roofing tiles (locally made).	Tan Kee Chong, P. Wellesley	1st
		Oh Ah Kak, Penang	2nd
334	Roofing tiles (Imported).	Oh Ah Kak, Penang	2nd
335	Flooring tiles (locally made).	Khoo Soo Ee, Penang	1st
		Oh Ah Kak, Penang	2nd
338	Pottery fancy.	Ramasamy, Province Wellesley	2nd
339	Baskets Agricultural.	Khoo Soo Ee, Penang	1st
		R. Young, Penang	2nd
341	Carriage, 4 wheeled (locally made).	Chin Seng & Co., Penang	1st
342	Carriage, 2 wheeled (locally made).	Chin Seng & Co., Penang	1st
		J. Samuel, Penang	2nd
343	Carriage suitable for Estate Work (locally made).	Chin Seng & Co., Penang	2nd
344	Flower pots.	V. Moorgappa, P. Wellesley	1st
345	Garden Furniture.	J. L. Wemyss, Penang	1st
347	Hack gharry (improved construction) locally made.	Chin Seng & Co., Penang	2nd
348	Shandrydan (locally made).	Chin Hin & Co., Penang	1st
		J. Samuel, Penang	2nd
350	Miscellaneous.	Musa, Penang	1st
		Geo. R. Woodford, Penang	2nd
		Ong Pin Huat, Penang	3rd
		H. C. Rice, Penang	Sp.
		Sin Beow Yean, Penang	Sp.

RAINFALL FOR AUGUST, 1909.

The Fort	Ins.	14	23	Pulau Jerajah	Ins.	7	83
The Govt. Hill		17	85	Pankore		10	06
The Prison		14	76	Lumut		11	37
Balek Pulau		16	22	Bruas		8	60

The highest Maximum Temperature on the Hills and Plans was	77° and 90° respectively	
The lowest Maximum Temperature	70 and 89	„
The highest Minimum Temperature	65 and 76	„
The lowest Minimum Temperature	59 and 74	„
The highest Sun Temperature	139 and 162	„
The lowest Sun Temperature	102 and 132	„

A fair average of rain has been registered this month at all the Stations, August always being the wettest month of the year. The following is a record fall in August for

1887	Ins.	23	39
1891	Ins.	20	96
1898	Ins.	25	56
1904	Ins.	26	33

M. E. SCRIVEN, S.A.S.,
Meteorological Observer,
Prison Observatory Penang.

9th September, 1909.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of August, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
510 General Hospital, K. Lumpor	29.867	144.1	79.7	88.1	72.1	16.0	75.9	.833	73.3	80	Calm.	6.70	0.78
Pudoh Gaol „	8.52	2.02
District Hospital „	8.36	1.39
„ Klang	13.37	3.97
„ Kuala Langat	87.1	72.0	15.1	...	...	...	...	...	11.03	1.90
„ Kajang	12.52	5.74
„ Kuala Selangor	88.4	75.9	12.5	...	...	...	...	...	8.50	1.32
„ Kuala Kubu	89.5	69.9	19.6	...	...	...	...	...	22.23	7.42
„ Serendah	91.5	69.7	21.8	...	...	...	...	...	18.07	3.89
„ Rawang	89.2	70.3	18.9	...	...	...	...	...	12.67	3.30
Sabak Bernam	8.70	2.05

OFFICE OF SENIOR MEDICAL OFFICER,
Kuala Lumpur, 16th September, 1909.

G. D. FREER,
Senior Medical Officer Selangor.

Perak.

Abstract of Meteorological Readings in Perak for the month of August, 1909.

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DISTRICT	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taipeng	...	149	81.58	93	70	23	76.85	860	...	79	...	15.74	5.40
Kuala Kangsar	80.11	93	70	23	75.59	827	...	80	...	7.94	1.65
Batu Gajah	...	156	79.90	93	71	22	75.51	827	...	81	...	11.90	2.34
Gopeng	79.35	91	61	30	74.18	775	...	77	...	20.53	3.22
Ipoh	80.43	92	70	22	76.46	857	...	82	...	9.48	1.65
Kampar	79.45	93	70	23	75.29	825	...	81	...	32.21	5.30
Teluk Anson	81.33	93	69	24	76.72	858	...	79	...	10.52	2.88
Tapah	79.98	91	64	27	75.37	820	...	79	...	14.12	2.30
Parit Buntar	88.83	90	71	19	76.71	865	...	81	...	7.37	1.46
Bagan Serai	81.07	91	69	22	76.73	863	...	81	...	9.71	2.29
Selama	80.75	91	71	20	76.58	862	...	81	...	15.28	3.27

STATE SURGEON'S OFFICE,

Taipeng, 15th September, 1909.

M. J. WRIGHT,

State Surgeon, Perak.

The Duff Development Company Limited, Kelantan.

Abstract of Meteorological Readings in Kelantan for the month of August, 1909.

512

DISTRICT.	Mean Barometrical Pressure at 32° Fahr.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis	Mean 89.3	Mean 72.7	Mean 16.6	...	...	...	...	...	6.59	2.52
Kuala Kelantan	82.0	72.4	9.6	...	...	...	...	...	4.99	1.30
Kuala Pergau	89.8	73.6	16.2	...	...	...	...	...	12.52	2.56
Taku Plantation	6.62	1.06
Pasir Besar Estate	7.53	.76

SURGEON'S OFFICE,
September, 1909.

A. G. H. SMART,
Surgeon.

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Negri Sembilan.

Abstract of Meteorological Readings in Negri Sembilan for the month of August, 1909.

513

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Seremban Hospital		140.3	79.6	86.7	69.9	16.8	77.4	.902	75.9	89.1	N.W.	7.03	1.15
Mantin												12.92	3.77
Tampin												6.75	1.46
Kuala Pilah												5.63	1.50
Jelebu												5.03	1.35
Port Dickson Town													
Port Dickson Beri-Beri Hospital												10.05	1.66
												13.40	3.76

M. O. OFFICE,

11th September, 1909.

S. LUCY,

Medical Officer, in charge.

Penang.

Abstract of Meteorological Readings in the Prison Observatory for the month of August, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	F°	F°	F°	F°	F°	F°	Ins.	F°	%	S.E.	Ins.	Ins.
Prison Observatory.	29.838	147.07	80.7	89.3	74.8	14.5	77.9	.926	76.1	88	S.E.	14.76	4.70

PRISON OBSERVATORY, SURGEON'S OFFICE,

9th September, 1909.

A. H. KEUN,

Medical Officer, Surgeon.

Seremban.

Table Showing the Daily Results of the Reading of Meteorological Observation taken at the General Hospital, Seremban, for the month of August, 1909.

DATE.	TEMPERATURE OF RADIATION.						TEMP. OF RADIATION.		WIND. DIRECTION.		TEMP. OF EVAPORATION.			COMPUTED VAPOUR TENSION.			RELATIVE HUMIDITY.			CLOUDS 0 TO 10.			WEATHER INITIALS.			RAIN. Inch	
	9 H.	15 H.	Mean.	Maxi- mum.	Mini- mum.	Range.	Sum	Differ- ence Sum & Shade.	9 H.	15 H.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	21 H.		
	1	76	84	80	90	70	20	140	50	N W	N W	72.6	77.4	75	801	938	859	89	80	84.5	3	10	10	N	N		N
2	77	86	81.5	88	69	19	142	54	N W	N W	71.9	77.7	74.8	783	955	869	84	76	80	4	2	6	C	S	C	65	
3	77	87	82	80	70	10	141	61	N W	N W	73.6	78.8	76.2	829	985	907	89	77	83	3	3	4	S	S	C		
4	77	86	81.5	88	71	17	144	56	N W	N W	75.3	79.4	77.3	877	1.008	942	94	80	87	1	2	2	S	S	C		
5	74	85	79.5	89	69	20	145	56	N W	N W	72.3	80	76.1	793	1.026	909	94	85	89.5	5	4	3	S	S	C		
6	75	86	80.5	87	70	17	145	58	N W	N W	73.3	83.7	78.5	820	1.121	970	94	90	92	8	3	4	S	S	C	04	
7	70	85	80.5	87	70	17	145	58	N W	N W	72.6	81.7	77.1	801	1.082	941	89	90	89.5	3	4	5	S	S	C		
8	75	86	80.5	86	70	16	140	54	N W	N W	73.3	83.7	78.5	820	1.121	970	94	90	92	2	1	2	S	S	C		
9	76	86	81	87	70	17	146	59	N W	N W	72.6	83.7	78.1	801	1.121	961	89	90	89.5	5	10	10	S	S	C		
10	76	84	80	86	70	16	143	57	N W	N W	74.3	80.7	77.5	848	1.045	946	94	90	92	2	8	6	S	S	C	03	
11	74	82	78	84	70	14	135	51	N W	N W	72.3	78.7	75.5	793	978	885	94	90	92	7	5	4	S	S	C	85	
12	75	84	79.5	85	69	16	136	51	N W	N W	73.3	80.7	77	820	1.045	932	94	90	92	5	7	6	S	S	C		
13	76	80	78	83	69	14	140	57	N W	N W	72.6	78.3	75.4	801	96	882	89	95	92	6	10	10	S	S	C		
14	75	83	79	86	68	18	140	54	N W	N W	73.3	81.3	77.3	793	1.067	930	94	95	94.5	4	3	4	S	S	C	26	
15	75	86	80.5	88	69	19	145	57	N W	N W	73.3	83.7	78.5	793	1.121	957	94	90	92	2	3	2	S	S	C		
16	75	85	80	89	69	20	146	57	N W	N W	73.3	83.4	78.3	793	1.141	967	94	95	94.5	2	5	2	S	S	C		
17	77	86	81.5	90	71	19	149	59	N W	N W	71.9	82.1	77	783	1.064	923	84	85	84.5	1	2	4	S	S	C		
18	77	85	81	91	70	21	149	55	N W	N W	71.9	80	75.9	783	1.026	904	84	85	84.5	0	2	5	S	S	C		
19	77	82	79.5	88	70	18	148	60	N W	N W	73.6	77	75.3	829	926	877	80	85	87	0	10	6	S	S	C		
20	78	82	81	85	70	15	138	53	N W	N W	74.6	77	75.8	857	926	891	89	85	87	4	8	10	S	S	C	18	
21	76	84	80	86	70	16	136	50	N W	N W	74.3	79	76.6	848	990	919	89	85	89.5	5	8	10	S	S	C	21	
22	76	83	79.5	87	70	17	140	53	N W	N W	72.6	78	75.3	801	956	878	89	85	87	4	2	6	S	S	C	11	
23	75	82	78.5	85	70	15	138	53	N W	N W	73.3	77	75.1	820	926	873	94	85	89.5	2	4	10	S	S	C	04	
24	74	85	79.5	85	70	15	136	51	N W	N W	72.3	78.4	75.3	793	973	883	94	80	87	4	10	8	S	S	C	48	
25	75	80	77.5	86	70	16	138	52	N W	S W	60.8	76.6	68.7	731	916	823	84	90	87	3	8	2	S	S	C	1.15	
26	76	81	78.5	89	72	17	147	59	N W	N W	74.3	76.3	75.3	848	897	872	94	85	89.5	4	8	0	S	S	C		
27	75	80	77.5	87	71	16	137	50	N W	N W	73.3	75	74.1	820	867	843	94	85	89.5	4	6	2	S	S	C		
28	76	80	78	87	71	16	138	51	N W	N W	72.6	76.6	74.6	801	916	858	89	90	89.5	5	10	5	S	S	C		
29	75	81	78	87	69	18	140	53	S W	N W	73.3	76.3	74.8	820	897	858	94	85	89.5	6	10	5	S	S	C	1.02	
30	75	80	77.5	85	69	16	115	30	S W	N W	73.3	75	74.1	820	867	843	94	85	89.5	10	8	0	S	S	C	50	
31	78	81	79.5	87	71	16	130	43	N W	N W	72.9	77.7	75.3	819	947	878	84	90	87	4	7	6	S	S	C	1.15	
Mean	75.8	83.4	79.6	86.7	69.9	16.8	140.3	53.6	N W	N W	72.7	79.2	75.9	811	994	902	91.6	86.7	89.1								7.03

515

Highest Temperature 91. Lowest Temperature 68. Greatest Rainfall in 24 hours 1.15 ins.

J. LUCY,
Medical Officer in Charge.

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

No. 11.]

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[VOL. IX

PEAT SOILS. (*Continued.*)

In Warming's Oecology of plants he deals in chapter 84 with the formations in acid soils, but his observations are only made on those of cold climates. Formations like those of our so-called peat-formations occurring in the tropics seem to be rare, and no records have been made of them.

The action of these soils on plants is, however, practically the same as in the temperate swamps, the main difference being that in the tropics the soil is composed of branches and trunks of large trees, while in temperate regions it is composed of smaller plants, bog-mosses, grasses and heaths. In the temperate regions a specially adapted flora has been produced to meet the demands of the peculiar soil, but in our limited areas, which seem to be of very modern age, there cannot be said to be a xerophytic flora developed from this soil formation as yet.

The factors which go to make these soils xerophytic, although one would naturally expect them to be hygrophytic, are given as follows:—

One of the factors is an increase in *Transpiration*, that is to say the plants exhale a greater quantity of water than they can afford, and even marsh plants specially adapted to grow in such localities may be forced to reduce their transpiration. *Wet soil is cold, and therefore physiologically dry.* We have no record of the temperature of these peat soils here, but this factor may affect the growth of rubber in such spots. *Respiration is obstructed* (the soil being poor in oxygen), and the roots functional activity depressed. This is a serious factor, and that this is of the greatest importance to plants is shown by the occurrence of aerating roots to trees in the wet, swampy peat woods of the peninsula. Many of those who have had to walk through such spots must have noticed the *knees* or projecting roots of certain trees rising a foot or more above ground in the form of cones. They are most abundant in the mangrove mud where the

supply of oxygen is very small but they are often very conspicuous and striking in the wet swamp woods of the interior. Their presence shows conclusively that there is not sufficient oxygen in the soil for the plants growing there. Again "Livingstone arrives at the conclusion that at least in some bogwater there occur chemical substances which are not in direct relation to the acidity of the water but which act on the vegetation, and it is suggested that these substances may play an important role in the inhibition from bogs of plants other than those exhibiting xerophytic adaptatious" (Warming).

The most important factor, or as Warming expresses it "the weightiest cause of the physiological dryness of the soil lies in the humic acid and other dissolved substances which chemically affect the roots. Humous acids depress the roots activity, and render it more difficult for the plant to replace the water lost by transpiration."

It may be pointed out, too, that these lands where this soil formation occurs are quite flat and consequently fully exposed to winds when cleared of forest for planting. In fact one feels the wind sweeping through the cleared ground and sees the seedling rubber plants bending and quivering before it. Now wind has more than one injurious effect on young plants exposed to it. Constantly moving the stem of a young plant, it keeps it loose in the soil and breaks the rootlets and root hairs as they grow, so checking the growth of the plant. But wind also does more. It increases the loss of water by transpiration. The loss of water would be sufficiently bad if the plants were protected from wind, but when by clearing the forest the loss is increased by the exposure to the action of the wind what chance has a hygrophytic plant like Para-rubber of existing? The injurious action of wind in increasing the loss of water has been overlooked or not realised by planters who bare every hill top overlooking the estate to plant more rubber on it instead of leaving windbelts to check this loss of water in the young plants. It is probable that this loss of water by transpiration is the cause of that peculiar wrinkled appearance of rubber leaves that one so constantly sees in wind-swept young plants, but this requires further investigation. *Hevea brasiliensis* possesses none of the adaptation for living in a dry or zerophytic region. Plants adapted for such a region are often protected from excessive loss of water by having the lower leaf surface covered with wax or hairs, by having a thick cuticle to the leaves, by having narrow leaves or leaves so arranged as to present the narrowest surface to the air and in various other ways. The leaves of Para-rubber are thin, neither protected by hair or wax; they are broad and flat, so as to get the freest transpiration in their normal habitat, dense damp shady forests. By planting them on ground where the transpiration or loss of water is excessive, as in these peat lands, we submit them to the same state of affairs as if we planted them in the desert. When we

add to this the insufficiency of oxygen in such soils, and the action of the humous acids and other chemical substances which injure the root and prevent its taking up water in sufficient quantity to replace that lost by transpiration, we can easily see that no plant of the type of *Hevea* can thrive or exist even for any time under such circumstances, strong and adaptable as the plant appears to be in these regions.

Peat-land, after being felled and exposed for a long time to the air, and drained so that much of the humous acids are washed out of the soil might (if not too deep above the underlying clays) in time become a good and suitable soil for growing Para-rubber in, but it would not be worth while to go to this expense and long delay.—ED.

THE WORK OF THE IMPERIAL INSTITUTE.

The immense importance to Colonists throughout the Empire of the Imperial Institute is very clearly shown by the report of its work for the year 1903 (Colonial Reports 601. July 1909) and the appreciation of its value by the Colonies is illustrated by the amount and variety of produce which has during the past year been sent to the Institute for examination and report, Almost every colony from the largest to the smallest has sent of its productions for investigation, and this mass of material includes every conceivable class of animal, vegetable and mineral produce.

The Institute is now with its large staff able to analyse and value such different materials as ores, clays, salt, kelp (for potash) and cocaine fibres of all kinds, wool, rubbers, timbers, oils and oil seeds, food grains, tan stuffs and dye stuffs, resins, gums, drugs, tobacco, sponges and ostrich feathers.

Among the substances sent from this Colony and Native States were minerals, the most interesting of which were limestones carrying tin, and in one case also enough phosphorus to be valuable as a manure after removal of the tin; fibres, hemp, Mauritius hemp and Sauseviera from Johore, Para rubber seed oil from the Federated Malay States and other vegetable produce.

The public of the Malay Peninsula does not however it appears make as much use of the Institute as many of the other colonies do. Probably this is because all are so satisfied with the progress of the rubber industry that they have no inclination to turn their attention to minor products.

The large number of samples of fibres submitted to the Institute during the year shows that at least in other parts of the Empire, there is a considerable amount of interest taken in this form of produce, and indeed the increasing demand for fibres of all sorts makes it imperative that attention should be paid to them. The Mercer's Company having made a grant for aiding in investigations into fibres, a Mercer's Research Fellowship has been established the holder of which is to devote himself to investigations of fibrous

materials with view to their employment in textile and other industries. We shall hope to see other Companies, and Associations following this good lead for other products.

Of cottons the best samples examined came from India, Rhodesia and British Guiana. Among the last fibres were several of interest, One was from the well known vegetable called here Lady's fingers. (*Hibiscus esculentus*), cultivated as a vegetable everywhere. The fibre was taken from the stalks after the fruits had been collected and was valued at £14, £10 to £20 per ton with medium jute valued at £14 to £16 per ton. As the plant is otherwise useless after two or three crops have been taken off, perhaps the vegetable gardeners instead of putting it on the burning heap might find it worth while to take the fibre out. The weed known here as Perpulut, and in America as Cesar-weed (*Urena lobata*) has an excellent fibre useful as a substitute for jute. Unfortunately it is apt to be too short, a tall variety would be very useful, as the plant is a very common village weed and grows anywhere.

Another common weed produces a fibre which is even more valuable, that is *Sida rhombifolia* a common roadside mallow. This fibre is silky and considered suitable for mixing with silk and was valued at from £25 to £30 per ton, and its cultivation recommended. The Indian textile journal for November 1908 discusses the possibility of its becoming a substitute for jute. The difficulties in its cultivation are said to be the hardness of the seed coat, which prevents rapid germination, and the tendency of the plant to branch. The former difficulty is obviated by soaking the seed in hot water, and it is reported that a straight growing variety has been found in Burmah.

The fibre is actually more valuable than jute, its cellulose content and therefore its durability being higher. Its texture too is finer, and it could be used for special purposes for which jute is unsuitable. As the plant is a very common village weed it is possible that in the near future it may be placed on the market as a fibre plant.

Manila hemp has been grown with very fair success in the Nilgiris and Trinidad, the sample from the latter colony valued at £30 ton.

Sisal hemp of good quality was sent from the Sudan, British East Africa, the Andamans and Fiji. The samples of *Sansevieria* seem mostly to have been too short, and poorly prepared. It should be at least three feet long. New Zealand flax (*Phormium tenax*) from St. Helena is an interesting new shipment. The samples were not equal to the best New Zealand product, but this is a matter which may be improved. Of the samples of Rubber sent for examination three only were Para rubber, and three from Zanzibar, the Nilgiris and the Seychelles. Those from the two latter places were good but too young, that from Zanzibar dirty and more resinous than usual. It is probable that the first two colonies will come into the market as rubber producers in time as the reports of cultivation there seem good.

Castilloa came from the Nilgiris and Zanzibar, the best from Burliar in the former district, and valued at 3s 6d to 3s 8d, as against hard Para at 5s 1d. The rubber in most cases was too resinous, probably from the youth of the trees.

Good *Para* rubber came from Kullar in the Nilgiris and was valued at 5s 6d against Para biscuits at 5s 3d to 5s 9d.

Funtumia elastica came in some quantity from different parts of Africa. There seems to be some difficulty in preparing it as most of the samples were reported rough. It was mostly valued at about a shilling a pound less than Para.

A number of other rubbers. *Landolphia*, *Ficus Vogelii*, e.i. *Mascarenhaisia*, *Clitandra*, *Raphionacme* (a root rubber) *Vaheca* came from the African region and were mostly fair to good and Jamaica sent *Forsteronia* rubber of fair value. *Sapium Jenmani*, from British Guiana seems equal in value to fine hard Para or even better. Plants of this rubber tree were recently received at the Botanic Gardens Singapore.

A number of oil seeds including those of Para rubber were investigated, and seeds of "*Crotalaria juncea*" from the Federated Malay States were under investigation at the end of the year. Is this correctly identified? We have never seen a plant of this in the peninsula, nor succeeded in growing it.

It is rather interesting to find among the drugs examined, and found to contain a minute quantity of a crystalline alkaloid "to which the physiological activity of the drug is due", that extremely common hated of planters *Ageratum conyzoides* the white weed. It would be very satisfactory to find it of some use, as no plant is a more persistent weed here.

The whole report is one of interest, and is a valuable record of work done and of steady progress, while at the same time it gives an idea of the vast resources of the British empire.—ED.

PARA RUBBER IN MADRAS.

The total rainfall "in the Botanic Gardens during the year amounted to 52.77 inches. Heavy rains fell on four days of January 1909, amounting to nearly ten inches. These extraordinary rains fell on the first four days of the month, After this practically no rain fell for three months". This is the report of the Curator of the Ootacamund and other gardens in Madras, in the Annual Administration report for 1908-1909, and one would hardly imagine that with such a low rainfall as this not much more than half of what falls in a year in the Malay Peninsula, Para rubber would be likely to thrive, but at Burliar and Kullar this tree seems to be doing well. Possibly the rainfall is somewhat heavier there, but the Curator gives no information on this point. The oldest tree planted

on 1882 gave on May 5th 1909 a height of 81 feet and a girth of 7.5 at one foot from the ground and 5.10 at 4 feet. From the tables given it appears that the trees put on a girth of from 2 to 3 inches annually, which though less than comparatively young trees (as many of the Madras trees are) usually grow is by no means a poor growth. It is regrettable that for measurements of tree growth the measurement are not taken at the almost invariable height taken namely at 3 feet from the ground. This height is found to be the most convenient one, and a uniform standard should be adopted for purposes of comparison. The measurement of girth at one foot is valueless, as trees vary so much in dimensions at the base, and measurements to form a valuable table of growth should be taken on the same day of each year or as near to it as is practicable. Examining the tables given in the report however, one may gather that the growth of the trees in spite of the scantiness of rain and the long dry spell is quite good enough for practical purposes, though considerably slower than in a rainier country.

Many of the trees are reported as being sufficiently developed for tapping and the rubber was reported on at the Imperial Institute as good but rather weak as the trees were young. So there is it seems a future for Para rubber cultivation in Madras. All the same the growth of *Castilloa* seems to be better than that of Para rubber, the trees running to a good size and making steady growth, and from latitude one would certainly expect this tree to do better, but Mr. Proundlock reports that it has fallen into disfavour with planters and there is no demand for it. It is quite possible however, that *Castilloa* may play an important part in the agriculture of India at a later date.—ED.

THE BLACK HEVEA FUNGUS.

Another sample of the black fungus described in the July number of the Bulletin, page 310, has been received at the Botanic Gardens, Singapore, from Selangor. In this case the fungus had attacked stumps about 3 inches in girth. No less than 80 per cent. of the stumps were found to be killed by this pest. In this case the fructification of the fungus had appeared in abundance at a height of 2 feet and all down the tap root. This shows that the fungus does not confine itself to the upper branches of trees, but, apparently, it can attack almost any young part of the plant. Dangerous and troublesome as this pest is likely to prove to young plants in nurseries, it would be more so if it attacked adult trees or trees in bearing, not only on account of the greater loss, but also because it would be much more difficult to deal with.

In any case this seems likely to prove as dangerous a plant as the *Fomes*, is not worse and its history and the best means of combatting, it should at once be carefully investigated.—ED.

THE GROWTH OF MANICOBA RUBBER TREES IN THE MALAY PENINSULA.

During December 1908 a quantity of seeds of *Manihot dichotoma*, Ule, and *Manihot piauhyensis*, Ule, were received at the Botanic Gardens Singapore, through the agency of the Royal Botanic Gardens, Kew, the Royal Botanic Gardens, Calcutta, and the Forests and Gardens Department, Hongkong, for experimental purposes in the Malay Peninsula. Part of the seeds or seedlings were given to Planters who were anxious to try them on their estates. The remaining seeds were sown in Singapore. In the Agricultural Bulletin for January of this year (No. I, Vol. VIII) I gave a short description and account of the cultivation of these Manihots in Brazil and at the same time promised to give a report of our trials in a future number of the Bulletin. Ten months having now elapsed since then, I am able to give an account of their growth during that period.

On Tebrau estate, Tampoi, Johore, a number of seeds of each species were sown in the same seed beds and two months previous to seeds of *Hevea brasiliensis* (Para). The soil on which the seed beds are formed is light and sandy and the annual rain fall in the district is not heavy, about 100 inches I believe. At the present moment the seedlings are about 10 months old. The Manihot seedlings show a much more rapid growth than those of Para, the branching tops of the former standing clear above the surrounding plants of the latter. The biggest plant is now over 15 feet high and 8 inches in circumference at 3 feet from the base.

Early this year a small case of seedlings was despatched from the Botanic Gardens, Singapore, to Sengat Estate, Ipoh, Perak, and Mr. Lyal Patterson informs me that the growth of his plants has been a surprise to him. One plant, he says, is over seven feet in height and all the others are well over five feet. One plant that was topped is now a fine bushy tree. The soil is also of a light sandy nature and the annual rain fall is not heavy.

The seedlings in the Botanic Gardens, Singapore, show similar growth to the above-mentioned cases. The plants vary in height from 8 feet to 12 feet with an average girth of 4 inches at 3 feet from the ground. The plants branch dichotomously and from very regular well-balanced tops. In appearance the two species of Manicobas are very much alike, but are easily recognised by the following differences in their leaves:—

Manihot dichotoma, leaves three to five lobed, pale green on the under surface, with ribs of greenish white, the contrast of the leaf with the ribs being sufficiently well marked to enable the species to be identified at a glance. Tree said to attain a height of 30 feet and more with a diameter of some 2 feet when fully matured.

Manihot piauhyensis, leaves 3 to 5 partite, ribs on underside of a purplish colour, leaf itself being of a darker green than the former. Small tree 6-16 feet tall.

From what we know at present these *Manihots* would appear to grow much faster in the first year than *Hevea brasiliensis* does, but whether the same rate of growth is maintained in the second and succeeding years remains to be seen.

Manihot dichotoma would appear to be the better tree from a planter's point of view attaining as it does a fair size. According to Dr. Ule *M. piauhyensis* is often not more than a shrub 6 feet tall and is obviously unsuited for practical purposes.

A third species has been mentioned recently, namely *Manihot heptaphylla* the "S. Francisco Manicoba," but of it we know very little although it is said to yield rubber of good quality.

Judging by the record of Ceara Rubber (*Manihot Glaziovii*) in Malaya in the past it is extremely doubtful if the Manicobas will ever be taken up in preference to Para. *Hevea brasiliensis* has everything to recommend it at the present moment and is eminently suited to our climate. Planters will therefore be well advised not to expend money on these new species of *Manihots* until something more is known of their reputed good qualities.—

T. W. MAIN.

SHORTAGE OF THE SUPPLY OF PARA RUBBER.

Heavy and increasing demands from America.

The continued high price ruling for raw rubber, which is now round about 8s per lb. has induced many investors to submit inquiries asking us for information as to the present market position.

The rubber standard of value is the "spot" price of hard Para, wild forest grown, and the market has now to face a natural shortage in this product, with the result that for the first time on record the value of wild has risen above that of plantation grown sorts of the best brands, and has also caused quotations for forward shipments to rise. This situation is causing manufacturers to make only "hand to month" purchases in the fervent hope that something will happen to cause the price to drop. Consumers complain that the market is being manipulated by speculators, but this does not rest on any tangible evidence. The only matter of uncertainty is that no one knows what the actual production in Brazil amounts to or is like to be, owing to the various difficulties surrounding its collection and transport.

As is well-known, the chief sources of wild growths are in the districts of the Amazon and its tributaries, whence it is brought down by boats or pack mules to Para and Manaus. It is cured before being moved, and therefore is ready for immediate shipment or for stocking at these ports, a universal marketable commodity. It is about the only commodity of its class which is not sold from sample.

The latest statistics show of a strong position, and with the Eastern plantations as yet producing only a small percentage of the total yield, the Brazilian output, as it has always done hitherto, dominates the market. The increase in quotations for forward delivery indicates that prices will be maintained, if not advanced, in the near future, and the plantation companies will continue to share in the profits to be made out of sales at the present range of values. The heavy and increasing demand, mainly from America, is not being over-taken by the supply, and while this remains the case it is not likely there will be any drop in the price.—*Financial Times*.

KUALA LANGAT DISTRICT PLANTERS' ASSOCIATION.

CHAIRMAN'S ANNUAL REPORT.

Following is the annual report of the Kuala Langat D. P. A:—
Gentlemen,—Since the formation of our Association, on August 27th, 1907, we have published no report on our proceedings, and I propose therefore to take this opportunity of saying a few words about the work it has done, and on one or two other matters affecting our common interests.

I have been your Chairman and Mr. E. Macfadyen your Hon. Secretary since the formation of the Association. The committee at present includes also Messrs. R. W. Munro, E. Valpy and J. Molesworth. Dr. Laidlaw and Mr. A. Glennie also served on the committee in the past.

About two years ago, on the dissolution of the U. P. A., we joined in constituting the P. A. M., a body which now represents the planting interests of the whole Peninsula and is continually acquiring authority and influence. At all the meetings of the P. A. M., with one exception, your Association has been represented and your delegates have brought forward several proposals which have been well received.

We were the first to move for a reduction of quit-rents on coconuts, and the granting of a reduction, however inadequate, involves a valuable principle.

We took a leading part in the crusade against the deplorable neglect by the authorities of the control of the liquor trade; a crusade that led to the passing of a new Excise Enactment, which, it is hoped, will prevent the sale of poisons, under the guise of alcoholic stimulant, to our coolies. I regret to say that, though enacted nearly a year ago, this law has not yet come into force in Selangor.

As an Association, as well as individually, we are keenly interested in the development of this district by the improvement of communications; and we may heartily congratulate ourselves on the completion a year ago of the Langat River bridge. We are assured that the new road for which the bridge was constructed will before long be opened for traffic.

Last year, with a view to removing a possible cause of friction amongst ourselves, we passed a resolution that no member of our Association may employ any Tamil cooly who has previously been employed by any other member, without the latter's consent. I think, gentlemen, that we may congratulate ourselves on the successful working of this rule. I believe there has not been a single serious dispute during the current year and the most cordial relations exist between the managers of every estate in our district.

In matters relating to the constitution of the P.A.M., we favoured the changes which recommended themselves to that body and heartily supported the abolition of that tiresome and curious anomaly known as "Sunday Names." We discussed several other matters some of which are still under consideration.

Three estate hospitals have been built. The largest, known as the Kuala Langat Estates' Hospital, is subscribed to by all the estates belonging to this Association, with two exceptions. These hospitals provide accommodation for 3% of our total labour force and prove, as anticipated, to be far in excess of the requirements of our sick. It is interesting to note that the Resident-General ascribes the improvement in health of our labour, in part, to the opening of the estate hospitals. So far as estates in this neighbourhood are concerned, our rate of sickness averaged about $\frac{1}{2}\%$ before our hospitals were built and there is no material improvement to be noted since they were opened.

The area under rubber and coconuts under European management in this district now exceeds 12,000 acres.

An interesting lecture on "The Build of the Para Tree," by Mr. Gallagher, on March 11th, 1909, and another by Mr. Pratt on "Termes Gestroi," on June 20th, were well attended and greatly appreciated.

I think we might take this occasion to offer our congratulations to the authorities on their choice of a successor to Mr. Carruthers. In appointing Mr. Gallagher Director of Agriculture, the Government has most happily shown its recognition, not only of the importance of the science of mycology to agriculture, but of the merits of an able and zealous officer.

The application of scientific knowledge to our industry is a question of steadily growing importance. On this subject the somewhat surprising remarks of H. E. the Governor, at Penang, last month, were ably replied to by the Chairman of the P.A.M. in so far as the *duty of the individual to the State is concerned*. But as an old colonist, I could not help comparing Sir John Anderson's view of *the duty of the State to the individual*, as I listened to his speech, with those generally held by the rulers of our great self-governing colonies.

Let me give you an example. As soon as it had been demonstrated to be possible for white men to make a living out of agriculture on the Darling Downs, a well-organized Agricultural Department

was formed by the Government of Queensland and given the necessary means for furthering every branch of agricultural development possible to the soil and climate. The land was alienated for next to nothing, seeds were imported and distributed to all who would plant them. I remember a fully-equipped dairy visiting my district there nineteen years ago, and giving instruction, free of charge, to all willing to learn. I believe there was not a single private dairy in all Queensland then. To-day there are 13,000 and instead of having to import butter and cheese, an enormous export trade has been established. Surely it is possible for our authorities to profit by such lessons as these.

Our $2\frac{1}{2}\%$ export duty on gross output is equal to a 2/- in the £ income tax, on an average net profit of 20% per annum and is probably the heaviest direct tax on agriculture in the British Empire. The F.M.S. planter's position in this respect is indeed a proud one, and he has been further elevated by the increased value placed upon the land he proposes to plant together with other burdens recently laid upon his industry. In spite of the high price of rubber, barely 10% of the rubber estates in the F.M.S. were in a sufficiently forward position to pay dividends last year, and not more than 5% have yet given an adequate return on the capital expenditure, considering how long the investors have had to wait for it. Therefore, with all respect to His Excellency, I would submit that the consideration of how we shall use our reserves is not a very urgent question with most of us to-day, and its discussion might be deferred, until the community in general have something more substantial than good prospects to sustain them.

The perusal of the annual reports for the past year must surely show that there is something wrong with the prevailing policy. The area of the F.M.S. exceeds 16,000,000 acres and most of this is suitable for cultivation or mining operations. Yet the total alienated acreage is only 1,300,000 acres. Of this the Resident-General tells us that probably, not more than one quarter, or say a little over 2% of the whole area, is under cultivation; while we learn from the Resident's report that the applications for land in Selangor amounted to only 30,925 acres as against 79,776 in 1907, while 3,534 acres reverted to the State.

In F.M.S. revenue (although we are still taxed in excess of local requirements) there was a falling off of more than four million dollars and the total reduction in the import and export trade exceeded \$21,000,000. It is true that there was a general depression in trade throughout the world in the year 1908; and the decline in the value of tin was largely responsible for the shortage; but surely there are sufficient remnants of prosperity left us to make it possible to tempt our fellow-countrymen, at any rate, to come here instead of going to the Dutch colonies? I think we may say that we have demonstrated that the soil and climate conditions of these States are as well adapted for the cultivation of rubber and several other

products as any other country, that the labour conditions are comparable with those prevailing in most other places and that there is no healthier land in the tropics.

C. E. S. BAXENDALE.

September 18th, 1909.

KUALA LANGAT DISTRICT PLANTERS' ASSOCIATION.

Accounts for 2 years ending July 31st, 1909.

	\$	cts.		\$	cts.
Acreage Assessment			P. A. M. contributions 5		
year ending 31-7-08 ...	197	68	months ending 31-3-08	140	00
Special levy; London			Special subscription, London		
Rubber Exhibition ...	200	00	Rubber Exhibition ...	200	00
Acreage Assessment			P. A. M. contribution year		
year ending 31-7-09 ...	337	18	ending 31-3-09 ...	200	00
Balances due Hon. Sec. ...	22	73	Do. do. 31-3-10 ...	200	00
			Stationery and printing	12	30
			Postal	5	29
				\$757	59
	\$757	59			

E. MACFADYEN,
Hon. Sec.

STRAITS REPORT.

London, September 10th, 1909.

Beeswax:—The trade has been good, there being steady demand for all qualities at full rates, but we close about 2/6d to 5/- per cwt. from the top.

Camphor:—The trade in crude has been quiet. The value of china on the spot 140/-; and for arrival 135/- c. i. f. Ceylon, spot value 135/- per cwt.

Capsicums:—Demand quiet, but good prices have been paid for superior qualities, common grades being slow of sale.

Chillies:—Have sold well, advancing during the month about 5/- per cwt. a part of which has since been lost.

Copra:—The market has been irregular, but the tendency rather in buyers favour. We quote F. M. States at £19.15.0 and sundried at £20.12.6; Java £20.17.6 per ton c. i. f. n. d. w.

Gums:—After a lapse of two months, and with only moderate offerings competition was good and prices obtained

satisfactory. COPAL:—was in fair supply and met an improved demand, and about one fourth sold at fully last sales rates. 502 cases, 3,671 baskets and 197 bags Manila, Macassar, etc., offered and 1,057 packages sold; Sambas, small to bold pale pinky hard scraped at 63/6d., pale nubbles at 33/- to 36/6d., dull ditto at 28/-. PONTIANAC, pale hard scraped at 70/-, pale and amber scraped at 54/-, bold pale nubbles at 37/-, pale and amber ditto at 33/-, mixed amber at 24/- to 25/-. CHIPS, pale small at 28/-, siftings at 16/-. Macassar, medium and small pale pinky at 43/-, ditto amber at 35/-, fair pipey sorts at 28/6d. to 29/-, rough dark blocky sorts at 12/6d. Nubbles good pale at 33/- to 34/-, pale yellowish at 30/6d. to 32/- blocky at 24/-. CHIPS, small at 21/- to 22/6d. Dust at 16/-, blocky at 12/6d. KORO, fair pale scraped at 33/- to 37/6d, dark coated at 20/- to 22/-, coated nubbles at 25/-, coated chips at 21/-, dark siftings at 10/-.

Damar:—The moderate supply of 616 packages was offered which met a better demand, and more than half sold at a dearer rates.

Singapore and Penang: 180 cases, 115 baskets and 295 bags, offered and 329 packages sold. Singapore, grayish sorts at 45/6d. Penang character, good pale sifted at 56/-, pale grayish sorts at 46/- to 48/-, blocky at 36/- to 38/-, pale siftings at 37/-, specky ditto at 30/-, dusty at 24/6d., blocky at 20/- to 24/-, Dust blocky at 20/-, pickings good gray at 33/- to 34/-, blocky at 26/-, ordinary dark at 18/-. Borneo, black coated chips at 10/-.

Batavian: 16 cases offered and bought in, pale, small dusty at 65/-.

India Rubber:—The decline mentioned in our last report was short-lived since when demand has been animated, and well sustained, the sales shewing higher prices.

On the last occasion Plantation Rubber sold as follows:—Malay and straits (about 100 tons): Sheet, fine smoked at 8/5d. to 8/6d. fair to fine at 8/0½d. to 8/3d., mixed inferior at 7/9d. to 7/11¼d. crepe, good to fine pale at 8/1½d. to 8/3¾d., fair to good palish at 7/7¾d. to 7/11¾d., palish mottled at 7/1¼d. to 7/7- clean brown part dark at 6/6¾d. to 6/11¼d., dark brown part specky at 5/6d. to 6/3d., black and soft at 4/4d. Scrap and virgin pieces, fair to fine clean at 5/2½d. to 5/6d., mixed inferior at 4/10d. Rambdng, crepe at 4/10½d., scrap, good clean at 6/5¾d. and black at 5/4¼d.

Ceylon (about 18 tons): Biscuits and sheet fair to fine at 8/0¼d. to 8/3d. Crepe, good to very fine pale at 8/0½d. to

8/4d., clean brown at 7/3½d. to 7/6¼d., dark brown at 6/6¼d. to 6/10¾d. Worms, good pale at 7/11¼d. Scrap, fair to fine at 5/2d. to 5/9d., mixed inferior at 4/9d. Java Plantation: 11 packages offered and bought in.

Isinglass:—There has been a good steady demand.

Penang: in good supply selling at irregular but generally steady rates for all kinds.

Saigon: has been freely offered, long leaf realising better rates, but round leaf was not so well enquired for in the last.

Sales:—Penang: 177 packages offered (about 34,000 lbs.) and 152 sold; Round Leaf, middling to fair palish at 4/- to 4/4d., ditto reddish at 3/5d. to 3/6d., ordinary reddish part small and rough at 2/9d. to 3/4d., small part thin and rough dark at 2/- to 2/8d., pickings at 10d. to 1/11d. Tongue, good heavy at 4/5d., middling to fair yellow and reddish at 3/7d. to 3/10d., heavy dark part small at 2/6d. to 3/2d., small and pickings at 10d. to 1/11d. Tails, small pale at 1/6d. to 1/7d., middling at 1/4d. Bladderpipe, thin at 1/-. Purse, fair to good at 11d. to 1/-. Ordinary to middling at 8d. to 10d., ordinary dark mixed at 6d.

Saigon:—66 packages offered (about 15,000 lbs.) and 34 sold. Long Leaf, good to fine stout pale at 5/8d. to 5/11d., middling to fair ditto at 5/4d. to 5/7d., middling part thin and dark at 3/4d. Round Leaf, fair palish part thin at 4/2d., fair reddish part thin and rough at 3/10d. to 3/11d., mostly thin part rough at 3/1d. to 3/6d., small reddish and pickings at 2/4d. to 2/10d.

Mace:—Trade small, but steady, prices have been paid for the small quantities offered.

Nutmegs:—Quiet. A few cases of Penang and Singapore have been offered and sold at unchanged rates. 64's to 57's 1/3 to 1/6d., 110's to 65's 4¾d. to 1/2d., 160's to 115's at 4d. to 4½d.

Pepper:—A moderate business has been done during the past month at irregular but generally firmer prices. We close sellers of fair Singapore at 3¼d., spot value. For arrival September to October shipment at 3 9-32d., October to December at 3 5-16d., November to January at 3¾d. January to March at 3 7-16d., delivered weights. White Pepper:—There has been a corresponding firmness, and a fair business. On the spot we close sellers of fair Singapore at 5¼d. For arrival October to December shipment at 5½d., November to

January 5 3-16d., and any position up to January to March at 5 3-16d. c. i. f. delivered weights.

Shell.—Green snail:—Sales just completed realised full prices. Offerings from Singapore and Penang consisting of small to bold realised 38/- to 46/- per cwt. and defective 28/- per cwt.

Sago:—Very little business has been transacted through the medium of public sales, the bulk of the offerings have been bought in privately, trade quiet. Value of fair small on the spot 12/- per cwt. We quote Pearl, dull to fine at 15/- to 16/6, medium 14/- to 15/-, small 11/6d. to 12/6d.

Flour:—Good pinky to white 9/- to 10/- per cwt.

Tapioca:—Trade also has been quiet. Very little has been sold from spot stock other than by private treaty.

Flake:—In moderate supply, fair to good Singapore offering at 1³/₄d. to 2d., and fair Penang at 1⁵/₈d to 1³/₄d. For arrival we close sellers in most positions at 1³/₈d. c. i. f.

Flour:—Also quiet. A few sales to arrive have been made prices ranging from 7/- to 10/- per cwt. The value of fair to fine on the spot 9/- to 11/- per cwt.

Pearl:—The spot value, Bullet 20/-, medium 13/- to 20/-, Seed 12/6d to 21/- per cwt. Medium Singapore near at hand has been sold at 11/-6d. We close sellers of forward at 12/- c. i. f.

Vanilloes:—The offerings have met a good demand, particularly, have fine black beans sold well, even red foxy and split have improved in value.

On the last occasion the following were offered:—

Ceylon:—Of 51 tins about 45 sold. Fair to good 6¹/₂ to 8 inch at 9/- to 11/6d., 3¹/₂ to 6¹/₂ inch at 8/3d. to 10/- common, 4 to 6¹/₂ inch at 6/3d. to 9/- good splits, 6¹/₂ to 8 inch at 9/-, 4 to 6¹/₄ inch at 8/- to 8/9d.

Mauritius:—Of 6 tins 2 sold. Fair to good, 6¹/₂ to 8¹/₂ in. at 11/-; common, 6¹/₂ to 7¹/₂ inch at 8/-.

Seychelles:—Of 47 tins 28 sold. Fair to good, 6¹/₂ to 6¹/₂ inch at 9/3d; common, 4¹/₂ to 7 inch at 6/- to 8/-; good splits, 3¹/₂ to 8 inch at 8/- to 9/-.

Madagascar:—Of 6 tins 4 sold. Common, 4 to 5¹/₂ inch at 8/-.

All descriptions of produce sold to the best possible advantage.

JOHN HADDON & CO.,
Salisbury Square, E.C.

Rainfall for September, 1909.

PENANG.

STATIONS.	Amount.	No. of days rain fall.	No. of hours rain.	REMARKS.
Fort Cornwallis ...	27·84	18	147½	
Government Hill ...	27·77	21	139½	
Prison Observatory ...	26·57	14	49	
Balik Pulau ...	21·92	9	54	
Lepor Asylum ...	11·59	10	68	
Lumut ...	3·33	8	24	
Pangkora ...	2·94	3	11	
Bruas ...	·80	2	7	

The last three stations do not come within rain-zone as it were, although from previous records for the past 10 years, this month has always been wet there.

There is a striking difference in the number of hours between all the stations, the two first are about the same, the next three very slightly different, and regarding the last three, the readings in all the columns are low.

The highest maximum temperature on the plain was 93°; on the Hill 77°; the lowest 86° and 70°.

The highest minimum temperature on the plain was 76°; on the Hill 95°; the lowest 73° and 62°.

The highest sun temperature on the plain was 155°; on the Hill 135°; the lowest 118° and 111°.

The rainfall recorded this month in Penang was the highest and longest for the past 30 years; several streets in town and in the country were under water, in some places over 4 feet, when boats and sampans had to be used, a lot of damage was done to houses, gardens, etc.; many large and old trees fell from soakage of the roots and destroyed telephone wires and electric lamp posts; the electric motor being interfered with, there were no lights in the streets, etc., on the night of 14th; nor could the tram run on that day. The Municipal slaughter-house also stopped work with the result of getting no mutton or beef for 24 hours.

M. E. SCRIVEN,
Met. Observer, Penang.

DEVELOPMENT OF RUBBER.

"The India Rubber World" commemorates its twentieth anniversary in the number for Sept. 1, 1909, and gives a little retrospect of the development and changes in the history of rubber industry. "Twenty years ago," says the editor, "rubber planting was a joke. Why not cultivate coal, scoffed one critic? About as practical as the romances of "Jules Verne," affirmed another. Yet to-day the rubber trade of the world not only believes in rubber cultivation but has invested millions of dollars in it very profitably." He points out too the development of the rubber chemist, as an essential part of every satisfactory organisation. Much of the manufacturing machinery remains much the same as it was twenty years ago though made speedier and generally improved. Mr. Pearson speaks from a manufacturer's point of view, but the change of cultivation during the past twenty years has been even more striking.

Who, twenty years ago, ever thought of employing a mycologist, or a chemist or entomologist on an estate? If the matter had been suggested we should be met with the old parrot-cry, "We don't want a scientific man, we want a practical man". The old-fashioned planters of the early days looked askance when any word of scientific technology, to which they were then quite unaccustomed, were mentioned. Now such words as cambium, latex, nitrogenous plants and Termes are quite familiar in their mouths as household words.

This change from the rule of thumb or empiric system to the scientific or knowledge system marks an era in the commencement of a sound system of cultivation not only of rubber but of every other plant of use, and this is probably the greatest and most remarkable feature of the rise of the rubber industry.—ED.

RUBBER IN DUTCH GUIANA.

The planting of Hevea in all likely and unlikely parts of the world goes on apace. The Government of Dutch Guiana has commenced cultivation with the modest area of 500 acres, and the partial failure of the cacao crop, one of the important crops of the country, has induced planters to turn their attention to rubber. The combination of banana and rubber planting should prove a success there, as a regular weekly service between Paramaribo and New York will enable the planters to get their bananas to the market speedily.

The Government is providing British coolly labour under the indenture system, as is also the case in British Guiana. We have no record as to whether the seeds sent to Dutch Guiana were supplied by the British Colonies also, but this is probable as the bulk of the plants in British Guiana came from the Singapore Botanic Gardens. Looking at the map of the world, it seems odd that Guiana, abutting on the Brazilian fatherland of Hevea, should be supplied with Hevea plants from the East Indies.

The growth and returns of rubber from the few trees, which are big enough to judge from, seem up to standard. The oldest trees, ten years old (300 in number), gave three pounds of rubber per tree.

There are about a dozen plantations, the biggest of which possesses 14,000 trees from 1 to 1½ years old.

The rainfall in Surinam is given as averaging 90 inches distributed over the year. This corresponds very well to our rainfall here and we should say was suitable.—ED.

RUBBER IN AFRICA.

There is still a steady demand for seeds of Para rubber for Liberia, Nigeria and Sierra Leone, and by all accounts the plants are thriving in those regions. There is indeed no reason at present apparent as to why they should not, the climate being suitable. Even native chiefs are taking up the cultivation.

The native rubber, *Funtumia elastica*, we hear, is not coming out strongly as a plant of cultivation. Its returns are poor, as has been pointed out some time ago, and its growth by no means compares with that of Hevea.

Under the title "The Dark African Rubber Prospect," "The India Rubber World" gives an account from the Directors' reports of some of the African Rubber Companies on the Congo which show a great falling off, both in supply and quality. One Company, which had a profit of nearly 5 million francs, has a loss on the year's work in 1908 of over fourteen thousand francs. The results of this great falling off in the Congo rubber trade are that the Belgian capitalists are transferring their investments to the East Indies.—ED.

RUBBER TESTING MACHINES.

We have received a pamphlet by M. Pierre Breuil of Paris entitled "Les Essais mechaniques du caoutchouc et des Tissus". This is a reprint from the reports of the International Congress for testing materials, at Copenhagen.

The author describes and illustrates by necessary figures two machines intended for testing crude or prepared rubbers in various ways.

One of the machines is a dynamometer, by which the tensility of a sample may be tested and by a slight alteration the same instrument may be used to determine the plasticity, compressibility, and the effects produced by repeated flexions.

The instrument is self-recording when used for tensility. Full descriptions of the machine and its use and a good series of figures are given, which unfortunately we are unable to reproduce, and the apparatus would appear to be a very useful one in the laboratory or on the estate.

The other machine is called an elasto-durometer, and it is used for determining the elasticity of a sample of rubber and also its hardness and flexibility. The elasticity is determined by the fall of a ball of chilled steel, upon a sample of the rubber. The height to which the ball rebounds determines the elasticity. The apparatus can be used for stone, metal, wood, leather, or any other substance assuming that it can be laid flat. It can also be used to measure the hardness of the sample by the aid of a steel needle which is pushed slowly into the sample; by measuring the depth in millimetres into which, with a given pressure, it penetrates, a certain method of measuring the hardness of the rubber may be obtained.—ED.

PLANTING DISTANCES.

The manager of the Bukit Rajah Estate reports that the best results have been obtained in tapping from trees 27 feet by 27 feet. In crowded fields the bark does not renew so thickly, and the trees do not yield so much latex. Trees at Sungei Binjai planted wide yielded 4 lbs. each, working out to 300 lbs. per acre.—ED.

A LARGE *FICUS ELASTICA*.

A beautiful photograph of a very large *Ficus elastica* growing in forests at Tapanuly, Sumatra, is given in the Bulletin de l'Association des planteurs de Caoutchouc, Aug. 1909, p 120. The height is said to be about 80 metres and it takes 36 men to surround it with their arms outstretched. Its age is estimated at a hundred years. The tree is growing in dense forest, and has apparently started as a seedling on some forest tree at a great height from the ground. It gives a very good idea of the natural growth of the plant.—ED.

DATE OF TAPPING IN BRAZIL.

According to the French Bulletin above quoted, the period of tapping in the Amazon seems somewhat irregular. In the districts of the furthest affluents of the big river, say from the Peru border, tapping commences in May, but in other parts of the State of Amazon as later in July and August. The trees flower from July to September, that is to say, towards the middle of the tapping season.

Full and accurate statistics of this are still required.—ED.

RUBBER IN SOUTHERN INDIA.

The subject of rubber planting came up at the meeting of the United Planters Association of Southern India and Mr. T. C. Parker, of Travancore, gave some information on the subject. The industry was in its infancy, but there were no less than 20,000 acres under rubber in Travancore and Cochin. They had commenced tapping and got the full price for the rubber. Besides this area there were 4,000 acres in Coorg, 2,000 in the Nilghiris, 2,000 in Anamallays, 250 in Shevaroy and 2,000 in Malabar.—ED.

IN St. LUCIA, WEST INDIES.

According to the report on the Agricultural School of St. Lucia, Para rubber is not in demand by planters. The plants had to be given away. There was much mortality among the young plants when about one foot tall, and after they were well-established in bamboo pots 50 per cent died. The cause of the loss was unknown. Possibly the bamboo pots had something to do with it. Why use them? *Castilloa* is perhaps more suitable for the West Indies, and seems to be doing well there. Some rubber from the trees was sent to the Imperial Institute, was analysed, and found to be of good quality, though with too much resin, possibly due to youth of trees. It was valued at 3s 6d per lb. against Para hard at 4s 3½d.—ED.

DISEASES OF RUBBER TREES.

A lecture given by Mr Petch, the mycologist of Ceylon, given to the Kelani Planters Association about 2 months ago, and it ends the discussion it evoked, has appeared in several papers.

The first fungus dealt with was *Corticium javanicum*, which was described as the "pink disease" and said to be called "writing" in the Straits. As there is more than one pink fungus, it is perhaps better to call it by some other name, and *Corticium* is as easy to remember as any other. Mr. Petch pointed out that it grew also on *Crotalaria* and that this plant would serve as a source of disease to the rubber. It grows on a good many other half shrubby plants too, but our experience is only where there is overcrowding and consequent excessive dampness.

The next disease mentioned was called "Die back", a circular dealing with which is promised. From the description given by Mr. Petch, it sounds like the black fungus we have recently described in the Bulletin, but Mr. Petch states that "the fungus which started the disease would not do anything to kill the green shoot, but after the death of the leading shoot another fungus got in and carried on the destruction right down the tree. The second fungus was one that came out in black spores on all dead *Hevea*."

There seemed to have been some confusion between this disease and an unusual fall of leaf in August and September due in part at least to climatic conditions. The report of the lecture here becomes somewhat obscure, but it is probable that this die-back is the same as the black fungus already described in the Bulletin, and in that case certainly the specimens sent to the Botanic Gardens, Singapore shewed the disease in and below still green buds, and was presumably the sole cause of the death.

The "Canker" was the next disease mentioned. It was known in 1900-1904 in Kalutara, but seemed to have almost or quite disappeared, but had reappeared this year. In 1903 it had usually

appeared on the untapped bark, but last year and this year it was appearing on the renewed bark. Mr. Petch did not seem to think that it would interfere with the tree further than making the bark rough where the canker had been. The importance of this roughening, he seemed to think, was serious, and in time it would be necessary to invent another system of tapping. He would be inclined to recommend the cutting out of the diseased bark and sterilising the tapping knife, as the knives would carry the infection from one tree to another. The tools could be disinfected by dipping them in a one-in-a-hundred parts of Corrosive sublimate.

The roughening of the bark due to the canker must be extraordinary if it is so great as to interfere with the tapping so seriously as Mr. Petch states. Many of the old trees in the Botanic Gardens in Singapore have very rough bark even where they have not been tapped, others have been irregularly hacked about in course of various experiments and the bark is raised and lumpy, some again have a regularly undulating surface, yet we have had no difficulty in tapping these trees, and make something better than scrap from them. It is not at all probable that trees after say 10 or 15 years tapping will have beautifully smooth bark, like that we see in the young trees. This cannot be expected, but there need be little fear but that the trees will still be easily tapped, and if this roughening of the bark is all that "canker" does for the tree, it need not be much dreaded.

PROLIFIC COCONUTS.

Mr. E. B. Copeland, Dean of the College of Agriculture of the Philippines, writes apropos of the prolific coconut which figured lately in the Bulletin, and says:—"The Moro Plantation and Development Company has a tree near Zamboanga, from which 106 nuts were taken at one cutting, and 112 two months later. I saw the tree less than two months later still, and it seemed to have fully a hundred nuts ready to harvest again. It looked like the tree in your picture, except that it was older and taller."

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

Ending 15th July, 1969.

			Tons.
Tin	Str. Singapore & Penang to U. Kingdom &/or		1,475
Do.	" do.	U.S.A.	625
Do.	" do.	Continent	420
Gambier	" Singapore	Glasgow	—
Do.	" do.	London	75
Do.	" do.	Liverpool	175
Do.	" do.	U.K. &/or Continent	25
Cube Gambier	" do.	United Kingdom	130
Black Pepper	" do.	do.	10
Do.	" Penang	do.	75
White Pepper	" Singapore	do.	210
Do.	" Penang	do.	—
Pearl Sago	" Singapore	do.	30
Sago Flour	" do.	London	125
Do.	" do.	Liverpool	1,800
Do.	" do.	Glasgow	75
Tapioca Flake	" Singapore	United Kingdom	250
T. Pearl & Bullet	" do.	do.	310
Tapioca Flour	" Penang	do.	350
Gutta Percha	" Singapore	do.	30
Buffalo hides	" do.	do.	210
Pineapples	" do.	do. cases	40,000
Gambier	" do.	U.S.A.	300
Cube Gambier	" do.	do.	10
Black Pepper	" do.	do.	430
Do.	" Penang	do.	60
White Pepper	" Singapore	do.	15
Do.	" Penang	do.	20
Tapioca Pearl	" Singapore	do.	190
Nutmegs	" Singapore & Penang	do.	39
Sago Flour	" Singapore	do.	50
Pineapples	" do.	do. cases	3,000
Do.	" do.	Continent	2,000
Gambier	" do.	S. Continent	175
Do.	" do.	N. Continent	15
Cube Gambier	" do.	Continent	30
Black Pepper	" do.	S. Continent	160
Do.	" do.	N. Continent	110
Do.	" Penang	S. Continent	25
Do.	" do.	N. Continent	—
White Pepper	" do.	S. Continent	15
Do.	" do.	N. Continent	25
Do.	" Penang	S. Continent	—
Do.	" do.	N. Continent	—
Copra	" Singapore & Penang	Marseilles	480
Do.	" do.	Odessa	940
Do.	" do.	Other S. Continent	500
Do.	" do.	N. Continent	2,750
Sago Flour	" Singapore	Continent	2,170
Tapioca Flake	" do.	do.	125
Do. Pearl	" do.	do.	30
Do. Flake	" do.	U.S.A.	50
Do. do.	" Penang	U.K.	75
Do. Pearl & Bullet	" do.	do.	75
Do. Flake	" do.	U.S.A.	—

				Tons.
Tapioca. Pearl	Str.	Penang	U.S.A.	430
Do. Flake	"	do.	Continent	25
Do. Pearl	"	do.	do.	400
Copra	"	Singapore & Penang	England	500
Gutta Percha	"	Singapore	Continent	—
Cube Gambier	"	do.	U.S.A.	
T. Flake & Pearl	"	do.	do.	
Sago Flour	"	do.	do.	
Gambier	"	do.	S. Continent	
Copra	"	do.	Marseilla	
Black Pepper	"	do.	S. Continent	
White Pepper	"	do.	do.	
Do.	"	do.	U.S.A.	
Pineapples	"	do.	do.	
Nutmegs	"	do.	do.	
Black Pepper	"	do.	do.	
Do.	"	Penang	do.	
White Pepper	"	do.	do.	
T. Flake & Pearl	"	do.	do.	
Nutmegs	"	do.	do.	
Tons Gambier				650
Do. Black Pepper				525

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

Ending 31st July, 1909.

				Tons.
Tin	Str.	Singapore & Penang to U. Kingdom &/or		2,808
Do.	"	do.	U.S.A.	173
Do.	"	do.	Continent	143
Gambier	"	Singapore	Glasgow	—
Do.	"	do.	London	75
Do.	"	do.	Liverpool	—
Do.	"	do.	U.K. &/or Continent	250
Cube Gambier	"	do.	United Kingdom	55
Black Pepper	"	do.	do.	25
Do.	"	Penang	do.	80
White Pepper	"	Singapore	do.	150
Do.	"	Penang	do.	—
Pearl Sago	"	Singapore	do.	35
Sago Flour	"	do.	London	200
Do.	"	do.	Liverpool	—
Do.	"	do.	Glasgow	50
Tapioca Flake	"	Singapore	United Kingdom	120
T. Pearl & Bullet	"	do.	do.	190
Tapioca Flour	"	Penang	do.	575
Gutta Percha	"	Singapore	do.	—
Buffalo hides	"	do.	do.	—
Pineapples	"	do.	do.	cases 13,500
Gambier	"	do.	U.S.A.	160
Cube Gambier	"	do.	do.	35
Black Pepper	"	do.	do.	130
Do.	"	Penang	do.	—
White Pepper	"	Singapore	do.	85
Do.	"	Penang	do.	20
Tapioca Pearl	"	Singapore	do.	30
Nutmegs	"	Singapore & Penang	do.	13

				Tons.
Sago Flour	Str.	Singapore	U.S.A.	50
Pineapples	"	do.	do.	cases 6,000
Do.	"	do.	Continent	" 2,500
Gambier	"	do.	S. Continent	—
Do.	"	do.	N. Continent	180
Cube Gambier	"	do.	Continent	120
Black Pepper	"	do.	S. Continent	125
Do.	"	do.	N. Continent	110
Do.	"	Penang	S. Continent	45
Do.	"	do.	N. Continent	10
White Pepper	"	Singapore	S. Continent	25
Do.	"	do.	N. Continent	95
Do.	"	Penang	S. Continent	—
Do.	"	do.	N. Continent	55
Copra	"	Singapore & Penang	Marseilles	—
Do.	"	do.	Odessa	1,100
Do.	"	do.	Other S. Continent	—
Do.	"	do.	N. Continent	2,850
Sago Flour	"	Singapore	Continent	1,500
Tapioca Flake	"	do.	do.	55
Do. Pearl	"	do.	do.	25
Do. Flake	"	do.	U.S.A.	—
Do. do.	"	Penang	UK.	40
Do. Pearl & Bullet	"	do.	do.	75
Do. Flake	"	do.	U.S.A.	—
Do. Pearl	"	do.	do.	—
Do. Flake	"	do.	Continent	50
Do. Pearl	"	do.	do.	650
Copra	"	Singapore & Penang	England	100
Gutta Percha	"	Singapore	Continent	—
Cube Gambier	"	do.	U.S.A.	—
T. Flake & Pearl	"	do.	do.	—
Sago Flour	"	do.	do.	—
Gambier	"	do.	S. Continent	—
Copra	"	do.	Marseilles	—
Black Pepper	"	do.	S. Continent	—
White Pepper	"	do.	do.	—
Do.	"	do.	U.S.A.	—
Pineapples	"	do.	do.	—
Nutmegs	"	do.	do.	—
Black Pepper	"	do.	do.	—
Do.	"	Penang	do.	—
White Pepper	"	do.	do.	—
T. Flake & Pearl	"	do.	do.	—
Nutmegs	"	do.	do.	—
Tons Gambier				1,100
Do. Black Pepper				600

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

Ending 15th August, 1909.

			Tons.
Tin	Str. Singapore & Penang to U. Kingdom &/or		1,718
Do.	do	U.S.A.	25
Do.	do.	Continent	373
Gambier	Singapore	Glasgow	—
Do.	do.	London	75
Do.	do.	Liverpool	125
Do.	do.	U.K. &/or Continent	200
Cube Gambier	do.	United Kingdom	110
Black Pepper	do.	do.	10
Do.	Penang	do.	50
White Pepper	Singapore	do.	270
Do.	Penang	do.	—
Pearl Sago	Singapore	do.	30
Sago Flour	do.	London	200
Do.	do.	Liverpool	1,300
Do.	do.	Glasgow	—
Tapioca Flake	Singapore	United Kingdom	275
T. Pearl & Bullet	do.	do.	250
Tapioca Flour	Penang	do.	420
Gutta Percha	Singapore	do.	35
Buffalo hides	do.	do.	95
Pineapples	do.	do.	30,000
Gambier	do.	U.S.A.	—
Cube Gambier	do.	do.	—
Black Pepper	do.	do.	—
Do.	Penang	do.	—
White Pepper	Singapore	do.	—
Do.	Penang	do.	—
Tapioca Pearl	Singapore	do.	70
Nutmegs	Singapore & Penang	do.	4
Sago Flour	Singapore	do.	—
Pineapples	do.	do.	100
Do.	do.	Continent	3,000
Gambier	do.	S. Continent	125
Do.	do.	N. Continent	140
Cube Gambier	do.	Continent	25
Black Pepper	do.	S. Continent	230
Do.	do.	N. Continent	65
Do.	Penang	S. Continent	—
Do.	do.	N. Continent	—
White Pepper	Singapore	S. Continent	45
Do.	do.	N. Continent	55
Do.	Penang	S. Continent	5
Do.	do.	N. Continent	—
Copra	Singapore & Penang	Marseilles	240
Do.	do.	Odessa	1,300
Do.	do.	Other S. Continent	780
Do.	do.	N. Continent	1,700
Sago Flour	Singapore	Continent	1,800
Tapioca Flake	do.	do.	250
Do. Pearl	do.	do.	50
Do. Flake	do.	U.S.A.	5
Do. do.	Penang	U.K.	50
Do. Pearl & Bullet	do.	do.	10
Do. Flake	do.	U.S.A.	—

				Tons.
Tapioca. Pearl	Str.	Penang	U.S.A.	55
Do. Flake	"	do.	Continent	—
Do. Pearl	"	do.	do.	100
Copra	"	Singapore & Penang	England	300
Gutta Percha	"	Singapore	Continent	
Cube Gambier	"	do.	U.S.A.	
T. Flake & Pearl	"	do.	do.	
Sago Flour	"	do.	do.	
Gambier	"	do.	S. Continent	
Copra	"	do.	Marseilles	
Black Pepper	"	do.	S. Continent	
White Pepper	"	do.	do.	
Do.	"	do.	U.S.A.	
Pineapples	"	do.	do.	
Nutmegs	"	do.	do.	
Black Pepper	"	do.	do.	
Do.	"	Penang	do.	
White Pepper	"	do.	do.	
T. Flake & Pearl	"	do.	do.	
Nutmegs	"	do.	do.	950
Tons: Gambier				310
Do. Black Pepper				

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

Ending 31st August, 1909.

				Tons.
Tin	Str.	Singapore & Penang to U. Kingdom &/or		1,301
Do.	"	do.	U.S.A.	1,130
Do.	"	do.	Continent	180
Gambier	"	Singapore	Glasgow	—
Do.	"	do.	London	25
Do.	"	do.	Liverpool	—
Do.	"	do.	U.K. &/or Continent	35
Cube Gambier	"	do.	United Kingdom	25
Black Pepper	"	do.	do.	—
Do.	"	Penang	do.	55
White Pepper	"	Singapore	do.	140
Do.	"	Penang	do.	—
Pearl Sago	"	Singapore	do.	35
Sago Flour	"	do.	London	210
Do.	"	do.	Liverpool	—
Do.	"	do.	Glasgow	—
Tapioca Flake	"	Singapore	United Kingdom	125
T. Pearl & Bullet	"	do.	do.	55
Tapioca Flour	"	Penang	do.	400
Gutta Percha	"	Singapore	do.	35
Buffalo hides	"	do.	do.	—
Pineapples	"	do.	do.	2,250
Gambier	"	do.	U.S.A.	1,150
Cube Gambier	"	do.	do.	45
Black Pepper	"	do.	do.	160
Do.	"	Penang	do.	160
White Pepper	"	Singapore	do.	150
Do.	"	Penang	do.	60
Tapioca Pearl	"	Singapore	do.	180
Nutmegs	"	Singapore & Penang	do.	48

				Tons.
Sago Flour	Str.	Singapore	U S.A.	250
Pineapples	"	do.	do.	3,500
Do.	"	do.	Continent	3,000
Gambier	"	do.	S. Continent	—
Do.	"	do.	N. Continent	325
Cube Gambier	"	do.	Continent	60
Black Pepper	"	do.	S. Continent	55
Do.	"	do.	N. Continent	140
Do.	"	Penang	S. Continent	40
Do.	"	do.	N. Continent	60
White Peppcr.	"	Singapore	S. Continent	5
Do.	"	do.	N. Continent	220
Do.	"	Penang	S. Continent	15
Do.	"	do.	N. Continent	40
Copra	"	Singapore & Penang	Marseilles	240
Do.	"	do.	Odessa	580
Do.	"	do.	Other S. Continent	100
Do.	"	do.	N. Continent	2,000
Sago Flour	"	Singapore	Continent	1,600
Tapioca Flake	"	do.	do.	25
Do. Pearl	"	do.	do.	15
Do. Flake	"	do.	U.S.A.	5
Do. do.	"	Penang	U.K.	50
Do. Pearl & Bullet	"	do.	do.	25
Do. Flake	"	do.	U.S.A.	—
Do. Pearl	"	do.	do.	170
Do. Flake	"	do.	Continent	—
Do. Pearl	"	do.	do.	70
Copra	"	Singapore & Penang	England	360
Gutta Percha	"	Singapore	Continent	—
Cube Gambier	"	do.	U.S.A.	—
T. Flake & Pearl	"	do.	do.	—
Sago Flour	"	do.	do.	—
Gambier	"	do.	S. Continent	—
Copra	"	do.	Marseilles	—
Black Pepper	"	do.	S. Continent	—
White Pepper	"	do.	do.	—
Do.	"	do.	U.S.A.	—
Pineapples	"	do.	do.	—
Nutmegs	"	do.	do.	—
Black Pepper	"	do.	do.	—
Do.	"	Penang	do.	—
White Pepper	"	do.	do.	—
T. Flake & Pearl	"	do.	do.	—
Nutmegs	"	do.	do.	—
Tons Gambier				950
Do. Black Pepper				800

SINGAPORE MARKET REPORT,

July, 1909.

Articles.	Quantity sold.	Highest price.		Lowest price.	
	Tons.	\$	c.	\$	c.
Coffee—Palembang ... ..	...	...	...	...	...
Bali ... ..	...	28	50	26	50
Liberian	69	24	50	23	50
Copra	6,240	9	80	7	80
Gambier Bale	1,570	9	92½	9	37½
Cube, No. 1 and 2	305	14	25	13	50
Gutta Percha, 1st quality ... ..	...	300	00	240	00
Medium ... ..	...	240	00	120	00
Lower ... ..	...	80	00	12	00
Gutta Jelutong ... ..	...	8	50	6	05
Nutmegs, 110 s. ... ..	...	18	50	17	50
80 ... ..	...	23	50	22	00
Mace, Banda ... ..	...	115	00	...	...
Amboina ... ..	...	78	00	74	00
Black Pepper	964	11	87	11	25
White Pepper	626	19	25	18	25
Pearl Sago, Small	45	4	40	4	10
Medium ... ..	...	...	...	...	...
Large ... ..	...	...	...	...	...
Sago Flour, No. 1	4,290	3	45	3	15
2	335	1	32½	1	25
Tapioca Flake, Small	604	4	75	4	60
Medium ... ..	...	...	...	...	...
Pearl, Small	294	6	00	4	25
Medium	373	4	50	4	40
Bullet ... ..	...	...	...	...	...
... ..	2,343	67	17½	66	37½

SINGAPORE MARKET REPORT.

August, 1909.

Article.	Quantity sold.		Highest price.		Lowest price.	
	Tons.		\$	c.	\$	c.
Coffee—Palembang
Bali	27	65	...	...
Liberian	...	69	25	50	24	00
Copra	...	5,040	9	25	8	25
Gutta Percha, etc.
Gutta Jelutong	8	25	6	05
Nutmegs, 110 s.	18	75	16	50
80	22	50	21	50
Mace, Banda	90	00	80	00
Amboina	75	00	70 ^s	00
Black Pepper	...	946	12	00	11	55
White Pepper	...	733	18	80	18	12½
Pearl Sago, Small	...	15	4	25	3	90
Medium
Large
Sago Flour, No. 1	...	3,380	3	21	3	11
2	...	250	1	30	1	25
Tapioca Flake, Small	...	553	4	70	...	...
Medium
Pearl, Small	...	360	5	10	4	20
Medium	...	353	4	50	4	45
Bullet	...	85	6	75	6	62½
Tin	...	2,465	69	62½	67	07½

PAHANG.

Abstract of Meteorological Readings in the various Districts of the State for the month of July, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Mean Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point	Humidity.			
Kuala Lipis	78	94	65	19.3	69	...	...	...	...	3 31	1.40
Raub	79	92	68	20.5	74	...	...	...	..	1.42	.50
Bentong	78	92	67	20.3	75	...	...	...	...	2.06	.58
Temerloh	62	70	18.3	...	...	...	...	...	1.50	.70
Pekan	82	94	70	17.4	78	...	...	...	...	5 16	1.90
Kuantan	84	92	67	19.7	77	...	...	...	...	5.23	2.84
Sungei Lembing	84	69	...	...	...	...	...	...	8 07	2.82

OFFICE OF THE SENIOR MEDICAL OFFICER,
Kuala Lipis, 24th August, 1909.

S. C. G. FOX,
Senior Medical Officer, Pahang.

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NEGRI SEMBILAN.

Abstract of Meteorological Readings in Negri Sembilan for the month of September, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Serembau Hospital		139.5	80.5	89.8	70.5	19.3	76.6	.845	74.1	81.4	N.W.	3.99	1.05
Mantio "												2.50	1.04
Tampin "												5.56	1.95
Kuala Pilah "												3.40	.91
Jelebu "												1.74	.55
Port Dickson Town Hospital												4.19	1.35
Do. Beri-Beri "												5.29	1.65

S. M. O's OFFICE,
October, 1909.

S. LUCY,
S. M. O.

PERAK.

Abstract of Meteorological Readings in Perak for the month of September, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping	149	82.59	93	70	23	77.18	864	...	78	...	7.76	3.45
Kuala Kangsar	80.59	92	70	22	75.91	834	...	79	...	2.31	.62
Batu Gajah	156	80.51	92	71	21	75.94	835	...	80	...	5.53	1.92
Gopeng	80.87	91	61	30	74.93	787	...	74	...	5.94	2.14
Ipoh	81.42	93	71	22	77.77	904	...	84	...	4.00	1.80
Kampar	81.23	92	70	22	76.41	842	...	79	...	7.66	2.65
Teluk Anson	81.88	93	70	23	77.02	865	...	80	...	4.54	1.71
Tapah	81.15	92	66	26	76.08	833	...	79	...	7.43	2.60
Parit Buntar	82.05	90	72	18	77.29	874	...	80	...	11.05	5.05
Bagan Serai	82.12	91	70	21	77.38	878	...	80	...	9.67	4.14
Selama	80.93	92	72	20	76.87	871	...	82	...	10.75	3.90

State SURGEON'S OFFICE.

Taiping, 15th October, 1909.

M. J. WRIGHT,

State Surgeon, Perak.

PENANG.

Abstract of Meteorological Readings in the Prison Observatory, Penang, for the month of September, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°	°	°	°	°	°	°	%		Ins.	Ins.	
Prison Observatory	29.832	144.6	81.7	89.1	74.9	14.2	8.00	1.012	78	92	South	26.47	8.50

PENANG,
12th October, 1909.

M. E. SCRIVEN,
Assistant Surgeon.

A. H. KUN,
Medical Officer.

KELANTAN.

Abstract of Meteorological Readings in Kelantan for the month of September, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lebir	88.7	72.7	16.0	...	...	...	...	...	5.56	3.38
Kuala Kelantan	82.6	72.6	10.0	...	...	...	...	...	7.71	1.11
Kuala Pergau	89.2	73.0	16.2	...	...	...	...	...	14.43	3.84
Taku Plantation	4.63	1.50
Pasir Besar	7.68	1.49

SURGEON'S OFFICE,
October, 1909.

A. B. H. SMART,
Surgeon.

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SEREMBAN.

Table showing the Daily Results of the Reading of Meteorological Observation taken at the General Hospital, Seremban, for the month of September, 1909.

Date.	TEMPERATURE OF RADIATION.						TEMP. OF RADIATION.			WIND DIRECTION.		TEMP. OF EVAPORATION.			COMPUTED VAPOUR TENSION.			RELATIVE HUMIDITY.			CLOUDS 0 TO 10.			CLOUD AND WEATHER INITIALS.			RAIN.	
	9	15	Mean.	Maxi- mum.	Mini- mum.	Range.	Sun.	Differ- ence Sun & Shade.	9	15	9	15	Mean.	9	15	Mean.	9	15	Mean.	9	15	21	9	15	21	Inches.		
	H.	H.							H.	H.				H.	H.		H.	H.		H.	H.	H.	H.	H.	H.			
1	75	84	79.5	88	70	18	142	54	NW	NW	73.3	77.4	75.3	.820	.938	.879	94	80	87	2	3	0	S	S	S	.65		
2	76	85	80.5	89	71	18	140	51	NW	NW	72.6	80	76.3	.801	1.026	.913	89	85	87	0	0	7	S	S	S			
3	76	86	81	90	70	20	145	55	NW	NW	74.3	79.4	76.8	.848	1.008	.928	94	80	87	6	0	0	S	S	S			
4	75	84	79.5	90	71	19	142	52	NW	NW	71.6	79	75.3	.774	.990	.882	89	85	87	2	0	3	S	S	S			
5	76	85	80.5	92	72	20	143	51	NW	NW	74.3	80.7	77.5	.848	1.045	.946	94	90	92	0	0	0	S	S	S			
6	76	86	81	92	71	21	144	52	NW	NW	72.6	79.4	76	.801	1.008	.904	89	89	84.5	1	0	0	S	S	S			
7	76	87	81.5	92	71	21	133	41	NW	NW	74.3	75.5	74.9	.848	.884	.866	94	60	81.5	3	0	0	S	S	S	.21		
8	76	89	82.5	92	70	22	135	43	NW	NW	72.6	72.7	72.6	.801	.801	.801	89	58	73.5	0	4	0	S	S	S			
9	76	88	82	92	71	21	136	44	NW	NW	72.6	74.9	73.7	.801	.865	.833	89	65	77	2	0	0	S	S	S			
10	75	85	80	91	71	20	138	47	NW	SW	73.3	73.4	73.3	.820	.826	.823	94	68	81	0	2	7	S	S	S			
11	77	86	81.5	92	73	19	138	46	SW	SW	73.6	72.8	73.2	.829	.808	.818	89	64	76.5	2	0	0	S	S	S			
12	75	80	77.5	88	73	15	126	38	SW	SW	71.6	75	73.3	.774	.867	.820	89	85	87	10	8	4	N	N	N	.37		
13	76	80	78	91	70	21	128	37	NW	SW	72.6	73.3	72.9	.801	.820	.810	89	80	84.5	5	10	7	C	C	C			
14	76	80	78	88	71	17	137	49	SW	NW	72.6	73.3	72.9	.801	.820	.810	89	80	84.5	0	5	6	N	N	N			
15	75	81	78	86	69	17	138	52	SW	NW	73.3	72.6	72.9	.820	.802	.811	94	76	85	3	4	6	C	C	C			
16	75	80	77.5	85	69	16	130	45	SW	SW	73.3	71.6	72.4	.820	.775	.797	94	75	84.5	6	4	10	C	C	C	.95		
17	79	83	81	87	72	15	135	48	SW	SW	75.6	71.3	73.4	.885	.766	.825	90	68	79	3	2	0	S	S	S	.55		
18	78	84	81	89	70	19	136	47	NW	NW	76.3	70.7	73.5	.906	.751	.823	94	64	79	2	0	0	S	S	S			
19	78	85	81.5	89	72	17	140	51	NW	NW	74.6	71.8	73.2	.857	.781	.819	89	64	76.5	0	4	0	S	S	S			
20	79	85	82	91	72	19	142	51	NW	SW	73.9	73.4	73.6	.839	.826	.832	85	68	76.5	0	0	0	S	S	S			
21	79	84	81.5	90	71	19	150	60	NW	SW	72.3	74	73.1	.793	.840	.816	80	72	76	0	0	0	S	S	S			
22	76	85	80.5	88	70	18	140	52	N	SW	72.6	73.4	73	.801	.826	.813	89	68	78.5	2	10	8	N	N	N			
23	74	87	80.5	90	70	20	150	60	N	SW	72.3	75.5	73.9	.793	.884	.838	94	69	81.5	0	8	6	C	C	C	.21		
24	77	83	80	88	70	18	115	27	NE	NW	75.3	74.7	75	.877	.856	.866	94	76	85	4	2	4	S	S	S	1.05		
25	78	84	81	90	72	18	146	56	NW	NW	74.6	75.7	75.1	.857	.888	.872	89	76	82.5	2	0	2	S	S	S			
26	78	85	81.5	91	72	19	148	57	NW	NW	74.6	75.9	75.2	.857	.873	.865	89	72	80.5	0	0	3	S	S	S			
27	78	86	82	91	72	19	145	54	NW	SW	72.9	72.8	72.8	.810	.808	.809	84	64	74	0	7	4	N	N	N			
28	79	85	82	91	70	21	147	56	NW	SW	76.3	73.4	74.8	.906	.826	.866	94	68	81	0	0	0	S	S	S			
29	78	86	82	91	69	22	149	58	NW	NW	72.9	75.9	74.4	.810	.873	.841	84	72	78	0	5	2	S	S	S			
30	78	84	81	91	70	21	147	56	NW	SW	74.6	72.8	73.7	.857	.808	.832	89	64	76.5	0	5	0	S	S	S			
Mean.	76.6	84.4	80.5	89.8	70.5	19.3	139.5	49.7	NW	NW	73.5	74.7	74.1	828	.862	.845	90	72.8	81.4							3.99		

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Agricultural Bulletin

OF THE
STRAITS
 AND
FEDERATED MALAY STATES.

EDITED BY

H. N. RIDLEY, M.A., F.R.S., F.L.S., F.R.H.S.

Director of Botanic Gardens, S.S.

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From the first of January, 1909

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AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

No. 12.]

DECEMBER, 1909.

[VOL. IX

BRAZIL-NUTS.

The Brazil-nut (*Bertholletia excelsa*) was introduced into the Singapore Botanic Gardens in the year 1881, September 20th, from the Royal Gardens, Kew. Only two plants were sent, and both are still in the Botanic Gardens, Singapore. They must first have been kept in the Upper Gardens, as the Economic Gardens were not then established, but when Mr. Cantley obtained what was then known as the military reserve in 1884, the plants were transferred there with many other plants of economic interest, including the Para rubber trees. The trees grew steadily on a clay bank near what is now the clerks' quarters, and flowered about 1901 for the first time. The first fruits were produced in 1902, and since then the trees have provided a quantity of fruit steadily each year. The crop this year has been much larger than in any previous year, and there were over a hundred of the large woody capsules on the biggest tree.

The biggest tree measures 65 feet tall, with a head of foliage 30 feet through; the girth at 3 feet from the

ground is 5 feet 5½ inches. The smaller tree measures 63 feet, with a breadth of foliage of 27 feet and a girth of 2 feet 7 inches at 3 feet from the ground.

The leaves are oblong and wavy smooth, rather firm in texture, dull dark green, paler on the back about 12-16 inches long and 4 inches wide. The flower spikes stand erect on the top of the branches and are 2 feet long, a quarter of an inch thick, green and bearing many flowers which open one by one. They are sessile and creamy white, yellower on the back and of a very curious structure, the stamens being collected into a curious dense mass in the form of a bearded lip.

The fruit takes upwards of a year to ripen, and by no means do all on the spike ripen. Indeed, this would be impossible as the weight of the fruit would break the inflorescence even if it did not break the bough bearing the spikes.

The biggest of the trees produced this year a hundred and eight fruits, the smaller one, which grows only within a few feet of the other, bore only a few fruits. The fruits are round and woody and brown in colour, about 6 inches through. They weigh about 2 lbs. 7 oz. and each contains from 12 to 15 nuts, which weighs altogether 9½ oz., each nut when peeled weighing half an ounce. The nuts are beautifully packed in the capsule and quite fill it. When it is ripe the fruit falls to the ground while in this differing from the allied Sapucaia nut (*Lecythis oleracea*) also in the Botanic Gardens, in which the top forms a lid which becomes detached and lets the seeds fall out. On account of this the Brazil-nut is cheaper in the markets than the Sapucaia nut, as the natives find it quicker to pick up the whole fruit of the Brazil-nut than the scattered seeds of the Sapucaia.

The seeds from the trees in the Botanic Gardens have as yet failed to germinate, possibly our fruit falls before it is quite ripe, but they have been highly appre-

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ciated by those who have eaten them. The kernel is crisp and firm, and has not the oily taste of the Brazil nut of commerce.

The Brazil-nut tree is not cultivated anywhere for profit. The fruits are collected by the natives in the forests of the Amazons, where it grows in abundance, together forming groves, according to Bates ("Naturalist on the Amazons.") He says it is one of the biggest trees in the Amazons forests, and as the forest trees there often attain the height of 150 to 200 feet, it is probable that the Brazil-nut grows to at least 200 feet. The trees of *Lecythis*, which I saw in the forests of Pernambuco were truly gigantic, both in size and in circumference, and it is said that *Bertholletia* is as big.

The Brazil-nut is not a tree which would bring a large profit to a planter, even of fruit trees, as its growth is slow and the fruiting not very heavy, considering the cheapness of the nuts brought from the Brazilian forests, but it is a handsome tree, and when it does fruit it does so quite heavily enough to supply the needs of the planter and many others.

H. N. RIDLEY.

AN IMPROVED PROCESS FOR COAGULATING THE LATEX OF *DYERA COSTULATA*.

(GETAH JELUTONG).

In the Singapore Botanic Gardens, we have only five trees of this species—excepting two specimen trees on the lawns which are left intact—and these all are below medium size, so that the available material for experiment is very small. In view, however, of improving the crude (wet and vile smelling) Jelutong rubber—better known as Pontianak—the experimental work so far accomplished may be of interest.

The first period of tappings gave the following results :—

Date.	Fluid ozs. of latex obtained.	Remarks excised.	Dry rubber ozs. (avoirdupois).
26—7—09	11 ozs. c/c	Herring-bone	5½ ozs.
27—7—09	18 „ „	„	10 „
28—7—09	14 „ „	„	3¾ „
29—7—09	18 „ „	„	8 „
30—7—09	12 „ „	H. B. New	3¾ „
31—7—09	12 „ „	„	4¼ „
20—8—09	36 „ „	H. B. New	16½ „
24—8—09	24 „ „	„	7¼ „
Total ...	145 ozs. c/c		lbs. 3-11 ozs.

It will be seen from this statement that daily tappings are not favourable; there is a fall off in the quantity of latex obtained and a large fall in the ratio of dry rubber to that of latex. When first tapped, or, after a period of rest of six days or more, between tappings, two fluid ozs. of latex yield one ounce (by weight) of rubber substance. It may be also remarked that—although not shewn in this statement—vertical instead of oblique excisions give the best results.

In preparing the rubber all the latex was strained, in the same way as Para, and to this latex boiling water was added in proportion of two parts to one. After well stirring about ½ oz. c/c of *Purub*, diluted in 4 ozs. of water, was dropped in the fluid and again stirred, when clotting or separation immediately commences and an agglutinated mass is formed which, after drying for about one day, is coagulated into a clear white, hard, odourless ball.

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Of all the chemicals tried *Purub* proved the only satisfactory re-agent. Both sulphuric-acid and creosote partially separated the hydrocarbon substance but in both instances the resulting substance went mouldy, and would undoubtedly have fermented in bulk in the same way as native-prepared Jelutong, coagulated with gypsum and kerosine, and also alum. In this latter form there is an excess of moisture as a consequence of partial coagulation and the fermentable matter is not separated and carried off in the remaining mother liquor.

The following report and analysis has been received on a sample of Jelutong rubber, coagulated with *Purub* in the Economic Gardens from a continental firm who are large consumers of this rubber :—

HARBURG VIENNA INDIA RUBBER WORKS,
HARBURG ON ELBE.

October 16, 1909.

H. N. RIDLEY, Esq.,

DEAR SIR,

“As desired we give you the results of our tests and analysis as follows :

The quality of the material sent us is much better in comparison to the market goods. The balls are of a fine white colour and had a general degree of moisture of only about 30% and was therefore much better for rubber manufacturers than the ordinary market goods. The resin was of greater purity and had a fine white colour, otherwise the same properties as ordinary Jelutong. The chemical constituents also (quantity of iodine, quantity of saponification, acid quantity), etc., were the same.

The quality of the material which, as the $C^{10}H^{16}$ resulting substance, so far as could be judged by the small quantity at our disposal, was middling, good and only slightly better than the product from the market goods.

Treated with aniline the $C^{10}H^{16}$ substance obtained was 11% and the following was the result of the analysis :

The $C^{10}H^{16}$ substance obtained 0.8% resin
1.8% ash
Melting point 145°

Treated with alcohol and ether we obtained of the $C^{10}H^{16}$ substance by—

— I Analysis 15%
— II „ 12.23%

The substance had of ash 0.28% analysis I
Melting point 140°

The total result of analysis I was

Moisture	29.23%
Resinous substance	54.12%
$C^{10}H^{16}$ substance	15%

A further examination of the rubber-like substance was impossible on account of the small quantity at our disposal.

The coagulation of the milk in this way seems to us to be a great improvement which will be of benefit for the selling price of Jelutong as the better keeping quality of the material will be favourably influenced by it, and besides, a saving in freight and packing will be possible.”

(Sd). HARBURG VIENNA RUBBER WORKS.

Owing to the small sample submitted for analysis, it was not possible to say the percentage of rubber in the 15% hydrocarbon substance, otherwise the analysis, is exceptionally favourable for so low a grade rubber and also as compared with other analysis of commercial Jelutong. Jelutong rubber as received in America is stated to contain 50% of moisture, and Weber in his “Chemistry of India-Rubber” places the resin as high, 85-95%. The purity, too, of our Purub prepared Jelutong should be of some value—as the difficulty of deresination is now better understood, and in America Jelutong resin is used for chewing-gum and in the manufacture of varnishes.

R. DERRY.

LAWNS.

Well-made and properly-kept lawns are one of the most attractive features of any garden. Golf courses and tennis courts also are popular or otherwise to a great extent according to the condition of the lawns and greens. As bad greens and lawns are the rule rather than the exception in this country, the following instructions and remarks will, I hope, be found useful by those interested in the formation of new lawns or in the renovation of existing ones.

In the tropics, there are many difficulties to face in the proper upkeep of our lawns, but with a little careful attention most of those may be overcome. Be a lawn ever so well made it will rapidly go to pieces if the strictest supervision is not given afterwards. Heavy tropical rains and scorching suns are severe trials to most lawns and the native gardener is not less an evil. It is my experience that the Malay gardener has not the slightest conception of what a good sward means nor does he seem to understand the meaning of the word level.

It is true that most tennis courts in this country, and I have seen and played on a great many, are spoiled by the scythe. This may sound strange, but it is nevertheless true. The gardener is given a scythe and his master tells him that he must cut the court at stated intervals. Then he proceeds to spoil the lawn with clock-like precision. He does not cut the grass as a good scythesman would, but bites and drags at it until he succeeds in dragging a good deal of the grass out by the roots and laying bare stripes and patches of earth all over the court. His scythe is badly set which is probably not his fault as he may never have seen one set properly. The result of this is that he either cuts too low as above stated or too high leaving a spongy "sole" and I must say that the latter is the most usual result and the spongy court or green is more difficult to play on than a bare patchy one.

It is surprising that so few mowing machines are met with in eastern gardens especially in these days when such machines are so cheap as to be within everyone's reach.

It is true that one finds them on most well-organised golf courses and in a few private gardens and in those places one almost always finds good tennis courts and golf greens.

It is quite possible, with proper care, to produce in this country that beautiful velvet sward which one finds on tennis courts at home and on the greens of St. Andrew's, and Prestwick.

The form and extent of the lawn under construction will vary in almost every case, the larger the area it covers the better will be the effect produced if the work is well done. The majority of lawns in this country are those surrounding private residences and it is principally for guidance in the formation of those that these remarks are written.

On sloping land, drainage is not of great importance as water soon drains off, but on level land or where tennis courts are being formed and a dead level is required thorough drainage is necessary before anything else is attempted. On a gravelly subsoil fewer drains will be required and in a few cases where the soil is exceptionally sandy and gravelly dispensed with altogether, but as a general rule surface rubble drains 18" x 18" at intervals of 8ft. should be made. The best material for these drains is rough laterite, ashes, or stone as large as apples. Any other material that is easily obtainable locally can be used. Broken brick-bats form very good drainage material when procurable.

When the drains have been filled to within 6 inches of the top the various levels of the surface should be taken and marked and the whole changkollod over a foot or more deep and as evenly as possible. If the soil is of good quality there should be no difficulty in doing this or in the after formation. When the soil is poor and sandy the addition of some of better quality with the addition of some well-rotted cow manure is advisable.

In low or wet situations, it is sometimes necessary to raise the level of the surface. This is best done when the drains are being laid. Stiff clayey soil should not be used for this purpose as it prevents the free passage of surface water to the drains underneath. In very wet places it may be necessary to have the drains as close as 6ft. apart and in such cases when it is desired to raise the level of the surface a good plan is to put down a layer of 6" or more of fine ashes between and over the drains; roll well to prevent subsidence in places and add a top layer of fine rich earth on which to plant the turf.

The condition of a lawn, court or green throughout the year greatly depends on the depth and quality of the soil underneath and as the formation of such is generally considered permanent it is important that the utmost care is given to its composition. After results will repay any extra care and expense that has been incurred.

In cases of very poor soil it sometimes pays to trench the entire area to the depth of the subsoil adding manure and richer soil and removing a corresponding quantity of the original earth.

Having thus dug the soil all over alike and roughly levelled it, it should be left for a few days exposed to the weather in order to render it solid and ready to tread down in preparation for seed or turf whichever may be chosen to plant.

Turf is more satisfactory in this country but care must be taken in choosing the proper kind.

Previous to planting, the soil should be trodden down firm, raked lightly over and made as level as possible. Turfs 9" or 12" square should then be planted, not too deeply, regularly at 6" apart over the

surface. Finely sifted rich soil with a liberal addition of burnt earth, wood ashes, and sand should then be spread between the turfs—to fill up the interspaces—and make the whole surface as level as possible. The top may then be beaten down or rolled to give a firm surface. In a few weeks the whole surface will be grown over but mowing should not be too frequent or too close for the first few months until a “sole” is formed. To assist this constant rolling should be given and to keep a lawn in good condition rolling should be continued regularly throughout the year. New lawns may require watering during dry weather. The appearance of the grass will suggest this.

Much depends on selecting the right kind of turf. It should be free from coarse grass and weeds, should be of a uniform thickness and should be composed of a grass which is naturally of a close, short creeping growth.

There are several grasses of this nature which are plentiful everywhere. The best are *Cynodon dactylon* for dry sandy places near the sea, and *Zoysia pungens* also for dry situations near the sea, and for inland situations *Digitaria longiflora*, a fine grey-leaved grass. Only creeping grasses should be used; others die out quickly during dry weather. In wet situations *Cynodon dactylon* dies out and *Zoysia pungens* becomes spongy if not very carefully looked after.

I do not recommend forming lawns from seeds although I have seen very good lawns from English grass seeds in this country. They are slow, expensive, and do not last so long as those made from native grasses and ants usually eat up the seeds before they germinate. When recourse is had to grass seeds they should, when possible, be collected in this country, only those being used which possess the qualities mentioned above.

When English lawn seeds are desired, most seedsmen supply mixtures ready for sowing and suited to wet or dry soils as the case may be.

The same preparations of the soil as given for turf are necessary. A fine layer of prepared soil should be spread over the surface on which the seed should be sown and lightly raked in.

The surface should be slightly rolled and protected from heavy rains; 50 lbs to the acre is about the quantity of grass seed required for a lawn. The ground should be kept carefully clear of weeds and rank growth and the young grass should not be mowed for at least 2 months, but frequent rolling will be necessary.

The keeping of lawns when once established is work of a routine character consisting chiefly of mowing, rolling and sweeping. This work must, however, be carefully performed. Very stiff brooms should not be used as they switch hundreds of young grass plants out of the ground and also remove earth round from the roots; and I have already pointed out the importance of proper mowing.

Old and worn lawns and greens may be renovated by top dressing with a finely sifted mixture of wood ashes and burnt earth sown broadcast or sprinkled on by hand, or Bat-Guano may be used in the same manner. The latter is a very powerful and quick-acting manure on grass lands and one I would recommend whenever procurable. Bare patches should be cut out in squares to a depth of 2"-3" and returfed, after adding sufficient new soil to bring the turf up to the surrounding level. After these operations the lawns should have a rest for a week or two and if careful attention is given to cutting and rolling the sward will be almost as good as new by the end of that time.

In most cases, worms would be regarded as useful creatures. They renew the surface soil with finely divided earth brought up from the subsoil, and by means of their burrows allow free access of air to greater depths than would otherwise be reached. They also promote more rapid decay of vegetable matter in the soil. But on the other hand they may be considered a nuisance on lawns or greens owing to the great number of "casts" they leave on the surface.

Many mixtures for killing worms in lawns are on the market at home but are not easily obtainable in this country. These are generally in concentrated liquid form and are diluted and watered into the soil. The liquid causes the worms to come to the surface and die when they are easily swept up and removed.

The following mixture is cheap and effective and the ingredients are easily obtainable here:—

Dissolve $\frac{1}{2}$ oz. of Corrosive sublimate in 15 gallons of water and apply it over the lawn. This will bring the worms to the surface when they can be swept up. Fowls should not be allowed to eat the worm or they will be poisoned. Another simple remedy is to mix a peck of freshly-made quick-lime in 40 gallons water, allowing it to stand until clear, and then apply the clear liquid from a rose watering-pot. This also will bring many of the worms to the surface. Still another remedy worth knowing is a weak solution of Carbonate of ammonia applied in a similar way.

T. W. MAIN.

GOMPHOCARPUS SEMILUNATUS

(A FIBRE PLANT FROM AFRICA)

Gomphocarpus or *Asclepias semilunatus* is a tall slender herb occurring from the Cape to the Zambesi, in Uganda, the Congo and Abyssinia. It produces an exceptionally fine fibre from the stalk after the manner of jute.

Seeds of this plant were received from Uganda, Entebbe Gardens; at the end of March, they germinated and a number were planted out in good light soil in the nursery. They had by October attained a height of over five feet and commenced flowering.

The stems are straight and unbranched, an important matter in cultivation for fibre. They are about a quarter of an inch through and bear numerous narrow lanceolate leaves. The flowers are borne in bunches near the top of the stem, and are white with a grey violet crown (corona) of the reproductive organs in the centre. It seems clear that the plant would do well in this region where jute is a failure and many of the other plants which also produce a good fibre have the awkward habit of branching low down and making a bush rather than a tall easily stripped stem with long fibre. This habit is the most objectionable character in such plants as Perpulut (*Urena lobata*) and the Sidas and other mallows, the fibres of which are excellent but too short, and difficult to strip owing to the branching of the plant. The Gomphocarpus, however, is free from this defect.

The plant appears not to be cultivated anywhere in Africa but is used occasionally for twine.

Fibre was sent from Uganda by Mr. White and was valued at £35 a ton, a very good price. The fibre from the bark of plants grown in the Botanic Gardens, Singapore, seems to be very strong and fine. Its colour and length, when well-grown, leave nothing to be desired. Cultivation of this plant would present no difficulty if sufficient seed was procurable. It merely requires to be sown in good open soil and should be ready for cutting in about six months. The plant seems well worth the attention of those interested in fibres.—Ed.

TACKINESS IN RUBBER.

In "Le Caoutchouc et Gutta percha" for September 15, p 3216., M. Gabriel Bertrand gives an article on the tackiness of the different kinds of rubbers, for which

he gives, besides the ordinary word "puissance," the curious Anglo-French name of "stickage." His object is to compare the tendency to tackiness in the different kinds of rubber rather than to discuss the cause of its occurrence, for which purpose he examined a large series of rubbers in the Musee d'Histoire Naturelle, the Ecole superieure de Pharmacie de Paris, and the Jardin Colonial de Nogent sur Marne.

Hevea braziliensis, was not tacky, even specimens dating from 1867 were in good condition, and two specimens of *H. guyanensis* were also good.

The rubber known as Sernamby, from Peru, and Guiyana, chiefly was all tacky, especially where it was in contact with the glass. These Sernambies are stated to be scraps and residues of *Hevea* but the writer suggests that they are of some other origin. Ceara rubber, out of 8 samples, 3 were not tacky, all the others more or less tacky or resinified.

Euphorbia Intisy from Madagascar, two out of five were not tacky, the rest spoilt. All the *Castilloa elastica* was sticky or resinified. Of *Ficus elastica* balls of scrap all were tacky. One sample out of five of *Ficus prolixa* of New Caledonia was not tacky as was a ball of scrap of *Ficus albinervis* from Reunion.

Cryptostegia Madagascariensis was all good, *Marsdenia verrucosa* and *Hancornia speciosa* were both tacky. Of the Landolphias no less than fourteen species were examined, all of which there were a number of specimens appeared to have a tendency to tackiness but the specimens of *L. Heudelotii* seemed the best. Four species of *Mascarenasia* were examined and two *lisianthiflora* and *longifolia* were neither sticky nor resinous. *Funtumia elastica*, *Willughbeia firma*, *Ecdysanthera rosea*, *Micrechites Napoensis*, *Xylinbaria Reynaudii* were all tacky, as were *Guayule*, *Lobelia elastica* and *Vahea senegalensis*.

In fact the only rubbers which really seemed proof against tackiness were *Hevea braziliensis* and *H. Guyanensis*.

In the case of other rubbers, all of which have a tendency to tackiness, the writer suggests that this depends to some extent on the methods in use in coagulation and quotes Tumelle's "Plantes a Caoutchoue" in corroboration of this.—ED.

TREES ATTACKED BY TERMES GESTROI.

A planter in Johore sends some notes on a piece of ground much infested by *Termes Gestroi*. He notes that the prevalence of *Termes Gestroi* in hilly land, alleged by Mr. Pratt, is hardly in accordance with his observations. It has not, he writes, "taken me long to find out that *Termes Gestroi* have their special hill and special lowland trees. Just outside my fencing (hills) are three Teruntang trees riddled with *Termes Gestroi*. I have seen this tree attacked in swamps as well. In forty acres I destroyed some hundred logs of Teruntang, each of which had a nest of *Gestroi*." He gives the following list of trees in which he found nests or traces of nests of *Termes Gestroi*.

Teruntang	(<i>Camphosperma auriculata</i>)	10
Keminyan	(<i>Styrax Benzoin</i>)	. 54
Pengara	(<i>Myristica sp</i>)	. 15
Bintangor	(<i>Calophyllum</i>)	. 6
Penang Banke		. 2
Damar	(<i>Shorea pp</i>)	. 1
Midang Kelawar	(<i>Elaeocarpus parvifolius</i>)	. 2
Tangkang	(<i>Xylopi ferruginea</i>)	. 1
Engey Burong	(<i>S'tengah Burong, Evodia Roxburghiana</i>)	. 6
Geronggang	(<i>Cratoxylon arborescens</i>)	. 5
Kandis	(<i>Garcinia</i>)	. 1
Mensurier	(<i>Ilex cymosa</i>)	. 2
Klat Samak	(<i>Eugenia</i>)	. 1
Terentai		. 1
Samarum	(<i>Sapotacea</i>)	. 2
S'tebal	(<i>Fagroea racemosa</i>)	. 1
Plajauw		. 1
Marer Bulan	(<i>prob. Gynotroches axillaris</i>)	6
P'tai	(<i>Parkia Roxburghii</i>)	. 2

Total 119

I have added the identifications as far as I can make them out by the native names given.

"I cannot say, so far, as to which of these kinds of trees is attacked in the jungle except Teruntang. It would appear likely that Keminiyan is also. In examining future clearings it may be a guide if the searchers pay particular attention to these kinds of trees. *Gestroi* are not above consuming Mengkuang (*Pandanus atrocarpus*) trunks and appear to delight in tapioca stems and roots." There is no Kempas, Meranti or Pulai, he says, on the district.

The noticeable thing about this list of trees attacked is that nearly all are soft woods, about the same texture as Para rubber and those most affected, the Teruntang and Keminiyan (Gum Benjamin tree), among the softest; of the Kandis, some species are hard, but probably those attacked are Kandis Gajah (*Garcinia Andersoni*) a common tree, of which one was killed many years ago in the Botanic Gardens by *Termes Gestroi*. Samarum should be a hard wood tree but it is doubtful as to what is intended by this name.

It is worth noting in this connection that we never heard of trouble from this termite in the days of coffee cultivation or of nutmeg and clove cultivation, nor does one ever hear of its destroying orchard trees such as durians and mangosteens. Possibly the wood of these trees is too hard for it.—Ed.

ANALYTICAL LABORATORIES OF AYN SOME, LANCASHIRE.

We have received the following letter from the Director of the Analytical and Technical Laboratories, Aynsome, Grange-overs-ands, Lancashire, and publish it as some of our readers may desire to avail themselves of the offer in the letter. The Laboratories are very complete, and not only is research work carried on, but students are instructed in the work of making varnishes, colours, analysis of oils, printing inks and paper making.

The staff is prepared to investigate any products suitable for any part of such manufactures.

ANALYTICAL AND TECHNICAL LABORATORIES, AYN SOME,
GRANGE-OVER-SANDS,

Lancashire, September, 1909.

DEAR SIR,

I beg to send you a booklet, descriptive of these Laboratories. Briefly, I may state that the Aynsome Laboratories are the largest private laboratories in the United Kingdom, and specially equipped for dealing with and reporting on Economic Products, both on a laboratory scale and with the assistance of the model plant installed, from a commercial and practical standpoint.

Being particularly interested in the question of the development of our British Colonies and Foreign Possessions, and keenly alive to the importance of the furtherance of such development, I venture to bring these Laboratories under your notice, and shall be glad to hear from you respecting such economic products as in your opinion call for investigation. I am prepared to furnish you with a preliminary report on any product of which you send me a sample, free of cost, provided that freight charges be paid on the same, and should the results of such preliminary investigation show that the commodity might be utilised commercially in one or more directions, I take it that you would have no objection to putting me into communication with those directly interested in its development.

I may inform you that in the past I have investigated and reported on various fibres for paper-making, submitting samples of paper made therefrom on our model paper machine (see pamphlets sent), gums and resins for varnish-making, earth colours-oxides, ochres, umners, etc.. vegetable fats and oily seeds for soap-making, siliceous earths, china, clays, tannin products, and numerous other commodities found in the as yet undeveloped parts of our Colonies in different parts of the world.

I therefore trust that you will file this communication for future reference.

I am, Sir,

Yours faithfully,

(SD.) J. STEWART REMINGTON,

Director.

A FIBRE EXHIBITION IN JAVA.

Circulars have been received from Java, treating of a congress and exhibition in connection with the cultivation and preparation of fibres, to be held at Sourabaya in 1911, from the 3rd to the 8th July. The object of the congress is to further the cultivation in the tropics, to advise on the culture, to discuss points in dispute, to attain uniformity in the production and product and find out as to the value of cultivating on a large scale. Cotton and Coconut will not be discussed and Ramie only lightly. Sisal Hemp, Manila Hemp, Kapok, Jute and its substitutes and Pine-apple fibre will be the chief subjects of discussion. The exhibition will include all kinds of fibres, collections of plants from which fibres are prepared alive or dried, and machinery for decorticating, drying, packing or preparing in any way for the market.

Diplomas will be awarded for each section.

NETHERLANDS INDIAN AGRICULTURAL ASSOCIATION.

Sourabaya, 20th September, 1909.

TO MACHINERY MANUFACTURERS,

I consider it desirable to draw your attention to the Fibre Congress which is to be held at Sourabaya in July, 1911, and of which a detailed programme has been sent to you.

In connection with this Congress an Exhibition will be held principally of machinery for the preparation of fibres. As the cultivation of fibre bearing plants, especially of sisal and manila hemp, is spreading widely, there is a good demand for such machinery.

It is unnecessary to point out that the extension of this culture is of great importance to manufacturers of machinery and it is therefore confidently expected that they will avail themselves of this opportunity of exhibiting their machinery and thus acquiring a good advertisement.

As indicated in the programme the machinery exhibits will be tested, and as the Congress is not restricted to Netherlands India, other tropical countries will doubtless benefit by the result of these trials and attention will be attracted thereto.

The Committee, acting on behalf of the Agricultural Association of which I am President, in charge of the Congress and Exhibition, will do all in its power to grant every facility to exhibitors of machinery.

Space and power will be furnished free of charge, while endeavours will be made to induce the steamship companies to grant reduced rates of freight on exhibits. The results of these endeavours will be advised you in due course.

As it is necessary to know in advance what space and power will be required for all the exhibits, the Committee has decided that requests for space must be received by the Secretary of the Netherlands Indian Agricultural Association at Sourabaya by the 1st of July, 1910.

Please therefore give a full description of the proposed exhibit and a close estimate of the necessary driving power required.

Further particulars may be had from the Committee's representative in Holland: Professor DR. G. VAN ITERSON, Delft.

A. PAETS TOT GANSOEIJEN,

President of the

Netherlands Indian Agricultural Association.

AMAZON'S RUBBER VERSUS PLANTATION RUBBER.

In the *Journal d' Agriculture Tropicale* (September, 1009) M. G. Lamy Torillhon discusses the causes of the difference in value between hard cure Para of the Amazons and plantation Rubber. He says that a manufacturer of fine para, if offered hard cure, knows right away that the product is fine, older collected, and dryer than Island Para, which is wetter and valued a little lower. With plantation rubber it is necessary for him to see and even analyse the samples before fixing the price. The Brazil rubber contains 15 to 20 per cent. of foreign matter, and water, while plantation rubber is quite pure and only gives $\frac{1}{2}$ to 1 per cent. of moisture, yet the price of the former is higher. He gives an explanation of the difference between the texture of the two rubbers in the following way: Pure raw caoutchouc is considered as composed of globules agglutinated by a physical or chemical method when they were in suspension in the latex. It is by a kind of coalescence that they are joined together, they then present themselves under two conditions of matter very distinct and complementary. One of these states corresponds to a fibrous, elastic, nervous matter, the other may be compared to a plastic matter always ready to unite with the former. The molecular arrangement is so well done that one might compare it to threads of chain joined by a weft, if the comparison of the rubber to a tissue is not too hazardous. It is just in "fine Para" that one finds the highest degree of perfection in this combination of the two substances.

He attributes this greater strength and nerve possessed by the Amazon's rubber to the practice of smoking. Unfortunately, says he, smoking does not exist or is at least very little employed in the Federated Malay States. We have only seen some attempts which should be followed up, for we are persuaded that rubber prepared by smoking should produce a notable increase in value high enough to induce the collector to persevere on these lines. It appears to us indispensable that the collectors of plantation rubber should make smoking general. They would by this means give to their rubber a quality which manufacturers would welcome.

He points out the important factor of the age of the trees, a fifty year old tree giving more elastic and nervous a rubber than a ten year old one, but this with respect to the difference between plantation and Amazons rubber, as he says, time will cure.

As to form, he prefers block, condemning crepe on the ground of its liability to collect dust and damp, and to favour oxydation and tackiness. Biscuits are better, but even they expose too much surface to the air.

The question of smoking rubber is decidedly coming more to the front now-a-days. In the very early days of rubber cultivation, smoking was not uncommon. The first lots of Biscuits sent from the Botanic Gardens to manufacturers were regularly smoked, but this form was rather darker in colour than unsmoked rubber. Amber biscuits took the fancy of the home market. They were very attractive in appearance and so transparent that the buyers could see that they were pure and free from dirt. Then came a reaction, and darker colouring was not considered a defect. In fact, lately smoked rubbers have fetched the highest price in the market. The smoking hitherto however, has only been on the outside of made-up biscuits and sheet, its advantage being the more rapid drying and the prevention of external mouldiness especially in wet weather.

However, for a year, experiments in smoking the latex itself have been in progress in the Botanic Gardens, and we hope very shortly to lay the results of these before our readers. A number of blocks of rubber thus prepared have been submitted to some of the best manufacturing firms in Europe, and their reports will be published when they are completed. We may say, however, that the rubber thus produced is very different in firmness and nerve from the ordinary plantation rubbers, and more resembles the best hard cure rubber of the Amazons.—ED.

THE ZAPUPE, A NEW FIBRE.

The Botanic Gardens, Singapore, have lately received a few plants of a new fibre plant discovered in 1905 between Vera Cruz and Tampico. This plant is one of the Agaves, and is known to the natives of Mexico as Zapupe. It seems to have been long known to the natives as a source of a very superior fibre, but has only come into cultivation within the last few years. At present, 5,000 acres near Vera Cruz are under this plant, and larger areas are being cleared for its cultivation. It is said that it produces a fine white brilliant strong fibre flexible and easy to weave. It is superior to other Agaves from this region in its more rapid growth, giving a good return in three years against the usual delay of six or seven years in other species. There are seven known varieties of it. The best one at three years old produces 125 to 150 leaves per year, after which the number gradually diminishes till its seventh or eighth year, giving an average during the whole time of 100 to 120 leaves a year, till it dies in about ten or fifteen years. It prefers a light sandy soil. About 1,000 to 1,400 plants are planted to the acre. They are planted from lateral buds as in the case of Henequen, or Sisal hemp, and produces six or seven buds on the roots each year, and when it poles, it produces 1,000 to 2,500 hulbils, which can be used for planting. The leaves are cut at any time during the year and care has to be taken to cut them at the level of the stalk, for the plant is

apt to die prematurely if carelessly cut. The fibre is prepared by a machine capable of defibrating 20,000 leaves an hour, with the labour of three men. A thousand leaves gives 50 to 55 pounds of fibre, that is $2\frac{1}{2}$ to 3 tons an acre. The fibre is valued at about £29 per ton, and as in Mexico the expenses are light, a good profit is obtained. At present the plants in the Singapore Gardens are small, but seem to make a steady growth, and it seems likely to do as well as Sisal, or Mauritius hemp here.

The above notes are taken from Mr. R. H. Millward's Mexican fibre Agaves known as Zapupe. (Trans. Acad. Science, St. Louis, 1909).

RUBBER NOTES.

PEAT FORMATION.

Through the kindness of the Collector of Land Revenue, Lower Perak, we have received a report of some peat soil taken from a spot between Chankat Tong and Sabak in Perak examined by the Government Analyst in 1906. Unfortunately no complete analysis is given. The Analyst (Mr. Burgess) merely says :

Coarse mineral matter on laevigation . . none.
Total mineral matter in the dry sample . 7—6.

The report shows how very poor in mineral constituents this soil is.—ED.

THE BLACK HEVEA FUNGUS.

We recently published (Bulletin VIII, 310) some account of a pestilential black fungus attacking the shoots of rubber trees in Johore and Selangor. Specimens were sent to the Director of the Royal Gardens Kew, who submitted them to Mr. Masee, the

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well-known authority on fungi, who reports on it as below. A fuller report will doubtless be published in the Kew Bulletin.

In the meantime the pest appears to be a serious one. Mr. Masee suggests it is a stage in the life-cycle of some species of *Rosellinia*, a genus which has supplied some of the most injurious fungi we know. It is disquieting to know that the fungus is doing damage in West Africa also as that seems to estimate that it is a plant of wide distribution.

The nectria mentioned in the last paragraph of Mr. Masee's report was a small orange-red fungus found on the outer bark of a Hevea tree where there had been an old wound and some of the wood was dead. It is probably harmless only attacking dead wood, as it is a saprophyte.—ED.

FUNGUS ON PARA RUBBER FROM SINGAPORE.

The fungus proves to be an undescribed species of *Diplodia*, and will be described as *D. rapax*.

The general structure, habit and parasitic nature suggest that the *Diplodia* is a stage in the life-cycle of some species of *Rosellinia*. The fascigerous condition may be looked for on thoroughly dead and dry wood that had previously been attacked by the *Diplodia* form.

In the first batch of specimens sent, the fungus was sterile but fruit was present in abundance on the material received on October 23rd.

The same fungus, parasitic on Hevea, has just been received at Kew from W. Africa, where it is said to spread rapidly.

The fungus sent in a match box is *Nectria sanguinea*, Fr., a saprophyte.

G. MASSEE.

26.10.09.

Rubber Companies' Statistics.

A FEW INTERESTING NOTES BY MR. ARTHUR SHEPHARD ON HIS TABLE AND THE PLANTATION INDUSTRY.

The high dividends which were being paid by rubber companies attracted my attention to the subject, and I felt the need for a table which should compare the respective merits of the various companies. My desire to find such a table was much stimulated by the publication in *THE FINANCIER* from time to time of interesting comparisons of the positions of various companies.

Here and there in other publications I found interesting estimates of future outputs from various estates—estimates extending sometimes over many years. It appeared to me, however, that in estimating the output of future years there must of necessity be far too much guesswork. Intimate knowledge of the particular estate was necessary in order to frame such an estimate, and the plan was, therefore, not practicable for dealing with any very large number of companies.

Rubber estates, of course, differ (like other estates) very greatly in value, and the market prices of shares differ quite as widely, and not always in direct ratio to the value of the estate. It seemed to me that a much sounder basis for comparison could be obtained by bringing together the figures relating to the leading companies, and comparing the planted acreages with the ages of the rubber and the capital expended, and these items with the prices of the shares. By this method the price of the rubber land is clearly ascertained—guesswork forms no part of the plan—and, having ascertained the price, the investor may then use his judgment as to whether he will pay a larger sum for the rubber of similar age in another company. If he can now secure reliable opinions as to the productivity of various estates, and as to the ability of the management, he will be well-equipped with the means of making a judicious investment.

Some of the uses of the table may be indicated as follows:—

- (a) The CAPITAL ISSUED, UNDIVIDED PROFITS and LOANS will, when compared with the COST OF THE ESTATE, show the capital resources of the company, and will show whether the company has sufficient capital to bring its young rubber into bearing. Development expenditure has to be met either out of capital or out of future profits, and, if profits are to be applied to development purposes, dividends must suffer.

- (b) The TOTAL ACREAGE, compared with the PLANTED ACREAGE, will show the extent of the company's reserve land.
- (c) The DETAILS OF THE CULTIVATED ESTATE have been shown in acres. The rubber acre is a more satisfactory unit of value than the individual rubber-tree; and the more modern view appears to be that, within reasonable limits, a closely-planted acre of rubber is worth no more than, if as much as, a widely-planted acre.

Every care has been taken to show as accurately as possible the number of acres planted in each year, but, as the reports of some companies still quote the number of trees instead of the number of acres, some estimating has been unavoidable. The planting distance has been taken into consideration, and inquiries of the companies' officials have sometimes elicited the desired information. As the particulars thus obtained have been adjusted to agree with the published acreage totals, it is believed that any discrepancy which may exist will not be of sufficient importance to vitiate the general accuracy of the calculations.

The average age of the rubber has been calculated to the middle of the present year, and the average cost per acre of rubber has been ascertained by taking the cost of the estate and development expenditure as shown in the company's balance-sheet, after making a moderate deduction for the unplanted land—usually £3 per acre.

The result is shown under two headings:—

- (1) The cost as ascertained from the item in the company's balance-sheet, less the estimated value of the unplanted land.
- (2) The cost after further deducting the reserve funds and any other undivided profits which the company could (if the directors so desired) apply in reduction of the book cost of the estate.

Where the profits in hand are considerable the difference is important.

The price per acre the investor is paying for rubber is the essential feature of the table. The balance-sheet of each company has been dissected, and the results shown in the table have been arrived at by calculating the price at which the company would have to sell its estate if it desired to realise all its assets, discharge all its liabilities and return to its shareholders (as on a winding-up) a sum equal to the present market value of the shares.

Options form a charge which will allow the option-holder to come in and share the future prosperity of a company; and this, of course, can only be done to the detriment of the holders of the shares already issued. In making the calculations it has been assumed, therefore, where shares stand at a premium, that the options will be exercised. But they have been valued NOT at the price which a buyer might be expected to pay on the Stock Exchange for a call of shares, but only as the option affects the financial position of the company and its present shareholders—that is to say, if £1 shares are quoted at £1 5s, it has been assumed that the option is worth 5s (equal to £1 share, nothing paid).

After the average price per acre which the investor is paying for the whole planted estate has been ascertained, a further detailed calculation has been made to apportion the price rateably among the older rubber and the younger rubber, according to age. It is sufficiently obvious that rubber which is now in bearing (yielding, it may be, a net profit of £150 to £200 per acre) is very much more valuable than immature rubber, which may not come into bearing until after famine prices have disappeared. No attempt has been made to show what the rubber possessed by any company is actually worth; but, for the purpose of maintaining a fairly correct ratio between the values of planted land of differing ages, a scale has been adopted such as is in use by professional rubber valuers, and the market price of the shares has been made to decide what is the market valuation of each year's planting according to the scale referred to.

A concrete example of the results obtained and of the thoroughness with which the table has been prepared may be given by examining the position of the Lanadron Company. According to the last balance-sheet, the assets and liabilities (after making the necessary adjustments for shares since issued, calls since paid, and for the purchase of Hollingbury) were as follows:—

LIABILITIES.			ASSETS.		
		£			£
Capital at par	...	269,780	Cost of estate, develop-	...	208,369
Creditors	...	5,443	ment, buildings, etc.	...	86,925
Dividend for 1908	...	20,071	Cash and realisable assets	...	
		<u>295,294</u>			<u>295,294</u>

The £1 shares, however, are quoted at $4\frac{7}{8}$, and the market valuation of the estate may be shown by the following adjusted balance-sheet:—

	£		£
269,780 shares at $4\frac{7}{8}$	= 1,315,177	Market valuation of	
Creditors	...	estate	...
Dividend for 1908	...	...	...
		Cash and other assets	...
	<u>1,340,691</u>		<u>1,340,691</u>

The market valuation of the estate has, in the table, been apportioned as follows:—

			£	£
25	acres	10 year old	rubber at	1,421 = 35,535
72½	"	9	"	1,244 = 90,790
375	"	8	"	1,066 = 399,762
65	"	7	"	888 = 57,744
30	"	6	"	711 = 21,320
150	"	5	"	510 = 76,620
440	"	4	"	333 = 146,576
962½	"	3	"	200 = 192,375
1,424	"	2	"	111 = 158,120
1,027½	"	1	"	53 = 54,767
6,709½	"	Jungle		3 = 20,157
Total = Market valuation ...				1,253,766

It is quite likely that many readers whose knowledge entitles them to express an authoritative opinion may not approve of the exact ratio of the apportionment; but the table has been so arranged that any reader may mentally readjust the figures to his own liking. If the older rubber is to be placed at a higher figure, the younger rubber must be put down at a lower value, and vice versa.

It may be of interest to note that the price at which the Lanadron property was sold to the public in 1907 is quoted in the prospectus as follows:—

				£	£
22½	acres	8½	year old	rubber at	190 = 4,275
2½	"	8	"	"	180 = 450
30	"	7½	"	"	170 = 5,100
42½	"	7	"	"	160 = 6,800
252½	"	6½	"	"	150 = 37,875
122½	"	6	"	"	140 = 17,150
45	"	5½	"	"	130 = 5,850
20	"	5	"	"	120 = 2,400
10	"	4½	"	"	100 = 1,100
20	"	4	"	"	100 = 2,000
150	"	3	"	"	60 = 9,000
150	"	2½	"	"	45 = 6,750
250	"	2	"	"	35 = 8,750
300	"	1½	"	"	25 = 7,500
602½	"	1	"	"	15 = 9,037
1,337	"	under 1	"	"	10 = 13,370
6,866	"	Virgin jungle	"	"	3 = 20,598
534	"	Secondary jungle	"	"	2 = 1,063
Total				159,073	

and it will be remembered that the shares went to a substantial premium immediately on flotation.

Particulars of catch-crops and interplanting have been fully detailed in the remarks column of the table. Interplanted crops frequently retard the growth of rubber, and, although their cultivation may in some instances lead to the payment of dividends before the rubber comes into bearing, their value is to some extent doubtful, and no allowance has been made for them in the calculations. Whatever benefit may accrue from interplanted crops may be regarded as an additional advantage, which may favourably influence the investor in his choice.

MINUTES OF MEETING OF THE PLANTERS' ASSOCIATION OF MALAYA

HELD AT THE MASONIC HALL, KUALA LUMPUR, ON OCTOBER 31st,
1909, AT 10-A.M.

PRESENT :

For Kuala Lumpur District Planters' Association :	Messrs. E. B. Skinner, E. F. Dupuis, C. Burn-Murdoch and H. C. E. Zacharias.
„ Malay Peninsula Agricultural Association :	Mr. H. Lamb.
„ Kuala Langat District Planters' Association :	„ E. Macfadyen.
„ Kuala Selangor District Planters' Association :	„ F. H. Staples.
„ Kapar District Planters' Association :	„ H. W. Bailey.
„ Negri Sembilan Planters' Association :	„ S. Hingston.
„ Klang District Planters' Association :	Messrs. A. B. Lake and R. W. Harrison.
„ Johore Planters' Association :	„ A. B. Brown and W. N. Gawler.
„ Batu Tiga District Planters' Association :	„ H. F. Browel and P. W. Parkinson.
„ Taiping Planters' Association :	Mr. Gordon Brown.

Visitor : Mr. M. J. Kennaway.
Mr. G. H. Day (Legal adviser).

Chairman : Mr. C. M. Cumming.
Secretary : „ H. C. E. Zacharias.

1. The Notice convening the Meeting having been read, the Minutes of the last Meeting are taken as read and confirmed.

2. INDIAN IMMIGRATION COMMITTEE.

The *Secretary* is instructed to write again, soliciting a reply to his letter of July 23rd.

3. PREVENTION OF PLANT DISEASES.

The following correspondence was read :

The Federal Secretary, F.M.S.,
Kuala Lumpur.

17th August, 1909.

Sir,—I have the honour to inform you, that the question of the prevention of plant diseases was considered at the last Meeting of this Association (held on the 10th instant), when it was felt that legislation on the lines of the present Coconut Enactment was most

desirable, in order to prevent diseases of perhaps originally quite local and endemic a nature from spreading and becoming epidemic in the large areas, where nowadays plant growth has artificially been restricted to a single species, viz., *Hevea Braziliensis*.

It was therefore resolved.

"That, in view of the possible danger to the Planting Industry owing to unreported outbreaks of plant disease, Government be asked to place such power in the hands of the Officers of the Agricultural Department as will enable them to summarily deal with any such outbreak."

I have, etc.,
(Sgd.) H. C. E. ZACHARIAS,
Secretary.

No. 3936/1909.

25th August, 1909.

SIR,—With reference to your letter of the 17th August, 1909, on the subject of the prevention of Plant Diseases, I am directed to inform you that legislation in the direction desired is already under consideration.

I have, etc.,
(Sgd.) R. G. WATSON,
Federal Secretary.

and noted with satisfaction.

4. RECRUITING IN BENGAL PRESIDENCY.

The *Secretary* read the following letter :

The Federal Secretary, F.M.S.,
Kuala Lumpur.

17th August, 1909

SIR,—I have the honor to inform you that at the last Meeting of this Association, held on the 10th instant, the question of recruiting natives of the Bengal Presidency, for labor in the Malay Peninsula, was mooted. I was subsequently instructed to submit to your Government that the Government of India be approached with a view of rescinding the order, which at present restricts recruiting for this country to the Madras Presidency.

I have, etc.,
(Sgd.) H. C. E. ZACHARIAS,
Secretary.

5. TRUCK ENACTMENT.

The Meeting having been in Committee during the discussion of this subject, Mr. Skinner proposes, Mr. Harrison seconds and it is carried unanimously :

"That in view of the great danger run under the present Truck Enactment, this Association press the Government to take urgent steps to amend the said Enactment."

The Secretary is instructed to write accordingly to the Federal Secretary, and, failing a satisfactory answer, again to the High Commissioner.

6. MYCOLOGISTS AND RESEARCH CHEMISTS.

In the absence of Mr. F. Pears, Mr. Cumming formally proposes and Mr. J. A. Brown seconds:

"That this Association advise its Constituent Associations to procure the services of a Mycologist and Research Chemist of their own."

After a prolonged discussion of the subject in Committee, Mr. Harrison proposes and Mr. Macfadyen seconds:

"That a deputation of this Association, with full powers to treat with the Government, wait on the Resident General and request the Government to increase immediately the scientific staff of the Agricultural Department."

Carried, with one dissentient.

Mr. Harrison proposes, and Mr. Bailey seconds, that this Deputation consist of Messrs. Cumming, Skinner and Lake.

Carried.

The Secretary is instructed to write to the R. G. A., informing them of the steps about to be taken by this Association.

7. RUBBER DEALERS' LICENCES.

The following correspondence is read:

The Federal Secretary, F. M. S.,
Kuala Lumpur.

13th September, 1909.

SIR,—I have the honor to inform you that the following two Resolutions were passed at the last Meeting of this Association held on the 10th ultimo:

1. *"That it be represented to the Resident General that legislation for the purpose of licensing and controlling dealers in rubber and gutta-percha is considered desirable by this Association."*

2. *"That this Association considers the definition of latex to be "any plant juice which contains caoutchouc or guttapercha," but would ask the Resident General to obtain the opinion of the Legal Adviser as to whether this reading is correct, and if not, to have the enactment amended to cover all grades of rubber."*

I have, etc.,

(Sgd.) H. C. E. ZACHARIAS,

Secretary.

No. 4428/1909.

20th September, 1909.

SIR,—I am directed to acknowledge the receipt of your letter dated the 13th September, 1909, reporting two resolutions which were passed at the last Meeting of the Planters' Association of Malaya held on the 10th ultimo.

2. With regard to the first, I am to invite your attention to this office letter 649/1907, addressed to you on the 16th February, 1907, and to state that the information asked for in the last paragraph of that letter does not appear to have been supplied, as yet.

3. With regard to the second, I am to point out that "Latex" was inserted in the Enactment in accordance with the wish expressed by the United Planters' Association. If a further definition is required, it would be well that the Planters' Association of Malaya should supply it.

I have, etc.,
(Sgd.) R. G. WATSON,
Federal Secretary.

Mr. Cumming thinks the reply unsatisfactory, but it was perhaps his fault, as under his instructions their last letter to Government had only contained the terms of the resolution mentioned above.

Mr. Skinner gives an instance which had come under his notice at Kajang. They were changing their factory; 125 lbs. of rubber disappeared, and the two watchmen and a storekeeper were fined \$3, \$5 and \$7 for carelessness.

Mr. Cumming says that rubber stealing was rife throughout the country. The Government had taken steps to protect the miner. All they asked was that Government should license rubber dealers, so that they might have access to their books, and that only reputable people be licensed.

Mr. Parkinson proposes that the Secretary be instructed to circularise members of the Association asking for concrete cases of theft to set before Government. This is seconded by Mr. Lake and carried.

PRAEDIAL PRODUCE ENACTMENT.

8. Mr. Lake considers the reply received from Government quite satisfactory. All they wanted was that "latex" should cover every form of rubber. He suggests that their legal adviser should define it. He proposes "that this Meeting agrees that 'latex' should include all forms of rubber and guttaperchas, and leaves the exact wording to our legal adviser."

This is seconded by Mr. H. F. Browell and carried.

10
200

9. EXCISE ENACTMENT.

Mr. Cumming remarks that planters had long been agitating for legislation to control the liquor traffic. The Excise Enactment had been passed and was welcome. Under that Enactment boards of licensing justices were appointed, and he says he had received a letter from the Acting Secretary to Resident, Negri Sembilan, as follows :

No. 1690/9/09.

Seremban, 13th September, 1909.

SIR,—I am directed to inform you that the Excise Enactment 1908 will be brought into force in Negri Sembilan from the 1st January next and to invite your attention to the provisions contained in the Enactment for the establishment of Licensing Boards to deal with the issue of licences for the sale of intoxicating liquors.

2. The Resident is anxious that the planting interest should be represented on these Boards, and I am to invite you to suggest the names of members of your Association who would be prepared to serve on the various District Boards which it is proposed to appoint viz. :

	The Seremban District Board.	
	The Coast	“ ”
	The Jelebu	“ ”
	The Kuala Pilah	“ ”
and	The Tampin	“ ”

3. I may mention that I addressed the Chairman of the Negri Sembilan Planters' Association in July last on this subject but have not hitherto been favoured with a reply.

I have, etc.,

(Sgd.) E. B. MAUNDRELL,

Ag. Secretary to Resident.

He would further inform the Meeting, that the Negri Sembilan Planters' Association had since met and appointed their members on the Board.

Mr. Skinner says they were now interested to hear, what Selangor was going to do in the matter. He believed the idea was to appoint only one Planting Member for the Coast Boards, and that on the inland boards planters were not to be represented at all.

Mr. Parkinson considers that even for the Coast one member is insufficient. Local knowledge was required, and each District Association should have one representative on the Board.

Mr. Skinner proposes that the Chairman ask the Residents of Perak and Selangor that the Planters' Association of Malaya be allowed to nominate licensing justices for Perak and Selangor.

This is seconded by Mr. Macfadyen, and carried.

10. RULES.

Mr. Macfadyen proposes :

" That the following be added to Rule 12. : Members may also be represented by a personal proxy entitled to speak and vote, provided notice has been given before the Meeting to the Secretary.

He considers that the more elastic their rules were, the better. He instanced that, if the letter of their Rules had been strictly carried out, Mr. F. Pears for instance would have been unable to speak at their last Meeting.

Mr. Lake is of opinion that these constant changes in their Rules are undesirable and in this case unnecessary.

After some discussion, Mr. Macfadyen then withdraws his original motion and substitutes the following :

That the following be added to Rule 6 :

" And any member of a Constituent Association, representing a delegate unable to attend, may speak and vote on all motions, provided notice has been given before the Meeting to the Secretary."

This is seconded by Mr. Dupuis and carried unanimously.

11. REGISTRATION OF COOLIES.

The following is brought forward by Mr. Staples on behalf of the Kuala Selangor District Planters' Association :—

" That the Planters' Association of Malaya be approached with a view to improve the registration arrangements re the employment of local Tamil coolies, and principally in the matter of notifying previous employers of the re-engagement of coolies previously employed by them."

Mr. Staples says the planters in his district thought that the system of registration was inadequate. The Superintendent of Immigrants was informed, and nothing else was done. The previous employer of a coolie ought also to be informed.

Mr. Lake formally seconds the motion, to allow it to be discussed.

Mr. Cumming says that the Association was not concerned with registration, and recommends that the Immigration Committee be approached. The motion is then put to the vote and lost.

12. RECRUITING ADVANCES.

Mr. Cumming reverts to the amount of the allowances given by the Indian Immigration Committee to importers of labour to cover their recruiting expenses, and to the irrecoverability of advances.

The Meeting goes into Committee.

Mr. Cumming, summing up, deprecates any hasty action and proposes that a Special Committee be appointed to go thoroughly into the subject.

Mr. Parkinson seconds this Motion, which is carried.

Mr. Parkinson then proposes that the Committee consist of one representative from each Constituent Association and of the Secretary, and that their quorum be 7.

This is seconded by Mr. Lake.

Mr. Skinner proposes and Mr. Bailey seconds as an amendment that the quorum be 5.

The amendment is carried by 8 to 7.

13. FEDERAL COUNCIL :

Mr. Cumming says that the Federal Council had been gazetted and was now in ease. The Planters' Association of Malaya had constantly advocated it and heartily welcomed this step, as now accomplished.

They now awaited with interest the official announcement of the Unofficial Members appointed.

14. TAIPING DISTRICT PLANTERS' ASSOCIATION.

Mr. Gordon Brown announces the formation of the Taiping District Planters' Association, and receives the congratulations of the Chairman to Perak planters on taking this step.

The Meeting terminates at 12.15 p.m.

H. C. E. ZACHARIAS,
Secretary.

STRAITS REPORT.

London, October 8th, 1909.

Beeswax:—The trade demand has been good, and prices well maintained.

Camphor:—A very quiet demand, even at 137/6d per cwt. for spot, and 132/6d. per cwt. c.i.f.

Capsicums:—Market firm. Very fine Beans from Natal have sold at 75/- to 79/- per cwt., but common East Indians are slow of sale at 25/- to 35/- per cwt.

Copra:—The market during the past month has been quiet and prices ruled rather in buyers, favor, but we close firm. F. M. Straits at £20.2.6; Sundried £22.15.0; Java £21.12.0; Manila £19.10.0; Ceylon £22.10.0; Malabar £23.15.0 per ton c.i.f.

The tendency of market for near future is strong.

Gums, Copal:—Privately a fair business has been done at steady prices.

The auctions held contained fair supplies, but buyers were rather slow and a little was sold but until afterwards.

551 cases 4509 baskets and 15 bags Manila, Macassar, etc., were offered, and about 1000 packages sold at nda since the sales. Macassar, fair scraped yellowish at 47/6, bold pale and amber fluted at 38-, fair fluted sorts at 29/-, small ditto at 26/6d. Nubbles, fair pale at 30/- chips, bold pale, at 25/6d, rough blocky at 17/6 to 19/-. Pontianac, amber and pale well scraped at 67/6, mixed colours fair scraped, without reserve at 58/-.

Nubbles, bright hard at 38/6d., fair part coated at 35/-; chips, clean pale small at 26/-, common mixed at 17-6d. to 18/-. Sambas, pale pinky scraped at 69/-, pale bold chips at 34/6d.

Benguela: 58 packages offered and sold, fair clean sorts part rough at 63/- to 65/-, palish part rough coated at 52/-, small clean at 47/-, part blocky at 39/-, rough pickings at 7/6d. to 12/6d.

Damar has been a very quiet market, privately the trade has been small, but quite sufficient, for in the public sales when 129 packages were offered there was no demand, and all was bought in.

India Rubber:—Prices during the month have continued to advance until record figures have been reached, far beyond even the greatest Bull's anticipation. At the beginning of this week the extreme rates received a

check to the extent of 8d. to 11 d. per lb., but a partial recovery has since taken place. The last sales of Plantation Rubber which were offered on the day of the decline only marked slight difference of about 1d. per lb.

Malay and Straits (about 78 tons): Sheet, fine smoked at 9/6d. to 9/6¼d., fair to fine at 9/0¾d. to 9/1d.; mixed part pressed and inferior at 8-10d. to 8/11½d. Crepe, good to fine pale at 8/11¼d. to 9/3¼d., fair to good palish at 8/8¼d. to 8/11d., palish mottled at 9/2d. to 8/9¾d., clean brown part dark at 7/6d. to 8/2d., dark brown part specky at 6/5d. to 7/6¼d., black and soft at 5/- to 6/1d. Block, fair pale at 9/2d. Scrap and virgin pieces, fair to fine at 6/- to 6/10½d. Rambong, Crepe, fine clean red at 6/8¼d., Scrap, good at 4/10d. to 5/-.

Ceylon (about 11 tons): Sheet and Biscuits, fair to very fine at 9/0¾d. to 9/1¾d. Crepe, fair to fine pale at 9/¼d. to 9/1¾d. with fine, thick "Rosebaugh" at 9/3d. fair palish at 8/8¼d. to 8/11½d., clean brown at 7/10¾d. to 8/4¾d., dark brown clean at 7/5¾d. to 7/8¼d., dark part softish at 6/5d. to 7/4½d. Scrap, fair to fine at 6/6d. to 6/9½d.

Mace:—Unchanged. 17 cases Penang offered and bought in, pale and reddish at 2/-, ditto wormy at 1/10d. also 4 cases Singapore, ordinary red and broken at 1/10d.

West India steady, 5 packages offered and sold, fair pale and reddish at 1/6d. to 1/7d., fair to good red at 1/5d. to 1/6d., broken at 1/- to 1/4d.

Isinglass:—A steady trade has been done. Penang was sold with good competition at rather irregular prices, but on the whole favoring sellers, particularly, for the better qualities of leaf and Purse.

Penang:—Round Leaf, good stout pale at 4/11d., middling to fair part small at 4/- to 4/6d., middling to fair reddish at 3/5d. to 3/11d., ordinary reddish part small and rough at 2/9d. to 3/4d., small part thin and rough dark at 2/4d. to 2/8d., and pickings at 1/2d. to 2/-. Long Leaf, small thin part rough at 2/9d., pickings at 1/1d. Tongue, fair heavy at 4/1d., middling to fair yellow and reddish at 3-7d. to 3-9d., heavy dark part small at 2/6d. to 2/11d., small and pickings at 1/2d. to

1/8.; long tongue, fair heavy at 2/7d. Tails, small pale at 1/5d. Purse, fair to good at 11d. to 1/1d., ordinary to middling at 9d. to 10d.

Nutmegs:—Unchanged. 25 boxes Penang, 64's were bought in at 1/6d. and 66 boxes Singapore 80's at 9d. and 91's at 8½d.

West India steady. 128 packages offered and sold, 71's at 10d., 76's to 81's at 8d., 92's to 93's at 5½d., 95's to 96's at 5½d. to 5¾d., 103's at 5d., 109's mixed dark at 4¼d., 116's to 119's at 4½d. to 4¾d., 127's to 140's at 4¼d. to 4½d.

Pepper:—A good business has been done in both Black and White at advancing prices—the result of speculation. Although recently with support withdrawn temporarily, a slight reaction took place, but values have recovered, and we close with a firm market.

Fair Singapore spot 3¾d.; for arrival October to December shipment 3½d., November to January 4¼d., January to March 4¼d. to 4½d., c.i.f. delivered weights.

White Pepper:—Singapore, September to November 6¾d., October to December 6¾d., November to December 7d. c.i.f. delivered weights.

Shell:—Green Snail: The last offerings met with good competition and firm prices were paid.

Mergui: Small to bold 38/- to 47/- per cwt. Defective 22/- per cwt.

Singapore and Penang: Small to bold 38/- to 46/- per cwt. Defective 28/- per cwt.

Black-edged, a steady market.

Manila and Ceram: In sales 718 packages offered and 660 sold on the average at firm prices to 10/- dearer.

Bold and medium £7.5.0 to £10.10.0 per cwt., medium and chicken £5.12.6 to £6.15.0. Pickings £4.15.0 to £8.7.6. Pieces £4.10.0 to £5.2.6. chicken to Bold £8.12.6 to £8.17.6.

Mergui: 46 packages offered and sold at about 10/- advance.

Bold and Medium £8.12.6 to £8.15.0 per cwt., medium and chicken £8.0.0 to £8.5.0 per cwt. Pickings £6.7.6 to £8.10.0 per cwt. Dead 46/- to 55/- per cwt.

Sago:—Trade for the past month has been very quiet, but recently there has been rather more enquiry. The value of fair small on the spot is 12/- per cwt.

We quote Pearl, large, at 15/- to 16/6d., medium 14/- to 15/-, small 12/- to 13/6d. and flour, good pinky to white 9/- to 10/- per cwt.

Tapioca:—Market has remained about steady. Singapore, November to January shipment 1½d. On the spot we quote Penang Flake at 1½d. to 2¾d.; Singapore 1½d. to 2¾d. Flour, fair to fine 9/- to 11/-.

Pearl: Bullets 20/-, medium 12/- to 21/-, and Seeds 11/6 to 21/-.

Vanilloes:—The small quantity offered, 108 tins, met a keen demand, quality somewhat poor, scarcely any fine beans being offered, practically all sold, prices averaging 1/- per lb. advance on the enhanced rates obtained at the last auctions.

Seychelles:—Of 85 tins 82 sold. Fair to good, 6½ to 8 inch at 11/-, 6½ to 7½ inch at 10/- to 10/6d., 5 to 7 inch at 9/6d. to 12/-, 3½ to 6½ inch at 9/3d. to 11/-; common, 3½ to 8 inch at 9/- to 10/-; mouldy, etc., 3/9d. to 5/9.

Bourbon:—Of 2 tins 1 sold. Good 8½ to 9 inch at 16/6.

Mauritius:—2 tins sold. Common, 3½ to 7 inch at 9/6d.

Ceylon:—13 tins sold. Common, 4 to 7½ inch at 5/9d. to 9/-, mouldy at 2/-.

East India:—3 tins sold. Common at 5/9d. to 8/-.

West India:—2 tins sold. Various at 5/3d. to 8/9d.

Australian:—1 tin sold. Common, 4½ to 6 inch at 3/3d.

All descriptions of produce sold to the best possible advantage.

JOHN HADDON & CO.,
Salisbury Square, E.C.

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

October 1909.

			Tons.
Tin	Str. Singapore & Penang to U. Kingdom &/or		1,296
Do.	do.	U.S.A.	885
Do.	do.	Continent	440
Gambier	do.	Singapore	—
Do.	do.	do.	Glasgow
Do.	do.	do.	London
Do.	do.	do.	Liverpool
Do.	do.	do.	U.K. &/or Continent
Cube Gambier	do.	do.	United Kingdom
Black Pepper	do.	do.	do.
Do.	do.	Penang	do.
White Pepper	do.	Singapore	do.
Do.	do.	Penang	do.
Pearl Sago	do.	Singapore	do.
Sago Flour	do.	do.	London
Do.	do.	do.	Liverpool
Do.	do.	do.	Glasgow
Tapioca Flake	do.	Singapore	United Kingdom
T. Pearl & Bullet	do.	do.	do.
Tapioca Flour	do.	Penang	do.
Gutta Percha	do.	Singapore	do.
Buffalo hides	do.	do.	do.
Pineapples	do.	do.	do. cases
Gambier	do.	do.	U.S.A.
Cube Gambier	do.	do.	do.
Black Pepper	do.	do.	do.
Do.	do.	Penang	do.
White Pepper	do.	Singapore	do.
Do.	do.	Penang	do.
Tapioca Pearl	do.	Singapore	do.
Nutmegs	do.	Singapore & Penang	do.
Sago Flour	do.	Singapore	do.
Pineapples	do.	do.	do. cases
Do.	do.	do.	Continent
Gambier	do.	do.	S. Continent
Do.	do.	do.	N. Continent
Cube Gambier	do.	do.	Continent
Black Pepper	do.	do.	S. Continent
Do.	do.	do.	N. Continent
Do.	do.	Penang	S. Continent
Do.	do.	do.	N. Continent
White Pepper	do.	do.	S. Continent
Do.	do.	do.	N. Continent
Do.	do.	Penang	S. Continent
Do.	do.	do.	N. Continent
Copra	do.	Singapore & Penang	Marseilles
Do.	do.	do.	Odessa
Do.	do.	do.	Other S. Continent
Do.	do.	do.	N. Continent
Sago Flour	do.	Singapore	Continent
Tapioca Flake	do.	do.	do.
Do. Pearl	do.	do.	do.
Do. Flake	do.	do.	U.S.A.
Do. do.	do.	Penang	U.K.
Do. Pearl & Bullet	do.	do.	do.
Do. Flake	do.	do.	U.S.A.

				Tons.
Tapioca. Pearl	Str.	Penang	U.S.A.	110
Do. Flake	"	do.	Continent	—
Do. Pearl	"	do.	do.	95
Copra	"	Singapore & Penang	England	660
Gutta Percha	"	Singapore	Continent	50
Cube Gambier	"	do.	U.S.A.	
T. Flake & Pearl	"	do.	do.	
Sago Flour	"	do.	do.	
Gambier	"	do.	S. Continent	
Copra	"	do.	Marseilla	
Black Pepper	"	do.	S. Continent	
White Pepper	"	do.	do.	
Do.	"	do.	U.S.A.	
Pineapples	"	do.	do.	
Nutmegs	"	do.	do.	
Black Pepper	"	do.	do.	
Do.	"	Penang	do.	
White Pepper	"	do.	do.	
T. Flake & Pearl	"	do.	do.	
Nutmegs	"	do.	do.	
Tons Gambier				550
Do. Black Pepper				500

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

October, 1909.

				Tons.
Tin	Str.	Singapore & Penang to U. Kingdom &/or		1,175
Do.	"	do.	U.S.A.	620
Do.	"	do.	Continent	70
Gambier	"	Singapore	Glasgow	—
Do.	"	do.	London	—
Do.	"	do.	Liverpool	—
Do.	"	do.	U.K. &/or Continent	100
Cube Gambier	"	do.	United Kingdom	—
Black Pepper	"	do.	do.	15
Do.	"	Penang	do.	5
White Pepper	"	Singapore	do.	100
Do.	"	Penang	do.	10
Pearl Sago	"	Singapore	do.	25
Sago Flour	"	do.	London	100
Do.	"	do.	Liverpool	—
Do.	"	do.	Glasgow	—
Tapioca Flake	"	Singapore	United Kingdom	85
T. Pearl & Bullet	"	do.	do.	15
Tapioca Flour	"	Penang	do.	200
Gutta Percha	"	Singapore	do.	20
Buffalo hides	"	do.	do.	—
Pineapples	"	do.	do.	cases 3,000
Gambier	"	do.	U.S.A.	50
Cube Gambier	"	do.	do.	75
Black Pepper	"	do.	do.	75
Do.	"	Penang	do.	70
White Pepper	"	Singapore	do.	20
Do.	"	Penang	do.	40
Tapioca Pearl	"	Singapore	do.	90
Nutmegs	"	Singapore & Penang	do.	8

	Str.			Tons.
Sago Flour		Singapore	U.S.A.	130
Pineapples	"	do.	do.	700
Do.	"	do.	Continent	900
Gambier	"	do.	S. Continent	—
Do.	"	do.	N. Continent	75
Cube Gambier	"	do.	Continent	—
Black Pepper	"	do.	S. Continent	—
Do.	"	do.	N. Continent	25
Do.	"	Penang	S. Continent	35
Do.	"	do.	N. Continent	5
White Pepper	"	Singapore	S. Continent	—
Do.	"	do.	N. Continent	30
Do.	"	Penang	S. Continent	—
Do.	"	do.	N. Continent	40
Copra	"	Singapore & Penang	Marseilles	220
Do.	"	do.	Odessa	50
Do.	"	do.	Other S. Continent	200
Do.	"	do.	N. Continent	1,200
Sago Flour	"	Singapore	Continent	875
Tapioca Flake	"	do.	do.	25
Do. Pearl	"	do.	do.	—
Do. Flake	"	do.	U.S.A.	—
Do. do.	"	Penang	UK.	25
Do. Pearl & Bullet	"	do.	do.	25
Do. Flake	"	do.	U.S.A.	—
Do. Pearl	"	do.	do.	190
Do. Flake	"	do.	Continent	80
Do. Pearl	"	do.	do.	140
Copra	"	Singapore & Penang	England	400
Gutta Percha	"	Singapore	Continent	15
Cube Gambier	"	do.	U.S.A.	—
T. Flake & Pearl	"	do.	do.	—
Sago Flour	"	do.	do.	—
Gambier	"	do.	S. Continent	—
Copra	"	do.	Marseilles	—
Black Pepper	"	do.	S. Continent	—
White Pepper	"	do.	do.	—
Do.	"	do.	U.S.A.	—
Pineapples	"	do.	do.	—
Nutmegs	"	do.	do.	—
Black Pepper	"	do.	do.	—
Do.	"	Penang	do.	—
White Pepper	"	do.	do.	—
T. Flake & Pearl	"	do.	do.	—
Nutmegs	"	do.	do.	—
Tons Gambier				500
Do. Black Pepper				900

10
305

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

November, 1909.

			Tons.
Tin	Str. Singapore & Penang to U. Kingdom &/or		1,496
Do.	do.	U.S.A.	1,085
Do.	do.	Continent	410
Gambier	Singapore	Glasgow	—
Do.	do.	London	15
Do.	do.	Liverpool	50
Do.	do.	U.K. &/or Continent	—
Cube Gambier	do.	United Kingdom	100
Black Pepper	do.	do.	—
Do.	Penang	do.	60
White Pepper	Singapore	do.	180
Do.	Penang	do.	15
Pearl Sago	Singapore	do.	15
Sago Flour	do.	London	200
Do.	do.	Liverpool	1,400
Do.	do.	Glasgow	—
Tapioca Flake	Singapore	United Kingdom	170
T. Pearl & Bullet	do.	do.	340
Tapioca Flour	Penang	do.	200
Gutta Percha	Singapore	do.	50
Buffalo hides	do.	do.	140
Pineapples	do.	do.	5,750
Gambier	do.	U.S.A.	50
Cube Gambier	do.	do.	25
Black Pepper	do.	do.	—
Do.	Penang	do.	40
White Pepper	Singapore	do.	—
Do.	Penang	do.	20
Tapioca Pearl	Singapore	do.	85
Nutmegs	Singapore & Penang	do.	28
Sago Flour	Singapore	do.	150
Pineapples	do.	do.	900
Do.	do.	Continent	1,250
Gambier	do.	S. Continent	170
Do.	do.	N. Continent	275
Cube Gambier	do.	Continent	60
Black Pepper	do.	S. Continent	70
Do.	do.	N. Continent	130
Do.	Penang	S. Continent	—
Do.	do.	N. Continent	—
White Pepper	Singapore	S. Continent	5
Do.	do.	N. Continent	30
Do.	Penang	S. Continent	5
Do.	do.	N. Continent	5
Copra	Singapore & Penang	Marseilles	780
Do.	do.	Odessa	—
Do.	do.	Other S. Continent	700
Do.	do.	N. Continent	2,650
Do.	do.	Continent	2,000
Sago Flour	Singapore	do.	150
Tapioca Flake	do.	do.	30
Do. Pearl	do.	do.	—
Do. Flake	do.	U.S.A.	175
Do. do.	Penang	U.K.	85
Do. Pearl & Bullet	do.	do.	50
Do. Flake	do.	U.S.A.	—

				Tons.
Tapioca. Pearl	Str.	Penang	U.S.A.	525
Do. Flake	"	do.	Continent	45
Do. Pearl	"	do.	do.	375
Copra	"	Singapore & Penang	England	30
Gutta Percha	"	Singapore	Continent	
Cube Gambier	"	do.	U.S.A.	
T. Flake & Pearl	"	do.	do.	
Sago Flour	"	do.	do.	
Gambier	"	do.	S. Continent	
Copra	"	do.	Marseilles	
Black Pepper	"	do.	S. Continent	
White Pepper	"	do.	do.	
Do.	"	do.	U.S.A.	
Pineapples	"	do.	do.	
Nutmegs	"	do.	do.	
Black Pepper	"	do.	do.	
Do.	"	Penang	do.	
White Pepper	"	do.	do.	
T. Flake & Pearl	"	do.	do.	
Nutmegs	"	do.	do.	
Tons Gambier				750
Do. Black Pepper				550

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

November 1909.

				Tons.
Tin	Str.	Singapore & Penang to U. Kingdom &/or		775
Do.	"	do.	U.S.A.	210
Do.	"	do.	Continent	195
Gambier	"	Singapore	Glasgow	—
Do.	"	do.	London	50
Do.	"	do.	Liverpool	—
Do.	"	do.	U.K. &/or Continent	75
Cube Gambier	"	do.	United Kingdom	30
Black Pepper	"	do.	do.	10
Do.	"	Penang	do.	40
White Pepper	"	Singapore	do.	15
Do.	"	Penang	do.	—
Pearl Sago	"	Singapore	do.	—
Sago Flour	"	do.	London	80
Do.	"	do.	Liverpool	—
Do.	"	do.	Glasgow	—
Tapioca Flake	"	Singapore	United Kingdom	65
T. Pearl & Bullet	"	do.	do.	60
Tapioca Flour	"	Penang	do.	625
Gutta Percha	"	Singapore	do.	20
Buffalo hides	"	do.	do.	5
Pineapples	"	do.	do.	3,250
Gambier	"	do.	U.S.A.	450
Cube Gambier	"	do.	do.	40
Black Pepper	"	do.	do.	35
Do.	"	Penang	do.	—
White Pepper	"	Singapore	do.	5
Do.	"	Penang	do.	—
Tapioca Pearl	"	Singapore	do.	300
Nutmegs	"	Singapore & Penang	do.	4

				Tons.
Sago Flour	Str.	Singapore	U.S.A.	100
Pineapples	"	do.	do.	100
Do.	"	do.	Continent	300
Gambier	"	do.	S. Continent	120
Do.	"	do.	N. Continent	230
Cube Gambier	"	do.	Continent	35
Black Pepper	"	do.	S. Continent	95
Do.	"	do.	N. Continent	170
Do.	"	Penang	S. Continent	35
Do.	"	do.	N. Continent	—
White Pepper	"	Singapore	S. Continent	—
Do.	"	do.	N. Continent	20
Do.	"	Penang	S. Continent	15
Do.	"	do.	N. Continent	10
Copra	"	Singapore & Penang	Marseilles	600
Do.	"	do.	Odessa	360
Do.	"	do.	Other S. Continent	400
Do.	"	do.	N. Continent	1,600
Sago Flour	"	Singapore	Continent	1,075
Tapioca Flake	"	do.	do.	25
Do. Pearl	"	do.	do.	—
Do. Flake	"	do.	U.S.A.	100
Do. do.	"	Penang	U.K.	55
Do. Pearl & Bullet	"	do.	do.	120
Do. Flake	"	do.	U.S.A.	—
Do. Pearl	"	do.	do.	80
Do. Flake	"	do.	Continent	45
Do. Pearl	"	do.	do.	75
Copra	"	Singapore & Penang	England	500
Gutta Percha	"	Singapore	Continent	10
Cube Gambier	"	do.	U.S.A.	—
T. Flake & Pearl	"	do.	do.	—
Sago Flour	"	do.	do.	—
Gambier	"	do.	S. Continent	—
Copra	"	do.	Marseilles	—
Black Pepper	"	do.	S. Continent	—
White Pepper	"	do.	do.	—
Do.	"	do.	U.S.A.	—
Pineapples	"	do.	do.	—
Nutmegs	"	do.	do.	—
Black Pepper	"	do.	do.	—
Do.	"	Penang	do.	—
White Pepper	"	do.	do.	—
T. Flake & Pearl	"	do.	do.	—
Nutmegs	"	do.	do.	—
Tons Gambier				1,300
Do. Black Pepper				350

SINGAPORE MARKET REPORT,
September, 1909.

Articles.	Quantity	Highest	Lowest
	sold.	price.	price.
	Tons.	\$ c.	\$ c.
Coffee—Palembang ... ..	...	...	...
Bali ... ..	...	27 25	...
Liberian	33	24 50	24 25
Copra	5,443	8 75	7 90
Gambier Bale	1,425	15 75	14 50
Cube, No. 1 and 2	235	14 25	13 50
Gutta Percha etc. ... ..	...	...	...
Gutta Jelutong ... ..	...	8 50	6 15
Nutmegs, 110 s. ... ..	...	18 75	18 50
80 ... ..	...	22 00	20 50
Mace, Banda ... ..	...	90 00	78 00
Amboina ... ..	...	73 00	64 00
Black Pepper	1559	16 00	12 12½
White Pepper	717	28 50	19 25
Pearl Sago, Small	25	4 00	3 90
Medium ... ..	...	...	...
Large ... ..	...	...	...
Sago Flour, No. 1	6,225	3 97½	3 50
2	290	1 30	1 25
Tapioca Flake, Small	695	4 85	4 40
Medium ... ..	...	...	...
Pearl, Small	254	5 37½	4 30
Medium	550	4 42½	4 25
Bullet ... ..	...	6 75	6 50
Tin	3,374	70 55	68 45

SINGAPORE MARKET REPORT.

October, 1909.

Article.	Quantity.	Highest	Lowest
	sold.	price.	price.
	Tons.	\$ c.	\$ c.
Coffee—Palembang ... ..	...	...	...
Bali ... ..	...	27 00	...
Liberian	92	24 75	23 50
Copra	4,733	9 35	8 15
Gambier Bale	1,885	12 12½	11 12½
Cube No. 1 and 2	175	15 75	14 75
Gutta Percha, 1st quality ... ..	..	300 00	240 00
Medium ... ..	...	240 00	120 00
Lower ... ..	...	80 00	12 00
Gutta Jelutong ... ..	...	9 00	7 30
Nutmegs, 110 s. ... ..	...	22 00	21 00
80 ... ..	...	84 00	70 00
Mace, Banda ... ..	...	30 00	26 00
Amboina ... ..	...	68 00	64 00
Black Pepper	1,093	16 00	14 75
White Pepper	580	30 00	27 00
Pearl Sago, Small	85	4 25	4 00
Medium ... ..	...	...	...
Large ... ..	...	...	...
Sago Flour, No. 1	5,690	3 90	3 35
... ..	395	1 25	1 20
Tapioca Flake, Small	770	4 90	4 50
Medium ... ..	...	...	...
Pearl, Small	273	5 45	4 27
Medium	598	4 75	4 25
Bullet ... ..	...	6 75	...
Tin	1,875	70 55	69 52½

METEOROLOGY OF PENANG.

October, 1909.

STATION.	Amount Ins. cts.	No. of days rain fell.	No. of hours rain fell.	Highest daily fall Ins. cts.
Government Hill	33.28	24	146	7.30
Prison Observatory	32.11	23	103½	6.91
The Fort	28.76	23	214	6.20
Balik Pulau	17.12	15	65	3.81
Pangkue	16.30	17	56	2.15
Pulo Jerejak	14.82	20	37	2.05
Lumut	14.13	20	92	1.95
Bruas	13.62	14	45½	3.50

The highest maximum temperature, Government Hill	...	78°
Do. do. the plain	...	91
The lowest do. Government Hill	...	71
Do. do. the plain	...	86
The highest minimum temperature, Government Hill	...	65
Do. do. the plain	...	79
The lowest minimum temperature, Government Hill	...	60
Do. do. the plain	...	70
The highest sun temperature, Government Hill	...	136
Do. do. the plain	...	180
The lowest do. Government Hill	...	103
Do. do. the plain	...	135

Prison Observatory,
Penang, November 10.

M. E. SCRIVEN,
Observer.

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PERAK.

Abstract of Meteorological Readings in Perak for the month of September, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping	...	156	82.09	92	71	21	77.16	867	...	79	...	14.61	2.50
Kuala Kangsar	79.88	92	70	22	75.73	836	...	81	...	9.51	2.56
Batu Gajah	...	165	79.47	92	70	22	75.83	845	...	83	...	8.22	1.92
Gopeng	79.82	91	62	29	74.88	801	...	78	...	11.86	2.23
Ipoh	81.21	92	71	21	77.70	903	...	85	...	9.20	2.05
Kampar	80.68	91	70	21	76.45	855	...	81	...	11.45	3.78
Teluk Anson	81.42	92	70	22	76.89	865	...	80	...	8.08	2.12
Tapah	79.24	92	68	24	76.12	860	...	86	...	10.04	1.52
Parit Buntar	81.28	89	72	17	77.18	880	...	82	...	11.21	1.50
Bagan Serai	81.45	91	70	21	77.16	875	...	82	...	10.80	2.07
Selama	80.60	92	72	20	76.78	873	...	83	...	13.84	1.51

M. J. WRIGHT,

State Surgeon, Perak.

State SURGEON'S OFFICE,

Taiping, 15th November, 1909.

SELANGOR.

Abstract of Meteorological Readings in the various Districts of the State for the month of September, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur ...	29.868	145.1	81.0	88.8	72.1	16.7	76.6	0.834	73.7	77	S.W.	3.68	1.35
Pudoh Gaol Hospital "	2.46	0.70
District Hospital "	2.47	0.81
" Klang...	89.0	72.0	17.0	...	...	...	...	...	3.82	1.71
" Kuala Langat	88.4	74.5	13.9	...	...	...	...	...	6.31	3.50
" Kajang	86.4	75.4	11.0	...	...	...	...	...	4.41	1.35
" Kuala Selangor	88.1	75.3	12.8	...	...	...	...	...	3.22	0.80
" Kuala Kubu	90.3	71.1	19.2	...	...	...	...	...	4.64	1.27
" Serendah	92.6	70.7	21.9	2.91	1.09
" Rawang	90.6	71.0	19.6	3.10	1.65
" Sabak Bernan...	2.70	1.20

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OFFICE OF THE SENIOR MEDICAL OFFICER,
Kuala Lumpur, 22nd October, 1909.

W. D. FREER,
Senior Medical Officer, Selangor.

SELANGOR.

Abstract of Meteorological Readings in the various Districts of the State for the month of October, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 Hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	... 29.865	146.9	81.6	89.1	72.5	16.6	66.8	0.835	73.7	77	Calm.	2.97	0.62
Pudoh Gaol " "	2.84	0.85
District Hospital " "	2.98	0.70
" Klang	89.1	72.1	17.0	...	...	...	...	...	3.57	0.80
" Kuala Langat	89.5	74.7	14.8	...	...	...	...	...	3.70	1.28
" Kajang	82.7	72.5	10.2	...	...	...	...	...	5.67	2.44
" Kuala Selangor	88.7	75.6	13.1	...	...	...	...	...	6.16	1.77
" Kuala Kupu	89.3	71.4	17.9	...	...	...	...	...	8.32	2.25
" Serendah	93.0	70.7	22.3	...	...	...	...	...	3.65	1.06
" Rawang	90.1	71.5	18.6	...	...	...	...	...	8.29	2.60
Sabak Bernam	4.90	2.60

OFFICE OF THE SENIOR MEDICAL OFFICER,
Kuala Lumpur, 19th November, 1909.

W. D. FREER,
Senior Medical Officer, Selangor

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NEGRI SEMBILAN.

Abstract of Meteorological Readings in Negri Sembilan for the month of October, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Seremban Hospital		140.5	82.3	89.1	70.6	18.5	76.9	.803	72.5	74.	N.W.	6.86	1.51
Mantin												4.14	.95
Tampin												9.36	1.75
Kuala Pilah												5.47	1.04
Jelebu												3.88	.87
Port Dickson Town												11.09	4.00
Do. Beri-Beri Hospital												14.99	3.04

S. M. O's OFFICE,
11th November, 1909.

J. HUNT,
S. M. O.

SEREMBAN.

Table showing the Daily Results of the Reading of Meteorological Observation taken at the General Hospital, Seremban, for the month of October, 1909.

Date.	TEMPERATURE OF RADIATION.						TEMP. OF RADIATION.		WIND DIRECTION.		TEMP. OF EVAPORATION.			COMPUTED VAPOUR TENSION.			RELATIVE HUMIDITY.			CLOUDS 0 TO 10.			CLOUD AND WEATHER INITIALS.			RAIN. Inches.	
	9 H.	15 H.	Mean.	Maxi- mum.	Mini- mum.	Range.	Sun.	Differ- ence Sun & Shade.	9 H.	15 H.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	Mean.	9 H.	15 H.	21 H.	9 H.	15 H.	21 H.		
1	78	84	81	90	71	19	151	61	NW	SW	74.6	70.7	72.6	.857	.751	.804	89	64	76.5	0	0	0	S	S	S		
2	78	86	82	90	72	18	150	60	NW	SW	74.6	74.5	74.5	.857	.855	.856	89	68	78.5	0	10	4	S	S	S	.86	
3	79	85	82	90	70	20	142	52	NW	SW	72.3	73.4	72.8	.793	.826	.809	80	68	74	2	10	5	S	S	S	1.15	
4	78	86	82	91	70	21	145	54	NW	NW	72.9	72.8	72.8	.810	.808	.809	84	64	74	1	0	2	S	S	S		
5	78	84	81	92	70	22	132	60	NW	NW	71.2	74	72.6	.765	.840	.802	79	72	75.5	1	0	0	S	S	S		
6	82	86	84	90	70	20	136	46	NW	SW	75.8	74.5	74.9	.877	.855	.866	80	68	74	0	4	5	S	S	S	.65	
7	81	87	84	89	73	16	126	37	NW	SW	76	77.2	76.5	.897	.933	.915	85	73	79	5	5	7	S	S	S		
8	79	88	83.5	88	71	17	130	42	NW	SW	72.3	74.9	73.6	.793	.865	.829	80	65	72.5	4	6	7	S	S	S		
9	77	88	82.5	89	71	18	127	38	NW	SW	71.9	74.9	73.4	.783	.865	.824	84	65	74.5	5	6	4	S	S	S		
10	77	87	82	83	71	17	130	42	NW	NW	73.6	72.2	72.9	.829	.792	.810	89	61	75	5	10	3	S	S	S		
11	76	88	82	89	71	17	131	42	SW	SW	72.6	68.4	70.5	.801	.693	.747	89	52	70.5	10	6	10	N	N	N	.11	
12	78	85	81.5	88	71	19	129	41	NW	NW	74.6	70.1	72.3	.857	.788	.797	89	61	75	10	6	10	N	N	N	.07	
13	76	87	81.5	90	71	19	135	45	NW	NW	74.3	72.2	73.2	.848	.792	.820	94	61	77.5	6	8	5	S	S	S		
14	78	86	82	89	71	19	152	63	NW	NW	74.6	72.8	73.7	.857	.868	.832	89	64	76.5	2	0	5	S	S	S	.03	
15	76	84	80	88	70	18	125	37	NW	SW	72.6	72.4	72.5	.801	.794	.797	89	68	78.5	3	10	10	N	N	N		
16	76	84	80	87	70	17	122	35	NW	NW	74.3	70.7	72.5	.848	.751	.799	94	64	79	5	10	10	N	N	N	1.51	
17	75	83	79	88	70	18	119	31	NW	SW	73.3	71.3	72.3	.820	.766	.793	94	68	81	2	10	4	S	S	S	1.02	
18	77	88	82.5	89	70	19	149	60	NW	NW	75.6	71.6	73.6	.887	.775	.831	90	58	74	2	5	0	S	S	S	.40	
19	80	89	84.5	91	72	19	151	60	NW	NW	75	72.7	73.8	.867	.801	.834	85	58	71.5	1	0	0	S	S	S		
20	79	88	83.5	90	71	19	148	58	NW	NW	75.6	71.6	73.6	.887	.775	.831	90	58	74	0	0	2	S	S	S	.15	
21	79	89	84	89	71	19	147	58	NW	NW	73.9	71.1	72.5	.839	.757	.798	85	55	70	0	0	2	S	S	S		
22	78	88	83	90	71	19	148	58	NW	NW	74.6	70	72.3	.857	.733	.795	89	55	72	2	1	0	S	S	S	.02	
23	79	88	83.5	90	70	20	148	58	NW	NW	75.6	70	72.3	.887	.733	.810	90	55	72.5	1	0	2	S	S	S		
24	78	88	83.5	89	70	19	149	60	NW	NW	76.3	69.4	72.8	.906	.716	.811	94	52	73	10	6	6	S	S	S	.71	
25	78	89	83.5	89	70	19	146	58	NW	NW	75.6	68.4	72	.887	.693	.790	90	52	71	1	0	2	S	S	S		
26	79	89	83.5	88	71	17	138	51	NW	NW	73.3	69.5	71.4	.820	.721	.770	94	58	76	5	6	0	S	S	S		
27	77	89	83	89	72	17	148	59	NW	NW	72.6	69.4	71	.801	.716	.758	89	52	70.5	1	2	0	S	S	S		
28	77	88	82.5	89	68	21	149	60	NW	N	73.6	68.4	71	.829	.693	.761	89	52	70.5	0	0	2	S	S	S		
29	77	87	82	89	69	21	148	58	NW	NW	73.6	65.6	69.6	.829	.632	.730	89	49	69	0	3	2	S	S	S		
30	78	86	82	89	71	18	140	51	NW	NW	72.9	66.2	69.5	.810	.643	.726	84	52	68	0	2	0	S	S	S		
31	77	85	81	89	71	18	142	53	NW	NW	73.6	68.5	71	.829	.698	.763	89	58	73.5	0	8	3	S	S	S	.18	
Mean.	77.8	86.9	82.3	89.1	70.6	18.5	140.5	51.4	NW	NW	73.9	74.7	74.1	839	.768	.803	87.8	72.8	74								6.86

Highest Atmospheric Pressure
Lowest " "

Highest Temperature 92
Lowest " 58

Greatest Rainfall in 24 hours 1.51

J. LUCY,
Medical Officer in Charge.

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PENANG.
Abstract of Meteorological Readings in the Prison Observatory, Penang, for the month of October, 1909.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°	°	°	°	°	°	°	°	%		Ins.	Ins.
Prison Observatory	29·866	145·9	81·5	88·9	71·3	17·6	77·6	·897	75·0	83·5	N..W.	32·11	6·91

PENANG,
 9th November, 1909.

M. E. SCRIVEN,
 Assistant Surgeon.

A. H. KUN,
 Medical Officer.

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