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AUSTRALIA.

QUEENSLAND

GARDEN MANUAL

CONTAINING CONCISE DIRECTIONS

FOR THE CULTIVATION OF THE

GARDEN, ORCHARD, AND FARM

IN QUEENSLAND.

TO WHICH ARE ADDED SERICULTURE (SILKWORM), AND THE CULTIVATION OF SUGAR, COFFEE, TEA, AND NUMEROUS OTHER TROPICAL PLANTS AND FRUIT TREES ESPECIALLY ADAPTED TO THE CLIMATE AND SOIL OF THE COLONY.

BY

ALBERT JOHN HOCKINGS,

AUTHOR OF THE "FLOWER GARDEN IN QUEENSLAND," ETC.

SECOND THOUSAND.

ENLARGED, REVISED, AND CORRECTED.

BRISBANE:

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MDCCCLXXV.

PREFACE TO THE FIRST EDITION.

On presenting this little work to the public, the Author feels that some apology is due for venturing to occupy, as a mere amateur, a position of authority on Gardening matters which could have been so much more fitly assumed by a person trained to the profession. Many reasons have combined to induce this step, among the most urgent of which is the total absence of any directions as to the cultivation and treatment of plants suited to this Colony and climate, for the guidance of the numerous class of farmers continually arriving, and anxious to adapt themselves to their new home. It is not presumed that this want has been fully supplied in this instance; but it is believed that a large amount of information is here given, of the most trustworthy character, embracing many subjects not generally treated of in books; and attention is directed to many plants of commercial value, which, if grown here for purposes of export, would tend greatly to the material wealth and prosperity of the Colony.

Seventeen years' devotion to this pursuit in Brisbane has given the writer many opportunities for observation; and, on all subjects beyond his personal experience, the best local as well as standard authorities have been freely consulted, to ensure accuracy. In numerous instances, however, where plants have been but recently imported, the information is necessarily meagre; in other cases omissions may occur, which it will be his study to rectify in future editions, should his present effort meet with the approbation of the public.

Brisbane, 1865.

PREFACE TO THE SECOND EDITION.

The general favor with which the first edtion of this work was received on its publication, upwards of ten years ago, the sustained interest which it commanded until the whole number had been exhausted, and the constant demands which have since been made for a second edition, have stimulated the Author to use every exertion to render the present volume worthy of public confidence.

The whole work has been most carefully revised; much valuable information, in a condensed but intelligible form, has been added in various parts; the results of enlarged experience in numerous industrial enterprises have been summarised and noted; new fruits are described; improved methods of cultivation, and important practical hints are interspersed under the appropriate heads; and in every way it has been sought to maintain the character of the "Manual" for being clear, comprehensive, and trustworthy, without increasing its cost.

Brisbane, *September*, 1875.

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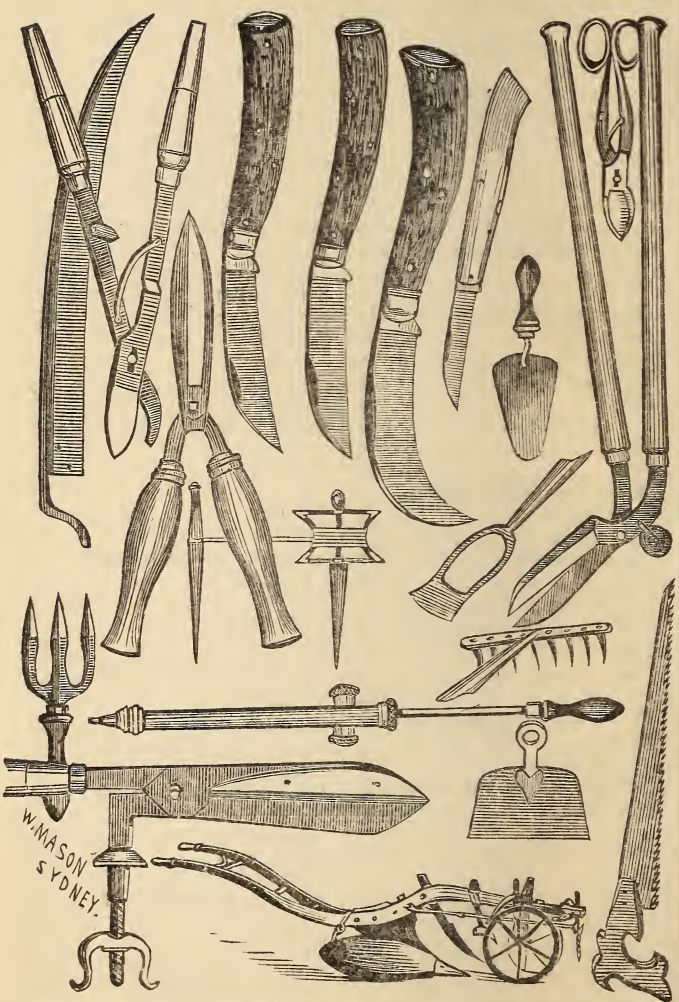
A. J. HOCKINGS,



QUEEN STREET, BRISBANE.

The Garden.

FIRST PRINCIPLES OF CULTIVATION.

Preliminary Observations.

THE proper growth of our cultivated crops depends upon certain conditions of the air, the soil, and water; and that the labor of the husbandman may be crowned with success he should thoroughly understand those conditions, and endeavor to secure such of them for his crops as he can command. The degree of light and heat, the state of the atmosphere, and the supply of rain being beyond his control, his attention may be directed to working the soil in a manner calculated to produce the best results in all weathers; to the cultivation of the crops best adapted to the climate, or meeting the most ready sale; the best means by which to keep the land from becoming exhausted by continual cropping, and the possibility of obtaining a supply of water for irrigation in times of drought.

All systems of gardening should be acted upon with some discrimination; that is to say, while proper attention be paid to the general directions and rules laid down, allowance must be made for the difference and variety of soils, of situation, and of climate, which require a strict attention to the mode of management peculiarly adapted to each; and it is the almost proverbial inattention to those important points which is the chief cause of that want of success which proves often so discouraging to the inexperienced cultivator.

To work the soil in a manner calculated to produce the best results in all weathers, the first principles of gardening must be understood and consistently applied. It is generally known that plants derive the greater part of their nourishment from the soil; and that, to enable the tender roots to extend in search of food, the earth has to be pulverised. It is known by sad experience that the crops, in flat lands especially, are lost season after season by water in the soil during rainy weather. Crops are frequently lost from shallow tillage during drought; and land gets "worked out" from continual cropping without manure. These *results* are admitted, but we fear the *causes* are not sufficiently studied, and we are satisfied that due precautions are not adopted to prevent the recurrence of such disasters.

Nature is very bountiful, but the husbandman will ordinarily only obtain his reward on conforming to certain conditions. To ensure the best prospect of success (pre-supposing the soil to be of average fertility), the grower should drain, subsoil or trench, manure, irrigate, and adopt a rotation of crops. These we have placed consecutively according to their importance; and, as the space at command is necessarily limited, such short articles will follow on the various subjects as it is hoped will be sufficiently explicit to be intelligible to the novice, while confined within the narrow limits imposed by the moderate pretensions of this little hand-book.

DRAINING AND SUBSOILING.

Several thousands sterling per annum are lost by the farmers around Brisbane through drought and excessive rain, the greater part of which they might

save by using the subsoil plough, and draining their land. Many are aware of this fact, but are deterred from giving their knowledge any practical effect because of the expense. This idea of expense is greatly exaggerated, and what is considered economy, is, in reality, the most wasteful extravagance in time and money. Let any farmer calculate the cost of cultivating the land on which year after year he loses his crops, either through drought or too much wet, and he will find that, without counting the value of the crops he has lost, he will have paid for merely working the land (from which he has had no return) sufficient money to have subsoiled and drained it. He therefore cannot plead that he "can't afford it," for he has been expending a similar amount of labor and money, *only to reap disappointment.*

The limited space at our command will not suffice to do justice to either of the subjects treated of, and the object aimed at, therefore, is not so much to convince the reader, as to arrest his attention, that he may seek more information and then bring his knowledge into practice.

Some cultivators think that it is not only superfluous, but improper to drain land here, because it is a hot, dry climate, and we are subject to long droughts. But it has been proved by long experience that drained land retains its moisture longer than swampy land; for the latter shrinks and hardens as the wet dries off, gets parched and cracks; while the former—being light and friable—admits the damp vapour to rise through it almost as fast as it dries from the surface. For similar reasons wet land is unfit for vegetation either in wet or dry weather; for during rain the roots are standing in water and are smothered, so that the plant either turns yellow or perishes; and in drought it strives in vain to push its roots through the parched, unhealthy mass in search of moisture it was not able to retain.

Drain the land, and have it thoroughly pulverised, and it will then lay light, so that excessive rain falling on it will percolate through and run off by the drains; an ample store being retained by absorption for the supply of plants during drought. By thus draining we deepen the soil, and allow the roots to travel further in search of nourishment; we admit an increased supply of atmospheric fertilizers, which hasten the decay of vegetable and other organic matter, and accelerate the disintegration of the mineral parts of the soil. It improves the mechanical texture of the soil, and warms it, by which the effects of frost are much modified, and the crops come on earlier in spring. It allows us to work sooner after rain, prevents the formation of acetic and other acids, and it admits large quantities of rain to pass into the soil which is always more or less imbued with the fertilizing gases of the atmosphere, to be deposited among the absorbent parts of the soil, and then given up to the necessities of the plants.

In Barbadoes, drain pipes are put down at intervals of sixteen to twenty-four feet, at a depth of two feet six inches to four feet (the latter being preferable), and one-inch pipes are found sufficient to carry the water into the main drains. The drain pipes must have a fall *throughout* to allow the water to run off. It would be useless to put them at *an equal distance from the surface* in uneven ground, as that would prevent the flow of the water; but there must be a decline from one end of the drain to the other, and it must be at least sufficiently below the surface, in the shallowest parts, to be out of the reach of the subsoil plough or the effect of pressure from horses walking over it. In fact, it should not be less than two feet six inches below the surface in the shallowest part, and the main drains should be at a lower level still, and with sufficient inclination to carry the water off freely.

A TABLE SHOWING THE NUMBER OF TILES REQUIRED FOR THOROUGHLY DRAINING AN ACRE OF LAND, ACCORDING TO THE DISTANCE OF THE DRAINS.

Length of Tile. *(Inches.)*	No. of Tiles per Acre, the Drains 10 feet apart.	No. of Tiles per Acre, the Drains 12 feet apart.	No. of Tiles per Acre, the Drains 15 feet apart.	No. of Tiles per Acre, the Drains 17 feet apart.	No. of Tiles per Acre, the Drains 18 feet apart.	No. of Tiles per Acre, the Drains 20 feet apart.
12	4,356	3,630	2,904	2,562	2,420	2,178

DEEP TILLAGE.

DEEP TILLAGE has been reserved for the second consideration, not because it is of less importance, but because it would be useless *without* drainage. Of what advantage would it be for a man to trench his garden three feet deep if the earth stood full of water? Premising, therefore, that nearly all soils require draining more or less, and that as want of drainage renders all other labor on the soil comparatively unavailing, it should be first attended to—we will endeavor in a few words to impress upon cultivators the advantages of working the subsoil.

The various plants, during their growth, use the constituent parts of the soil in different proportions, some requiring a preponderance of the alkalies, some the phosphates, &c., and this fact accounts for the exhaustion consequent upon continually growing the same sort of crop in a field without intermission; some necessary food having been extracted from the soil which is consumed by that plant, and it ceases to remunerate the cultivator for his labor until he *manures* his land—or, in other words, *returns to the soil similar ingredients to those he has carried away*

from it in his crops. Such being the case, it will be admitted that deep ploughing will afford greater scope for the roots, more food for the plants, and consequently the land will not be so soon exhausted; it will be almost like two fields in one. In shallow ploughing a hard "pan" is formed at the bottom, as impervious to water as if it had been puddled, and during our heavy and continual rains everything is flooded and destroyed. In drought the result is equally disastrous, for the four or five inches of earth is soon dried through to the hard bottom, and the crop either perishes or yields no return.

There are some subsoils which are unfit for the support of vegetable life until exposed to the action of the atmosphere, and thus in shallow tillage the roots, on reaching the undisturbed subsoil, run along without penetrating it, and are forced to depend entirely upon the few inches of surface soil for support, exposed alike to destruction by either drought or flood. As an instance of this, some clay subsoils may be mentioned which owe their color to the presence of protoxide or oxide of iron, which is deleterious to vegetable and animal life; but, by thoroughly draining and breaking this soil, and thus fully exposing it to the influence of the atmosphere, more oxygen is absorbed, and this injurious agent is converted into peroxide of iron, which is beneficial and necessary, being a great promoter of vegetation. It also frequently happens that from want of mixture the *surface* soil is deficient in some of the important earths and *saline* matters in which the *subsoil* is rich. In most cases, however, it will be best to break up the subsoil without bringing it to the surface, and gradually mix it with the surface soil at each subsequent ploughing, as it gets sweetened and ameliorated by exposure to the air and rain; and this may readily be accomplished by using the trenching plough in the bottom of the furrow after the common plough—for

as it is constructed in a very strong manner, with a share but no mould boards, it raises the earth in the bottom of the furrow, and passing under it leaves it in a loosened state without raising it to the surface.

TRENCHING.

The result aimed at in this operation is similar to that contemplated by using the subsoil plough, only it is more uniform and effective; and this is more generally used in forming gardens, orchards, and vineyards. As soils differ much in character, trenching has to be modified accordingly: in some cases it may be desirable to bury the top soil six or eight inches for the roots of the trees or vines to grow in, while the next spit would be exposed on the surface to be gradually ameliorated by the sun and atmosphere; in other cases, such as the gravelly ridges around Brisbane, which generally have a clay subsoil, and those of a schistose formation, require digging to the full depth and mixing thoroughly; while a third class, having a rank and unproductive subsoil, requires trenching in such a manner as to leave the bad soil at the bottom.

Common trenching (which should be two feet to two feet six inches deep) is performed as follows:— On the upper part of the ground to be trenched, mark off a strip two feet six inches wide, divide the remainder of the ground in a similar manner; dig the whole of the earth out of the first portion to the full depth, and wheel it to the lower part of the ground where the work is to terminate; dig the top spit of the next space and throw it into the bottom of the newly made trench, and so on until the second space is to the required depth, and thus to the end of the work.

The method adopted when the subsoil is to be left at the bottom is to remove the strip of surface soil two

feet six inches wide, as directed previously, and dig the subsoil thoroughly, and as deep as possible, mixing manure with it if thought desirable; then dig and throw in the surface soil from the next portion; repeating the operation to the end.

In trenching land great care should be observed lest the bottom is left in hollows where water would collect and injure the soil.

MANURING LAND BROADCAST.

A TABLE SHOWING THE NUMBER OF HEAPS REQUIRED PER ACRE, PLACED AT GIVEN DISTANCES.

Distance of Heaps.	3	4	5	6	7	8	9	10	11	12
Yards.										
3	640	480	384	320	275	240	214	192	175	160
4	480	360	288	240	206	180	160	144	131	120
5	384	288	231	192	165	144	128	115	105	96
6	320	240	192	160	137	120	107	96	88	80
7	275	206	165	137	118	103	92	83	75	69
8	240	180	144	120	103	90	80	72	66	60
9	214	160	128	107	92	80	72	64	59	54
10	192	144	115	96	83	72	64	58	53	48
11	175	131	105	88	75	66	59	53	47	44
12	160	120	96	80	69	60	54	48	44	40

NOTE.—The figures at the top are the distance of the rows in yards, those on the left are distance of the heaps; then under the top, and opposite the proper figure on the left, are found the number of heaps required for an acre.

VALUE OF MANURES.

The saving and application of manures have received much attention of late years in England, and the farmers of Queensland would do well to follow the example of the Chinese gardeners and Belgian farmers in this respect. Refuse of every description, bones, human excrement, and the excrement of all the domestic animals and fowls, are carefully collected and applied to the soil, and urine, which is in many countries entirely neglected, is carefully collected in tanks. With regard to the value of the latter, Dr. Hodges says: "A farmer who keeps three stall-fed cows and one horse, and collects merely the solid dung, allowing the urine to escape into the drains, loses annually in the cow urine 3069 lbs., and in that of the horse, 89 lbs.; in all upwards of 28 *cwt. of dry fertilizing matter, equal in virtue to the best Peruvian Guano*, and which would be capable, without the addition of any other manure, of *keeping seven acres of land in the most fertile condition.*" The same quantity of Guano would be worth upwards of £23 in Brisbane.

"The bodies of both men and animals are derived from the same materials as the plants that we cultivate—both are from the same soil—creatures of the dust; the plant *directly* deriving the materials of its growth from the minerals of the field and the gases of the air, and the animal *indirectly* through the vegetable creation. Chemistry has clearly shown us that the lime of our limestone mountains, the potash which exists in our granite rocks, and the phosphorous of our soils, by the wonderful arrangements of Providence, become food for our crops, and ultimately build up the structure of our bodies. Nor are these materials which nature provides in the earth squandered; a wonderful economy is displayed in every part of creation. The matters which we receive in our food,

which become blood and flesh and solid bone, are not allowed, even during life, to remain inactive. They have no sooner performed the office assigned to them than they are discharged from the body; and in the liquid and solid excrements of both men and animals we discover the mineral materials contained in the bread and beef, the seeds and roots, which had composed their food."—*Liebig.*

"By the Belgian farmer the value of the liquid and solid excrements of an individual is estimated at £1 17/- per annum, and so carefully is every trace of these manures collected in the towns, that the public authorities are relieved from all the expense and trouble which in this and other countries are incurred in the removal of nuisances. In China also, which has preceded us in so many of our boasted improvements, strict laws are enacted for the careful preservation of human excrements."

What has just been stated of the valuable fertilizing qualities of human excrements, and the importance which is at present attached to their preservation in other countries, may, it is to be hoped, induce farmers here to give greater attention to these manures. Their offensive odour may be removed, and their value as manure increased, by adding to them coal or wood ashes, or sawdust moistened with a solution made by dissolving the substance called "Green Vitriol" (sulphate of iron) in water. To fix the ammonia in urine, add ten drachms of sulphate of iron to each 20 gallons.

The "earth closet system" presents this valuable manure in the most inoffensive and portable form; and it should be largely used.

It has been proved by chemical analysis that the various crops require the constituents of the soil, in different proportions, for their proper growth, which will account for the advantage derived from rotation of crops, and also explain why some experiments have

failed when made indiscriminately with either lime, bones, guano, gypsum, or salt. They have each been expected by some of their unthinking advocates to produce marvellous results on every variety of soil and for every description of crop. Land already charged with saline particles will derive no benefit from a dressing of salt, neither will land well supplied with lime and its compounds be improved with a lime dressing. But with a moderate amount of knowledge it will be found there is no land but what may be improved; and the means of improvement are at the command of every cultivator, small or great.

Lime and salt are both destructive of insect life and fungus, and as they greatly improve the texture and fertility of soil previously deficient of them, their application to almost all soils would be highly beneficial.

If all the sweepings and refuse of the farm-house, fowl-house, pigsty, stable, and the human excrements were carefully collected, mixed with green weeds, and rolled into a pit, and all carefully applied to the land, we should have less complaints of bad crops, and the necessity of sending to Peru for guano would be considerably diminished.

Peruvian Guano is rendered less dusty, and, consequently, more easy to handle, by being mixed with an equal quantity of salt. Its value as a manure is also increased.

The following are the different kinds and rates of manures applied to the acre of ordinary ground for producing heavy crops :—

10 cwt. of crushed bones ... ... per acre.
5 cwt. ditto and 10 tons farm-yard manure ,,
5 cwt. ditto and 1½ cwt. Peruvian guano... ,,
3 cwt. Peruvian guano ... ... ,,
1½ cwt. ditto and 10 tons farm-yard manure ,,
20 tons farm-yard manure ... ... ,,

10 cwt. of salt per acre for asparagus, beet, mangel wurzel, &c.
1½ oz. of fresh Peruvian guano to one gallon water is a safe proportion for guano liquid.
One part by weight of cow dung with ten parts water is the proportion used for liquid manure.

COMPARATIVE PROPERTIES OF SOIL.

It is admitted by all gardeners that the soil best calculated for general garden purposes should be of rather a light, rich, friable, loamy texture; dry, mellow, and capable of being wrought at all seasons, and of a good depth—that is, from two feet to three feet and a-half, and that the worst kinds are those of the very light, sandy, and stiff clayey texture. A loam of a middling texture, rather inclining to sand, will be found the most suitable for the majority of kitchen vegetables. If the soil be too strong, the roots of plants push weakly into it, and are apt to canker and perish; if too light, and at the same time poor, the roots of vegetables will wander far in search of nourishment, and be unable to collect a sufficient quantity for their support and maintenance. It is a false principle to depend upon manures entirely, for were they to be had in the greatest abundance, a too free application of them would have effects highly injurious to the quality of vegetables in general. In the formation of a garden a moderate and prudent expense should be bestowed at the beginning, if the undertaking is to be ultimately crowned with success and satisfaction.

Strong stubborn clays are to be avoided, being the most unfit of all others, as few vegetables will prosper in them. Sand, lime, chalk, and coal-ashes, correct the tenacity of clayey soils, and make them work more

pleasantly; the former, if sharp, or if it be river or sea sand, with a mixture of shells, will, if given in a sufficient quantity, render it of a lighter texture. Chalk should be spread on the surface in spring, so that the whole may be pulverised by the action of the summer's sun and rains, and dug in in the autumn. It corrects the acidity of the clay, and renders it at the same time more friable. Lime acts much in the same way, but should be used more sparingly. Coal-ashes have much the same effect upon stiff soils. Lime rubbish dug in is a good corrector of stiff soils, and is less objectionable than the coal-ashes. Decayed tanners' bark, bog mould, or any vegetable mould applied to strong soils, lightens them considerably. Such soils cannot be too much wrought by the spade; every opportunity should be taken to ridge and rough-dig strong soils; and such operations should not be done in wet weather, nor when the ground has been saturated with wet.

Orchards, orangeries, vineyards, and pineapple plantations are found to thrive on the stony ridges in the vicinity of Brisbane better than in the rich alluvial flats. The soil for such purposes should be trenched two feet six inches deep and well drained, at least three feet deep, no matter what the surface declivity may be. If manure is required, it may be applied as a top-dressing, and lightly forked in among the plants.

In this climate great advantage will be derived from digging such land deep, and roughly throwing it up in beds to lay exposed to the sun during the summer. The sun has an effect almost equal to the frost in England in causing the disintegration of the soil under such circumstances.

In procuring mould, either for renewing or improving the soil, care should be taken to prefer such only as is near the surface, as it is in general the most productive and fruitful, and is in reality the true vegetable earth. The top spit, that is, to the depth of

one foot from the surface of any common or field, which has not been cropped, is to be preferred, and the fuller it is of fibrous matter the better it will prove for the growth of the plants.

IRRIGATION.

Irrigation as a means of increasing the produce of the soil is of great antiquity. It is practised to a considerable extent in China, India, Italy, and other countries, and in England the water meadows are a source of great profit. In Queensland there is abundance of grass for the cattle without resorting to this means of providing it; but there is scarcely any country where the inducement to irrigate is greater. With the continual risk of drought, and wages at the maximum rate, it behoves the farmer to adopt every means within his reach to protect himself against the former, as well as to economise the latter. One great obstacle to the general introduction of irrigation is, that our rivers are mostly salt; and we are not possessed of any satisfactory information as to how far such water can be advantageously used for growing crops. It is not considered safe to use water containing more than three per cent. of salt; and as from some experiments made by the late Mr. Eldridge on the River Brisbane water, after dry weather, it was found to contain five per cent. of salt, it appears that at the time when the water would be most urgently required for irrigation it would be unsafe for the farmers on the Brisbane to use the water from that river, unless mixed with an equal quantity of fresh; and then it should never be allowed to touch the foliage of the plants.

There are, no doubt, many positions where a suitable supply of water which, taking its rise at a

greater elevation, would be at command for this purpose, or could be made available at a reasonable outlay. Were such circumstances taken advantage of, it may be safely affirmed that the benefits would be so striking as to induce more costly operations. It cannot be too clearly impressed that, in time of drought or in hot weather, a mere sprinkling from the watering pot is often injurious, while a good flow of water running along the alleys among the growing crops for half an hour in the evening two or three times a week would produce the utmost luxuriance of growth. Mr. Knight, one of the first authorities in all matters connected with gardening, says in reference to this subject: "The quantity of water which may be given with advantage to plants of almost every kind, during warm and bright weather is, I believe, very much greater than any gardener who has not seen the result will be inclined to suppose possible; and it is greater than I myself could have believed upon any other evidence than that of actual experience."

It has been found on careful experiment that only about one-fifth of the rain-fall reaches the water channels so as to be available for irrigation; but that quantity stored up and applied judiciously to the farms around the great centres of population would produce the most valuable results.

The average annual rain-fall in Brisbane for five years was nearly 56 inches, which bears favorable comparison with Sydney, where on an average of fifteen years the returns indicate only 49 inches. It will thus be seen that it is not from insufficiency of rain that we suffer, but the means of storing it up and applying it to the land. One inch of water is equal to 22,627 gallons on an acre of land.

There are two classes of persons who will be especially benefited by the development of any simple and easily managed system by which the produce of the soil may be increased. These are the agriculturists

and the flock-owners. The former have often to regret the loss of their crops from the droughts which too frequently interfere between seed time and harvest. The latter have to mourn over the loss of flocks and herds which perish during a drought, partly from want of food to eat, but principally from want of water.

The flock-owner, again, even when not affected by drought, is obliged to distribute his flocks and herds over a large area. The produce of the natural pasturage of the country is too scanty to admit of the depasturage of one-tenth part of the stock which might be kept upon it, were proper means taken to increase its fertility, among which means irrigation ranks highest. The agriculturist is obliged to content himself with inferior crops from the want of means of applying the proper stimulus to the soil, which means would be afforded were he placed in a position to irrigate his farm.

The soil and the climate of Lombardy are not more favorable to cultivation than those of many parts of this colony; and the district between Milan, Lodi, and Pavia, containing about 100,000 acres, supports 100,000 head of cattle, 28,000 horses, and 100,000 head of smaller stock—an amount which would in this country depasture an area at least twenty times as great. The increased capacity of maintaining stock is due entirely to the mode in which advantage has been taken of the water by which this district is surrounded to irrigate the whole of it perfectly.

IRRIGATION OF GRASS LANDS WITH LIQUID MANURE.

Occupiers of land on the Continent have been for many years aware of the eminent advantages of liquid manure. "So long ago as 1829, in a published account of the various methods of dairy husbandry, pursued by the Dutch, the practical application and advantages of liquid manure was well understood by that industrious and intelligent people," The method was as follows :—"Early in the season part of the proprietor's farm and some small fields near the cow-house were sown with barley and grass seeds, and watered with diluted cow urine by means of a fire engine. Barrels full of urine were also conveyed to the land on hand barrows with broad wheels, which were easily wheeled along the rich soft ground, which would have been destroyed by horses and carts. The contents of the barrels were discharged by means of pipes eight feet long, perforated with holes. The grass of the field thus irrigated was cut five or six times a year, and, though not very long in the blade, there was always great weight of produce. Indeed, it was so thick and rich, that it would have rotted unless cut often. The grass was cut during the day when the weather was wet or moist, but when it was dry it was cut late at night or early in the morning, and the field irrigated immediately after being cut."

In an experiment made by Dr. Guy, in which the grass of a park had been partly irrigated with sewage, the animals found the irrigated grass so grateful to them, that "while in other parts of the park they have suffered the grass to grow without let or hindrance, they have kept it close nibbled, and will not give it an opportunity of growing."

Mr. Chadwick relates the experience of Mr. Barber, Murdnachwood. This gentleman had twenty-seven acres of land before his house, so poor that it originally fed only two cows. In a stable near the house were forty cows and four horses; the dung of the cows was put into a tank and largely diluted with water, and with this he irrigated twenty-two acres. With the refuse of his house and scullery he irrigated five acres. The produce was so large that on that same plot he has been enabled to feed all the cows and the horses; that is to say, the increased produce was such, that forty-four animals were fed where there had previously been only food enough for two. Mr. Smith, Deanstone, says: "The practical result of this application of sewage is, that land which let formerly at from 40/- to £6 per Scotch acre, is now let annually at from £30 to £40, and that poor sandy land, on the sea shore, which might be worth 2/6 per acre, lets at an annual rental of from £15 to £20. That which is nearest the city brings the higher rent, chiefly because it is near and more accessible to the points where the grass is consumed, but also partly from the better natural quality of the land. The average value of the land, irrespective of the sewer water application, may be taken at £3 per imperial acre, and the average rent of the irrigated land at £30, making a difference of £27; but £2 may be deducted as the cost of management, leaving £25 per acre of clear annual income due to the sewer water."

Every farmer in Queensland should have one or more tanks of liquid manure to apply to the roots of his growing crops. To every pigsty, stable, and water closet there should be a tank conveniently situated (and fitted with a lid), from which a supply could be at all times obtained, and being diluted according to its strength, with three or six times its volume, applied to such crops as require it. Care should be taken not to use it too strong.

ROTATION OF CROPS.

CERTAIN plants exhaust the soil of the particular salts or other mineral matters which are required for their nourishment. When the substance required by plants is found in the soil in which they grow, the plants are vigorous; but when the soil becomes exhausted of them the plants become weak and sickly, and a further crop of that plant cannot be grown in that soil until it has had returned to it the substance which had been exhausted. Another crop, however, requiring a different substance may be grown in the same soil the next year. For instance, plants that require potash, such as the beet, the mangel wurzel, and the turnip, may succeed plants that require lime, such as beans, peas, &c.

THE KITCHEN GARDEN

THE KITCHEN GARDEN.

ARTICHOKE—Jerusalem—(Helianthus Tuberosus).

THESE are propagated in the same manner as potatoes. Being very hardy, and spreading in the soil, they will thrive in almost any situation; and as they are difficult to eradicate, they should be put in some situation where they are not likely to be troublesome. Plant the small tubers in spring (or in February if not procurable at that time), fifteen inches apart, in rows three feet between. To save time and trouble the rows may be dug alternately, and the small sets immediately replanted in the same place after well manuring and digging. By this method a continual succession is provided in the same bed.

ARTICHOKE—Globe—(Cynara Scolymus).

SOME growers prefer the French or oval artichoke on account of its superior flavor, but the globe sort is more generally cultivated because of its dwarf and prolific habit. In Europe, artichoke bottoms are dried in the sun for winter use, and are esteemed either plain, fricaseed, fried, or pickled; but the whole plant, if covered with sand, may be preserved for a long time, and the young ones may be pickled whole.

The artichoke is propagated my means of suckers, which are planted early in spring. Plant them when about ten inches high, in rows, four feet apart, and three feet from plant to plant, in rich, deep, moist loam, well manured. The situation should be open. Shade with

large pots, and water freely in dry weather, occasionally giving rather strong liquid manure. Remove the pots when the plants begin to grow. In October remove all small suckers, and mulch the ground with dung three inches thick between the rows. In the absence of dung, use grass mowings. The beds last for about five years, when a fresh plantation should be made. Manure the beds annually early in spring with a layer of fine wood or coal ashes forked in, and then a heavy dressing of half rotten dung. Mulch the ground annually in October.

Artichoke Chards: In October or November cut away the leaves and stems of a few plants to within six inches of the ground: many young shoots will soon appear; when sufficiently grown, draw them together and bind them up in haybands. In a month they will be blanched.

ASPARAGUS.

In making asparagus beds, choose the best soil which the garden affords. The most favorable is a deep sandy loam, dug deep and well manured, a good sprinkling of salt being added to the surface a month or two before the planting season, that the rain and atmosphere may act upon it. Before planting, the ground should have another good dressing of well rotted manure, be trenched again two feet to two feet six inches deep, and again well sprinkled with salt, leaving the surface neat and even as the work proceeds. The Connova is much esteemed by some growers, on account of its gigantic size.

Planting: During May or June, mark out the beds four feet wide, with paths two feet wide running north and south. Strain a line parallel with the bed nine inches from the side; with a spade cut a trench six inches deep perpendicular on the side next the line; against this place the plants at fifteen inches

asunder, with great care, spreading the roots out and leaving the crowns two inches below the surface; fill in the earth quickly to avoid all unnecessary exposure. Two other rows at fifteen inches asunder, planted in a similar manner, will complete each bed. The object in having the beds so narrow is that they may never be trodden upon, as from the length of time they remain without any further opportunity for deep digging, everything must be avoided which would tend to compress the earth.

Subsequent cultivation: Water must be given daily in dry weather until the plants are established. The beds must be kept clear of weeds throughout the year. Liquid manure should be applied plentifully twice a week from September through the summer, and a dressing of salt once a month. In May cut the stalks down and dig the beds lightly over with a fork, turning up the paths also. Lay over the beds a good dressing of manure to remain until spring. Early in August give the beds a good digging with the fork, thoroughly mixing the manure; rake the surface smooth, drawing the rough lumps into the paths. Begin to cut in September, as ready. Superphosphate of lime is a good special manure.

About eight square perches will be sufficient for a large private establishment. The beds should be entirely free from the shade of trees. In Spain, Austria, and other continental countries, earthen pipes, wooden tubes, and cane joints, twelve to fifteen inches long, are placed over the tender shoots to ensure their being more perfectly blanched. The seed roasted and ground is said to equal coffee.

BEANS—(Broad Windsor, Longpod, and Mazagan).

The soil most suitable for the main crop is a heavy loam dug deeply and manured, if necessary.

Sow in drills two inches deep, three feet six inches apart, and the seed nine inches apart in the drills. If sown in dry weather, have the bottom of the drills well watered before sowing. For five rows, each five yards long, a pint of seed will be sufficient. For an early crop, sowings may be made in March or April, and for a late crop, in September or October. When the crop comes into full blossom take an inch or two off the top of each plant; it is said to strengthen the plant and throw it into fruit. The crop should be gathered as it becomes fit for use, whether required or not, to prolong the succession of supplies.

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BEANS—(French or Kidney).

THE best dwarf varieties yet tried are the *Early Dun*, *Negro*, *China*, and *Black* and *Red Speckled*.

An open situation and light rich soil, well dug, are required for French beans. They should be sown in drills two feet or two feet six inches apart, care being taken not to sow the seed too deep, say never more than one to one and a-half inch. The plants should be eight inches to a foot apart in the rows, and as they grow the earth should be drawn up to the stems at each side to prevent their being blown over by high winds.

If the weather should become very dry, and there is a supply of water at command, the beds should have a good soaking occasionally. Gather the beans regularly as they are ready, as it will prolong their bearing. Successional sowings may be made in the neighbourhood of Brisbane from September to April. The running varieties should have their runners cut when they have grown a fair size, to check over luxuriance and induce fruitfulness.

BEET.

THE varieties are known as *Red Beet* and *Silver Beet.* The former is grown for the roots, and much esteemed by some persons as a vegetable; but more generally used sliced in salads, sometimes alone with an acid dressing, and also pickled. Sugar is produced from the latter; it is also grown for its leaves, which are used as spinach, and the stalks as seakale. Beet requires a deep, rich, open soil, well manured. The ground should be dug at least two spades deep, the whole of the manure used being turned in with the bottom spit, to cause the tap roots to descend, and prevent forked or side roots. Sow for early winter crop in February, and for summer crops in August and September, in drills two feet apart; the seed should be covered about an inch deep, and the plants thinned out to twelve or eighteen inches apart in rows. A dressing of salt dug in with the manure will be found beneficial, and fine bone-dust or phosphatic manures are highly valued for this crop.

BROCOLI.

White and *Purple Cape*, and *Grange's Early White*, are the most suitable for our climate. For cultivation see *Cauliflower*. Sowings may be made in June, August, November, and January for succession.

BRUSSELS SPROUTS.

THIS plant rises up with a very long stem, which has a spreading open head at the top. The large leaves are broken down to facilitate the formation of the little cabbages from all the joints up the stem. They should be gathered when they have the appearance of half-blown roses, leaving the top uncut.

The seed may be sown in June and August, and again in November and February. The cultivation is the same as for cabbages, but they require more room on account of their height. They should be planted in rows three feet apart, and the plants two feet apart in the rows.

CABBAGE.

The following varieties are selected as the sorts most approved of for general cultivation: Early—*Wheeler's Imperial, East Ham.* Medium—*St. John's Day, Large York, Sugar Loaf, Nonpareil, King, Dwarf Dutch, Battersea.* Late crops — *Drumhead, Flat Dutch.*

Soil: The soil should be rich, moist, but well drained, and not too light; thoroughly well dug, and highly manured, turning in 75 to 100 loads of stable manure per acre.

Sowing: It is desirable to make small sowings at intervals throughout the year, that plants may always be ready to put out in favorable weather. The largest sowings may be made in January and June. The latter season, the red pickling cabbage may be sown. It is best always to protect the seed bed from the sun until the plants have four leaves, by sticking in small sprigs of brushwood all over the bed. Should it be deemed advisable to make a sowing of cabbage seed in dry weather, the following will be found a good practice:—The bed being well dug, give it a thorough good watering, not a mere sprinkling; the next morning repeat it, and in the afternoon sow the seed, raking it in well; protect the bed from the direct rays of the sun by a portable calico screen, and, if the weather continues dry, water every morning until the plants have got the fourth leaf.

Transplanting: In performing this operation, the

extreme ends of the roots may be removed, to increase the tendency to form lateral roots. The small varieties may be planted two feet apart each way, and the large sorts three feet; in poor soil they may stand closer. If the plants are at all infected with the blight, dip them carefully in a weak solution of Gishurst Compound. In transplanting in dry weather, holes should be made with the dibble where the plants are to stand, and abundance of water poured in; in a few minutes they will be ready to receive the plants by sinking the setting stick in the centre of each hole to open it a second time; then let the plants be put in, closing the earth well at the bottom of the roots.

Culture: Digging between the growing crops will be of great advantage, especially if the ground has got hardened by excessive rain. In seasons of drought the ground should not only be kept open, but mulching and liquid manure should be resorted to. Lime is a good special manure.

CHILLI and CAPSICUMS.

Under this head we will include the several sorts of chilli and capsicum. They are all hardy in the vicinity of Brisbane, and can be sown in the open border in September, slightly protecting the bed from sun and wind until the plants are well up. When strong enough to transplant, remove them to where they are to stand, in a rich, warm bed, at three feet apart. Shade them with a branch placed over them at the sunny side until established.

CARDOON.

The *Spanish* variety is considered the best, from the size and succulency of the midribs of its leaves. The soil suitable for the cardoon is a light deep loam.

In September prepare a trench as for celery, twelve inches deep and twenty-two inches wide; fork into the bottom of it well decomposed manure, four inches deep; sow three or four seeds in patches eighteen inches apart along the centre. As soon as the seed leaf is well formed thin the plants, leaving only the strongest one in each patch; hoe frequently among the plants, and water thoroughly with diluted liquid manure. When about eighteen inches high rub off all the side shoots from the crowns to the surface, and add a little earth to support the leaves; when they are full grown (two feet in height or more), tie up the leaves compactly together with a piece of banana fibre or soft rope, then wind a hay or straw band, moderately tight, round from the bottom to nearly the top, and earth up the same height; when completely blanched the plants are ready for use.

CARROTS.

THE *Early Horn* is a fine flavored early carrot, and, on account of its habit of growth, is adapted for cultivation in soils which would be too shallow for the other varieties. The *Intermediate*, *Long Orange*, and *Altringham* are suitable for deep soils.

The carrot requires a light, rich, sandy loam, of considerable depth, which should be dug two spades deep, being careful to break all lumps, and to turn in any manure ten or twelve inches under the surface, that the roots may strike down straight and smooth.

Sowing: The seed soon perishes, and is more frequently bad than any other garden seed. The carrot may be sown either broadcast or in drills one foot apart. As the seed is liable to hang together, it should be well rubbed in the hands, mixed with sand, to separate it previous to sowing; and as it is very light it should be sown on a calm day. On light soil,

not subject to binding in wet weather, the seed should be gently and evenly trodden in, and then evenly raked over; being careful not to draw the earth into hillocks. On land of a more retentive nature, it should be raked in only. Sow for main crop in January, February, and March, and occasional small sowings for succession.

Culture: Ply the hoe freely to keep the weeds down and stir the soil. Thin the plants out to five or six inches apart.

CAULIFLOWER.

The *Large Asiatic, Early London, Early Dwarf Erfurt,* and *Alma* have given great satisfaction in Queensland.

Soil: The soil for the seed bed may be light, but for final transplanting it can hardly be too rich.

Sowing: For the winter crop, sow in December and January; for the summer crop in June and July. It is desirable to protect the seed bed from the drying effect of the sun and wind, by sticking in a few twigs of brushwood, in rows over the bed (not too thickly), until the plants are up, and the seed leaves well developed.

Cultivation: The soil should be of the best description, thoroughly dug and manured. Transplant in favorable weather two feet to two feet six inches apart, watering the plants until established. During the growth of the plants, water frequently with liquid manure. Stir the surface as often as it binds, and draw the soil up to the stems to support them. When the heads begin to appear, water should be freely applied, for the flower is greatly improved by abundant watering. Two or three leaves should be bent over each flower to preserve the color and prevent its expanding.

A few cauliflowers may be preserved for some time after the crops are over, by attention to the following directions:—Select what may be required for this purpose a day or two before they are quite ready. Pull the plants up by the roots, and tie the tops of the leaves loosely together, then place them in a cool shed amongst damp sand or sandy soil, and they will keep quite fresh for several weeks.

CELERY.

The *Red Solid* and *White Solid* are grown under various names. The red is considered more hardy, and the white is valued for its crispness and delicacy.

A deep, rich, vegetable mould, in a moist situation, is that best suited for celery. In a light rich soil, in a shady situation, mark off a seed bed in January. Having freely watered, sow the seed thinly broadcast, tread then in evenly, and, if the weather is dry, cover lightly with sifted stable droppings or decomposed manure. When the rough leaf is a little advanced, prepare a bed by mixing two inches in depth of well decomposed manure with about three inches of the soil; level the surface, water thoroughly, and a few hours afterwards, in the evening, plant out the seedlings five or six inches apart. The plants should be selected of an equal size; and another bed may be pricked out a month later for a succession.

Final Planting: At five feet apart from centre to centre throw out trenches a foot broad and a foot deep. At the bottom lay four inches of well rotted manure, and mix it well with the soil at the bottom. The Americans recommend a dressing of salt. Give the whole a thorough good soaking of water; and, if the seed bed be dry, water it also a few hours before the seedlings are required, and raise up the plants with a ball of earth by means of a trowel; plant then in the centre of the trench at twelve inches apart, and

water again. Shelter them until they are rooted. The plants will be eight to twelve inches high when finally transplanted, and should at that time have all side shoots carefully removed from the crown. The beds should be so arranged that no water could stagnate at the roots.

Blanching, &c.: As soon as the plants make a little growth apply water copiously when required, and diluted liquid manure, soapsuds, &c., occasionally, keeping the surface of the soil well stirred. When the plants are nearly full grown remove any side shoots, then gather the leaves of each plant evenly, but not too tightly, together, and tie them up to prevent the earth getting into the hearts while earthing up. Draw the earth carefully to the plants on each side to within six inches of the top; this operation will have to be repeated, and should only be done in dry weather. The plants have greater strength and flavor if the blanching is deferred until within a few weeks of the heads being required for use.

In Henderson's "Gardening for Profit"—the experience of a very successful market gardener in America—the practice of planting in trenches for the purpose of blanching is deprecated. Henderson recommends that as the seedling plants advance in growth, the tops be shorn off twice before the time of setting out, so as to induce a stocky growth. He sets the plants six inches apart, in rows which are three feet apart, on the level ground, the roots being made firm by pressure of the foot. In six or seven weeks afterwards sufficient soil is drawn up to the plants to keep the leaf stems upright, the earth being pressed round each plant with the hand. The blanching process is finished with the spade, banking up the earth taken from between the rows against the plants as they increase in height. He grows only dwarf celery, as, unlike the taller varieties, the whole of the stem of this kind is fit for use.

CELERIAC, OR TURNIP-ROOTED CELERY.

THIS is not much grown in Queensland, but is highly esteemed by Germans and natives of other continental nations. The soil and treatment is similar to celery, but it is not earthed up to the same extent. The turnip-like root is cooked, or it makes an excellent salad when sliced and used with vinegar,

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CRESS.

THE *Curled Cress* is generally preferred. It should be sown every fortnight for succession in shallow drills on a rich light soil. The seed should be very lightly covered, and the drills need not be more than three inches apart.

American Cress is hardy, and may be sown monthly during the spring and summer in drills nine inches apart. When the plants are bushy, cut the heads by the surface of the ground.

Water Cress is an excellent salad and well deserving cultivation. It is generally propagated by cuttings, but may also be reared from seed. To raise seedlings, take a box and set it in a shady place; see that there are holes at the bottom to allow the escape of stagnant water; place two inches of charcoal or other rough material for drainage at the bottom; add six inches of compost, made of equal parts of well decomposed cow dung and sand, make the surface quite smooth, and water copiously: when quite drained off, sprinkle the seed evenly over the soil, and sift a small quantity of sand over all, so as just to cover the seed. Keep the soil regularly watered with a fine rose watering-pot; be careful the surface is not disturbed by the water, and that it never gets dry. As the plants get large enough to handle, they may be planted out three inches apart in a rich well

sheltered bed, and watered regularly and abundantly until large enough to plant out in their permanent positions; they may then be increased to any extent by cuttings, under similar treatment. A stock of plants should be kept in the nursery, until the beds have stood the test of drought and flood.—See *Garden Calendar* for June.

CUCUMBER.

THE *Stockwood*, *London Ridge*, and *Cuthill's Black Spine* have been found good sorts for general cultivation.

Any good garden soil, rather moist and sheltered from the west, will be found suitable. The ground should be double dug, and well manured. In August mark off the land into six feet squares. If the soil is not very rich, make a hole at each crossing twenty-four inches in diameter, mix with the soil two large spadefuls of sheep or poultry dung, adding a little ashes, bone dust, and salt, if convenient, and fill the hole up level with the surface. In the centre of each bed make a ring and sow five or six seeds half-an-inch deep. When up, thin out to two plants in each bed. As the lateral branches show fruit they should be stopped, and the secondary laterals should be pinched back to the fruit in the same manner. The various runners should be placed so as to cover the bed equally.

Whenever the soil has a tendency to bind, stir it up deeply; and if the weather is dry give the beds a good soaking with diluted liquid manure at least once a week. In hot, dry weather plants should be watered at night, and then not niggardly, but sufficient to damp the bed thoroughly to the roots. Successional sowings may be made in September, October, and November.

To produce straight cucumbers, provide some three-sided boxes made of three-inch battens eighteen inches

long; place them underneath the fruit with the open side uppermost.

ENDIVE.

THE cultivation of this useful salad is the same as for lettuce, which see.

Blanching: When the leaves are quite dry and the plants have attained nearly their full size, gather the whole plant up in your hands in a conical form, and tie it round lightly with a strip of banana fibre, which is to go several times round the plant, causing it to end so pointedly at the top as to prevent the rain or dew from penetrating to the interior. Endive is sometimes blanched under garden pots, or blanching-pots, after the manner of seakale. A week to a fortnight will generally be sufficient.

EARTH NUTS.

THIS plant is also known as "pea nut," and "pindar ground pea." It is grown extensively in the Southern States of America, in China, and other countries.

Make the hills in August, two and a-half to three feet apart, and drop three or four of the shelled seeds in each; cover them two inches deep; thin the plants to two in a hill, and keep the ground free from weeds. The best soil is a rich sandy loam.

To promote fruiting, the branches should be spread out evenly, and gently pressed to the soil.

The nuts are highly exteemed in England and France, and the demand is said to be almost unlimited. The quantity exported from Bathurst, on the coast of Africa, had increased from 47 tons in 1835 to 11,904 tons, valued at about £130,000, in 1851. A fine oil is

extracted from them, and the residue makes a valuable oil cake to feed cattle and swine, of which the latter are particularly fond. In France the cake is ground, roasted, and used as a substitute for coffee.

In America the consumption of earth nuts is enormous, and the crop which, prior to 1860, was very insignificant, had reached, in 1871, the value of 2,250,000 dollars. The market price varies with the quality from $2 to $2.50 per bushel, and the weight of a bushel is from twenty-four pounds, yielding one quart of oil to the bushel, to thirty-four pounds, yielding five quarts of oil. The crop averages forty bushels per acre. A machine has been invented by Thos. L. Colville, of Wilmington, North Carolina, for hulling and winnowing them. The demand is so great that pea nut shops have them roasting all day to supply the retail trade, and the sales of one man amount to upwards of one thousand bushels a year. The nuts thrive best near the sea, and require lime in the soil.

EGG PLANT—(Solanum Melongena).

THE seed may be sown in a warm border in September; and ultimately thin the plants one to two feet apart.

The fruit is much used in India, France, and Italy, in soups and stews, and for the general purposes of the love apple or tomato.

The purple variety is known as the Brinjall in India.

GARLIC.

THIS vegetable is propagated from the young bulbs or offsets. They should be planted in winter, in drills drawn one foot apart and one inch deep.

Press the lower half of the offset into the soil, leaving them in this state during winter, without covering. When hoeing them in spring, let the soil fall to them so as to leave a level surface. When the leaves get yellow in summer they will be fit to gather and hang up to dry. A good rich soil suitable for onions will also suit garlic.

HERBS.

Plants should be procured if possible. They may be planted any time between April and August, in a shady border, at eighteen inches apart, and water should be given in dry weather. Where plants are not obtainable sow the seed in lines drawn a foot apart, merely deep enough to cover the seed. When up, thin out to a foot apart; water and mulch during summer, and keep the surface loose. In autumn or early spring take up and divide the roots, planting them at eighteen inches apart, as first directed.

As some herbs are annuals, a list is given of a considerable number; and the usual mode of propagation mentioned for the guidance of cultivators.

Shrubby plants: Sage, winter savory, rosemary, thyme, rue, wormwood, southernwood, lavender, hyssop, may all be propagated by division of roots, and by cuttings.

Perennial herbaceous plants: Peppermint, spearmint, pennyroyal, balm, tansy, burnet, chamomile, fennel, liquorice. These are all increased by parting the roots.

Perennial and annual plants: Caraway, coriander, dill, anise, sweet marjoram, summer savory, sweet basil, angelica, borage, horehound. All propagated by sowing the seed.

HORSE-RADISH.

SELECT in the spring a moist situation, having a sandy or light soil. Take out a trench two feet wide and eighteen inches deep; put in the bottom a good layer of decomposed manure, which mix with a little of the earth at the bottom; cover this with an inch or two of soil; cut up the roots into portions about three inches long and place them along the centre of the trench six or eight inches apart, then fill up the trench to the level of the surrounding soil.

LEEK.

THE *Musselburgh* and *London Flag* are the best sorts. The soil should be rich, deep, well dug, and manured with well decomposed manure. Sow the seed in April and May, in drills six inches apart and half-an-inch deep. When about eight inches high transplant them into a bed previously prepared for them. Shorten the roots to about an inch from the plant, and cut off two inches or more from the extremity of the leaves. In drills, fifteen inches apart and six deep, plant them with a dibble deep in the bottom of the drill, nearly up to the leaves, at a distance of eight inches apart. Cut back the leaves once a month during their growth, to make their necks swell out. As the plants grow, level down the soil in the process of loosening it. Late sowings may be made with advantage, in favorable seasons, during August and September.

LETTUCE.

THE sorts most approved for general cultivation are the *Neapolitan*, the *Drumhead Cabbage Lettuce*, the *Silesian*, and the *Paris Cos.*

Sowings may be made monthly for succession, and small beds may be transplanted in favorable weather at fifteen inches from plant to plant.

Some persons having light, rich, moist soil, find it to advantage to make their summer sowings in rows, fifteen inches apart, putting the seed in thinly, and allowing the plants to remain until they arrive at maturity. In this case especial care must be taken that the ground does not cake, that it be frequently stirred, and liquid manure supplied, if necessary. Salt and ashes are good special manures.

Lettuces may be blanched as directed for endive.

MARTYNIA.

THE seed-pod of this flowering plant is much used in America for pickling.

MELONS.

THE rock and English hybrids are very numerous, and so much crossed with each other that they are seldom to be obtained true to name and character. The water and sugar melons are more generally grown.

The melon requires a stronger soil than cucumber, greater exposure to the sun, and not quite so much water. The soil should be dug deep, and ashes are a good special manure. Stop the lateral branches at the third leaf beyond the fruit, renewing the operation every fresh growth.

For sowing and general cultivation see cucumber.

MUSHROOM.

A BED of mushrooms is not so difficult of attainment as is generally believed. There are certain

conditions to be carefully observed, the attention to which would be amply repaid by an abundant crop. The bed must not be too hot or too cold, too dry, and especially not too wet. Experience alone, it is presumed, would enable the novice to determine the happy medium. Excessive heat and too much wet are, however, the two great evils to guard against; and any person having a spare corner of a cellar, outhouse, or stable, can supply himself with mushrooms either in beds or boxes. As mushroom spawn is not to be purchased in Queensland as it is in England, one of the most approved methods of *procuring spawn artificially* will be given, with such modifications as the climate demand: Take two barrow-loads of cow dung, one load of sheep, and one of horse dung; *dry them well;* then break them quite small, so as they may go easily through a coarse garden sieve. When well mixed together, lay them up in a round heap, finishing at the top in a point. It is to be understood that the operation is to be conducted in a dry shed. Observe to tread the heap as it is put up, which will greatly save it from heating too much: the best adapted and most productive heat is from 55° to 60° Fahrenheit. The heap is to be covered with horse litter, in a state of fermentation, to the thickness of four inches all over, if made in the winter; but in the summer clean old bags would be better, as the least over heat would spoil the heap. In this state let it lie one month; then throw the litter a little on one side, thrust the hand into the heart of the heap and take out a handful; if the spawn has begun to run you will observe numerous small white fibres or threads through the dung; if not begun to run, cover the heap up again. The spawn thus procured is of the very best description, but will not keep.

Growing mushrooms in boxes: Each box may be three feet long, one and a-half foot broad, and seven inches in depth. Fill each box half full of fresh horse

dung (if wet, to be dried three or four days previously), the dung to be well beaten down in the boxes. After the second or third day, if any heat has arisen amongst the dung, it is then a fit time to spawn. Take pieces of the spawn the size of an apple and place them about four inches apart upon the surface of the dung; here let them lie for six days, when it will be probably found that the side of the spawn next to the dung has begun to run in the dung below; then add one and a-half inch more of fresh dung over all, beaten down as formerly. In a fortnight try the dung almost to the bottom of the box, to see if the spawn has run well through it; if it has, cover two and a-half inches of mould all over, the surface being beaten smooth with a spade. In about a month the mushrooms will begin to appear; if the mould seems dry, give a gentle watering with warm water.

MUSTARD.

Cultivation same as garden cress, which see.

OKRA, OR GUMBO—(Abelmoschus Esculentus).

This vegetable is much used in India and the Southern States of America in soups and stews, for which purpose the pods should be gathered while green and tender. Make successive sowings during spring and summer in any good garden soil; the plants should be about five feet apart, and the pods may be cut into thin slices and dried for winter use.

ONIONS.

Onions require a rich, mellow soil, on a dry subsoil, and are an exception to the general rule of never

cropping the same ground successively with the same plant. In order to ensure a good crop, the ground should have a deep digging in the summer, with a good supply of manure, laying the ground up as rough as possible. In February give the ground a good dressing of soot and ashes, and dig it over, breaking all the lumps. Throw it up into beds of convenient width, and sow pretty thickly in drills one foot apart and one inch deep. Tread the seed firmly down, and cover nicely with a rake. The crop must be kept clean by frequent hoeings, and the surface of the ground loose, but not disturbed too deep.

Transplanting: When the plants are about six inches high, transplant into beds similarly prepared into rows fifteen inches apart and eight inches apart in the rows. In transplanting be careful only to insert the root, as deep planting prevents a proper development of the bulb. When the leaves begin to turn yellow, bend down the tops just above the bulb, to facilitate ripening.

Sowings have been made in September in the neighborhood of Brisbane, with the most satisfactory results. At that season of the year the growth would be rapid and uninterrupted, provided the soil was suitable and the weather showery.

Soot, sea sand, salt, guano, and charred rubbish are good special dressings for the surface of onion beds, applied at least a week before sowing.

The *Tree Onion* is very useful in gardens in the interior, as, a few bulbs being secured, a crop is almost sure, whether the soil be rich or poor. The ground should be well dug, liberally manured, and trod firm. Choose the largest of the top bulbs; press these down firmly to the line at six inches apart. The rows may be a foot apart. Cover the whole over with three or four inches of charred rubbish, charred turf, light rich soil, or sandy road scrapings. When the heads run up, stakes should be put in at about a yard apart on each

side of the row, to support them when they get top-heavy with their curious crop of onions at the summit of each.

PARSLEY.

PARSLEY may be sown twice a year to provide a continual supply. Sow in January and August, thinly, in drills twelve or fifteen inches apart, and about half an inch deep, covering the seed firmly with the rake. As the seed does not germinate quickly, the rows should be gently shaded by small twigs of brushwood stuck into the ground on the sunny side until the plants are up. Thin them out to twelve inches apart, and when they become strong cut them down, to induce strong, well-curled foliage.

PARSNIPS.

THE cultivation of the parsnip is the same as for carrots, with the exception that the soil should, if possible, be dug deeper; and if the seed be sown in drills, they should be six inches further apart.

PEA.

SOWINGS of early peas, such as *Daniel O'Rourke*, *McLean's Dwarf Gem, and Veitch's Perfection*, may be made in January; the main crop may be sown in February, and small occasional sowings through the winter. *Yorkshire Hero*, sown in May or June, is an excellent cropper.

Peas require a rich, light, well drained soil; and one of the most frequent errors in their cultivation is sowing them too thickly. Dwarf sorts should be sown in drills two feet six inches asunder, the peas

being thinned out to five or six inches apart in the rows. The varieties growing three feet high should be in rows three feet six inches apart; and varieties five to six feet high, would be grown to greater advantage at eight feet between the rows, and two rows of cabbages between them. The top of one row should not cast a shadow on the lower part of the next, and the whole from top to bottom should be fully exposed to light and air. Earth up all the crops as they advance, and stake up the taller varieties as the tendrils appear. Manure liberally, and give liquid manure in dry weather.

Trellis for Peas: Galvanised wire netting of two-inch mesh, attached to posts, forms an excellent trellis for peas. It need not be nearer than ten inches above the ground, and the tendrils will catch hold of it as the peas advance in growth.

PUMPKIN and SQUASH.

THE cultivation is the same as for cucumber, which see; the only difference is in the space required to accommodate their more vigorous growth. The holes should be eight feet apart, instead of six, and only one plant be left in each hole. Two may be left of the sorts which are of a less robust habit.

ROSELLA.

THIS is a variety of Hibiscus, and in the southern districts of Queensland is an annual. The seed should be sown in July or August, protected in a frame if there is any risk from frost, and planted out in favorable weather when the plants are sufficiently strong, at about six or eight feet apart each way. The fruit, from which the favorite rosella jam is prepared, consists of the fleshy calyx covering the pericarp or seed

vessel, and is generally fit to gather about May. The plant thrives in good, rich soil, not too wet, and requires a free exposure.

RADISH.

Sow occasionally throughout the year. In the spring small sowings may be made fortnightly. A light, rich, garden soil is suitable for them. If sown broadcast, the seed should be covered evenly about half an inch deep with soil, and the plants thinned out to about four inches apart. If sown in drills they should be six inches apart. The seed may be sown a little deeper in summer than during winter, and in dry weather give the bed a good soaking of water when required, as the plants should be grown quickly, and used young.

RHUBARB.

The *Myatt's Victoria* is much esteemed for size and quality, *Prince Albert* for hardiness.

In August prepare a piece of deep, rich soil, and sow the seeds in drills eighteen inches apart and one inch deep. When the plants are well up, thin them out to one foot apart. As they are tender in this climate, they must be kept clear of weeds, and have sufficient water during the dry weather, or they will die off. In June following, let a bed of similar soil be dug deep and manured. It should be in a moist, shady situation, and quite free from stagnant water in the soil. Plant the roots two feet apart each way, with the crowns about two inches below the surface. Water occasionally, while growing, with a weak solution of guano, liquid manure, or soapsuds. Cut the flower stems as they appear, which, if they do the first year, it is a sign that the ground is not rich or

strong enough, or has been badly prepared. In the autumn apply a good strong dressing of manure, and fork it in. Mulch during the hot weather, keeping the ground open.

SALSAFY and SCORZONERA.

These require the same treatment as carrots. Sow in drills twelve inches apart and two inches deep, covering firmly with the rake. Thin the plants out to four inches apart, and use them as required until the roots show signs of growing, when they may be taken up and stored like carrots.

SAVOY.

Cultivation same as cabbage.

ESCHALOT.

May be propagated throughout the year by division of the roots. Plant as onions, in rich, sandy soil, and keep them well weeded. By planting on the top of small ridges, the roots only will be in the ground, and the bulbs, being on the surface, will develope like small onions.

SEAKALE.

Cultivation the same as for rhubarb. Obtain strong two-year-old roots, and plant them three in a clump, at two feet apart each way. The young shoots growing from the crowns early in the spring are blanched, and, when eight or ten inches high, are fit for the table. The ribs of the leaves are sometimes used in summer as asparagus. Blanching may be

performed in the usual way by covering with blanching pots or large garden pots, taking care to cork up the hole in the bottom, and to draw some earth round to keep out all light; or may be effected by covering the beds with leaves or light manure, or with sea sand. Salt is a good special manure.

SPINACH.

THE prickly spinach is more hardy than the round, and is therefore generally sown for the winter crops, while the round variety is used for the summer. Occasional sowings may be made during autumn, winter, and spring. Sow thinly in drills two feet apart by two inches deep. Thin out the young plants to twelve inches apart, using the thinnings for culinary purposes. After the plants become well developed all the outside leaves should be gathered as required for use until the flower stalks appear.

TOMATO.

THERE are several varieties of tomatos, yellow and red. They are much esteemed in America, and are extremely wholesome.

Sow in August and September in a warm, rich border. When the plants are six inches high, thin them out to about three feet apart, and support them with sticks as you would peas; or put a light trellis to train them on. By this plan they will not grow so rambling, and the crops will be much greater and of superior quality. Stop the plant when the first fruit forms, by pinching off the end of the shoot. Water when necessary.

"Dr. Bennet, a professor of some celebrity, considers it an invaluable article of diet, and ascribes to it very important medicinal properties. He declares:

1. That the tomato is one of the most powerful deobstruents of the *materia medica;* and that in all those affections of the liver and other organs where calomel is indicated, it is probably the most effective and least harmful remedial agent known in the profession. 2. That a chemical extract can be obtained from it which will altogether supersede the use of calomel in the cure of diseases. 3. That he has successfully treated diarrhœa with this article alone. 4. That when used as a diet it is almost a sovereign remedy for dyspepsia and indigestion.

TURNIP.

The *White Dutch, Early Snowball, Red American Stone,* and *Orange Jelly* are the favorite sorts. The red American stone is much valued in the interior, where it is found early and hardy, producing a good turnip in seasons which prove destructive to the other varieties.

A light, moderately rich garden mould is suitable. It should be dug thoroughly and broken fine. Bone dust, lime, ashes, and gypsum are good special manures.

The seed is sown broadcast for main crop during August, September, and October, rather thinly, covering the seed with the rake; when the plants have the rough leaves one inch broad, thin them with the hoe to six inches apart, carefully eradicating the weeds. They should be watered during dry weather with diluted liquid manure. Occasional sowings may be made during January, February, and March.

VEGETABLE MARROW.

For mode of cultivation see "Cucumber," the instructions for which are applicable to the vegetable marrow, except that only one plant should be left to each space, and the distance eight feet apart instead of six.

SEEDS—Per Acre.

THE following table of seed necessary per acre will be found useful for reference :—

	Pounds.
Beets	4 to 6
Cabbage	1 to 1½
Carrot	2 to 3
Cucumber in hills	1 to 2
Clover, red, broadcast	15 to 20
Clover, white, broadcast	12 to 16
Clover, white, in drills	8
Furze or Gorse, broadcast	30 to 40
Furze or Gorse, in drills 10 inches wide	15 to 20
Lucerne, broadcast	25
Mangel Wurzel	6
Onion, in drills	5
Parsnip, in drills	4 to 6
Radish, in drills	5 to 8
Radish, broadcast	12 to 16
Salsify, in drills	6 to 8
Spinach	8 to 10
Turnip and Ruta Baga, broadcast	1½
Turnip and Ruta Baga, in drills	1
	Quarts.
Beans, pole, in hills, 3½ × 4	8 to 12
Corn, in hills	8 to 12
Broom Corn, in hills	10 to 12
Millet, for seed	12
Mustard, broadcast	12
Sorghum, or Chinese Sugar Cane, in drills	2 to 3
Sorghum, or Chinese Sugar Cane, broadcast	30 lbs.
	Bushels.
Beans, bush, in drills 2½ feet apart	1½
Corn, for fodder	3 to 4
Barley, broadcast,	2 to 3
Barley, in drills	1¾ to 2
Buckwheat	1 to 1½
Grass, lawn	2 to 3
Millet, broadcast	½ to ¾
Oats	2 to 3
Grass, orchard	2 to 3
Potatoes, in drills or hills, cut tubers	10

	Bushels.
Potatoes, cut to single eyes	3 to 5
Rape, broadcast	15 lbs.
Rye, broadcast	1½ to 2
Rye Grass	2
Sainfoine	3
Timothy	½
Vetches	2 to 3
Wheat, broadcast	1½ to 2
Wheat, in drills	½ to 1

DESTRUCTION OF VERMIN INJURIOUS TO CULINARY CROPS.

DESTRUCTION OF ANTS.

ANTS are very destructive to pot plants. Stand the plants in water until they are drowned. In the open ground they may be exterminated with boiling water applied to the hill at night, or a strong and hot solution of Gishurst Compound. A piece of fresh meat is a good trap: when well covered, scald them and set it again.

DESTRUCTION OF APHIDES, &c.

A SOLUTION of Gishurst Compound, applied warm with a syringe after sunset, or on a dull day, is the best cure for Aphis. The quantity used may be two to four ounces of the Compound to a gallon of water, according to the plant operated upon. If too strong it is likely to injure the tender ends of shoots and young leaves. If the first application is not

efficacious, apply a second dressing after the lapse of a few days. This solution is also a cure for American blight, green and black fly, red spider, thrip and brown scale, and is also the best agent known for thoroughly arresting the Oidium blight on the grape vine during the summer months. The best time and method of dressing for the destruction of insects in general is during July, after the winter pruning. The Gishurst may be used for this purpose at the rate of four to six ounces to the gallon of boiling water, and, when thoroughly dissolved and the liquid a little cooled, it should be applied by means of a brush to every part of the tree, especially where there are cracks or crevices.

DESTRUCTION OF EARWIGS.

Where earwigs annoy, place beanstalks, about a foot long, in the neighborhood they frequent every evening, and in the morning blow the earwigs through the stocks into a pail of boiling water.

DESTRUCTION OF MICE.

In positions where there would be no danger from poison, equal portions of arsenic and butter, made into a paste and spread on thin pieces of bread, may be laid about, and will prove very efficacious. Where poison is objected to, try the following:—Soak a few peas in water, and when fully soaked, draw a thread through one of them, with a needle, then place two little sticks in the ground, at the exact distance from each other of the breadth of a brick, tie the ends of the threads to the two sticks, leaving the pea in the middle, and then let the brick rest upon the thread. The mouse in devouring the pea will gnaw the thread, and the brick, losing its support, will fall upon the mouse and crush it.

DESTRUCTION OF SLUGS.

Scatter cabbage leaves about at night; the slugs will take shelter under them and may be destroyed next day. Dressing the land with salt and lime is also destructive to these pests.

WORMS IN PATHS, &c.

Worms are often troublesome in lawns, garden paths, &c. Mix some lime and water, not very strong, and water the grass or gravel path with the mixture. The worms will soon appear at the top, when they may be destroyed.

THE ORCHARD.

THE ORCHARD.

THERE is probably no country in the world capable of producing in perfection a greater variety of fruits than Queensland. Enjoying a climate ranging from that of Europe on the Downs, to the tropical temperature of Mackay, she may embrace in her productions the English Gooseberry, Strawberry, Apple and Pear; and the Pineapple, Guava, and Mango. Next to the growth of Sugar, Cotton, Tobacco, and Coffee, this Colony is likely to excel in the abundance of its fruits: possessing such a variety of temperature and a fertile soil, it awaits only the skill and enterprise of man to transfer its stately forest into vineyards, orchards, and cornfields. Unlike the older colonies, here is a large *local demand, almost wholly supplied by importations*, and there can, therefore, be no doubt as to finding a market for the produce.

The Orchard should be a feature in every farm. Every little homestead in the suburbs should have a few fruit trees of the best sorts, if only for the use of the household. Quite independent of the wholesomeness of good fruit in a warm climate (where, as a rule, too little vegetable food is consumed), it is wise to take some little trouble to surround the "home" with such comforts and attractions as a few fruit trees and a neatly kept flower border.

In all the directions which follow, it is pre-supposed that the land about to be planted has been cleared and trenched throughout to an uniform depth

of two feet or two feet six inches, and has been drained at least six inches deeper than it is trenched. Some soils and situations do not require draining, but these are very rare—so rare, indeed, that external appearance cannot be depended upon, and there is only one safe test. Persons are often deceived by a sloping surface, thinking that, because water cannot lie *on* it, there can be no need of drainage. If the roots of the trees grew *on* the ground they would be right; but as they are *in* the ground, and often at a considerable depth, we must *dig into the soil to see that there is no water standing there.* Many valuable trees are lost in a rainy season; the wet season is blamed, but the loss arose from want of drainage. Few fruit trees will live long with their roots standing in water, and this is often the case without any being on the surface of the soil. The only way to obtain a satisfactory answer to the question,

"DOES MY LAND REQUIRE DRAINING?"

is as follows: Immediately after a heavy and long continued rain, dig several holes three feet deep in the lowest parts of your trenched land. If in six hours after there is no water in the holes, your land does not require draining; but it will more or less urgently need it in proportion to the quantity of water found there.

TRANSPLANTING.

ALL trees, whether deciduous or evergreen, are more safely transplanted *while in a state of rest,* and for this reason, partly, this operation is generally performed in the winter, when the former class of trees is denuded of its leaves. Evergreens should also be transplanted during winter, on account of evaporation being less rapid at that season. In all cases, calm,

cloudy weather should be selected as the most favorable, and the roots ought never to be exposed to the sun or wind for a moment. When trees have travelled any distance, and appear shrivelled, they should be carefully protected from the direct rays of the sun and high winds, and the bark be kept damp until they begin to grow; but, in doing so, see that they have sufficient light, and that the earth does not get too wet. Directions for planting will be found in the article on the apple.

A TABLE

SHOWING THE NUMBER OF PLANTS AN ACRE OF LAND WILL CONTAIN.

Feet asunder.	No. of Plants.	Feet asunder.	No. of Plants.	Feet asunder.	No. of Plants.
2	10,890	9	537	20	108
3	4,840	10	435	21	98
4	2,722	12	302	25	69
5	1,742	15	193	30	48
8	680	18	134	35	35

RULE.—Multiply the distances into each other, and with the product divide 43,560 (the number of square feet in an acre), and the quotient is the number of plants.

THE HYBRIDIZATION OF PLANTS.

THIS is a subject alike interesting to the amateur and the professional gardener. Its success depends upon facts so easily understood, and the results obtained by it have been so important, that every person possessing a garden should be acquainted with it.

The labors of Knight, Van Mons, and others, have secured to the world varieties of peaches, apples, pears, &c., as much surpassing the common sorts in excellence as the latter do the crab; and hybridizing flowers is now so well understood by some persons, that with certain flowers they can produce any color they desire with almost the same precision as an artist mixing his paints.

There are, no doubt, occasional examples of hybridization in nature, by bees or other insects; and valuable sorts of fruit or flowers may thus be originated; but the issue is altogether too uncertain. Ten thousand seedlings might be raised without obtaining a variety superior to the parent, and when it is sought to impart some new quality to a plant, it is unwise to depend upon chance, when, by bringing a little natural science to bear upon it, the result may be reduced to a comparative certainty.

As the most likely and useful direction for experiments in hybridization in a new country will be in attempting to originate new and acclimatized varieties of the best sorts of fruit and vegetables, I will attempt to illustrate the mode of operation by small diagrams of the orange blossom.

Most flowers are composed of the following parts, viz.: The *calyx*, which is usually green, and enveloping the flowers whilst in the bud; the *corolla* or *petals*, leaves so beautifully colored, and so delicate in most flowers; the *stamens*, or male portion of the flower, secreting the *pollen* or impregnating powder; the *pistilis* or *pointals*, the female portion, impregnatable by the pollen, and rendering fertile the seeds; and, lastly, the *pericarp* or *seed vessel*.

In conducting experiments of this kind, it is well to know that in general the characters of the female parent predominate in the flowers and fruit, while the foliage and general constitution are mostly those of the male parent.

No. 1.

No. 2.

No. 3.

When the blossom is as No. 1, quite developed, and on the point of expanding, open the leaves or petals with great care, and it will then appear as figure No. 2; then remove with a small pair of sharp pointed scissors the whole of the stamens, leaving the pistil only, as in figure No. 3; gently close the flower again, and screen it with muslin or otherwise from the approach of insects, and when it opens of itself shake the ripe pollen off the other tree over the pistil, carefully exclude insects, and the seed in the fruit thus impregnated will produce the variety.

There is not a fruit, grain, or vegetable growing in Queensland which is not susceptible of improvement and further acclimatization by this means. To those who have the time what could be more interesting than to attempt to give the English raspberry the productive and hardy habit of our wild raspberry. The writer has been informed that there exists a very superior variety of native raspberry on the seaboard between Brisbane and Wide Bay, and a large and excellent native yam in the same part of the country, which might either be improved by cultivation, or used advantageously to hybridize the West Indian yam. It is believed that no attempt has yet been made to obtain a new variety of the English potatoe from seed, but there is no doubt that by perseverance a sort might be originated possessing characteristics peculiarly adapting it for cultivation in this climate.

The undoubted success of many English growers in raising, in this way, numerous hardy good sorts; and of the Americans in originating the early rose, ought to afford sufficient encouragement.

Time and space alike forbid proceeding with the subject further; but it is hoped sufficient has been said to stimulate many persons to the pursuit of this most interesting study.

THE AKEE TREE—(Blighia or Cupania Sapida).

The Akee Tree is a native of Africa, and attains the height of 20 feet. The fruit, which is a pome, is borne in racemes in the same manner as the loquat. It is about the size of a goose's egg, of a reddish yellow colour, of a grateful subacid flavor, and much esteemed in the West Indies.

It is propagated by seeds, layers, and cuttings; and would be likely to prove a valuable addition to the Fruit Garden in tropical Queensland.

THE ALLIGATOR OR AVOCADO PEAR—(Persea Gratissima).

This tree grows to a large size. It is a native of the West Indies; and the opinions of travellers as to the value of its fruit are very conflicting. It appears, however, to be highly appreciated by the residents in India, who eat it with the addition of wine, lime juice, &c. The foliage is a beautiful deep green, and the fruit the size of a large pear. It is propagated by seeds. It has proved hardy in Brisbane, a tree in the Botanic Gardens bearing well.

THE ALMOND.

The Almond is indigenous to Barbary, China, and many other eastern countries within the latitude of 20° to 30°.

Varieties: Soft Shell or *Sultane*, and the *Jordan* are the sorts most cultivated. Another sort, however, appears to deserve special attention in Queensland. It is named "pistache," after the pistache nut, which it resembles in shape and size. The fruit is smaller than the Sultana, being about $1\frac{1}{4}$ inches long. The shell is tender, but not so easily broken between the fingers as the tender-shelled. The kernel is sweet and well flavored. It is highly esteemed in Provence and the southern departments of France, where alone it attains perfection. The climate of Paris is insufficient to bring it to full maturity; and, as it requires a very warm climate, it is well worth trying in some of the northern coast districts of this colony, which have proved too hot for the ordinary sorts.

The oil obtained from the almond is of considerable use in the arts, and our fair readers are acquainted with it under various names. Macassar oil is merely oil of almond colored red with alkanet root; and the no less celebrated Russian oil is the same, rendered milky by a small quantity of ammonia or potash, and scented with oil of roses. Rowland's Lotion, Milk of Roses, Caledonian Cream, Kalydor, &c., are nothing but a solution of oxymuriate of mercury in almond emulsion, with a proportion of sugar of lead or white oxide of bismuth.

Planting, &c.: When convenient, it is better to transplant early in the season—April, or early in May; and, under ordinary circumstances, some young roots will be formed in their new position, which will enable the plant the better to withstand the effects of the dry hot spring weather so general in Brisbane. If the trees have to go any distance they should not be shifted until the fall of the leaf—May, June, or July. The pruning of standard almond trees will be the same as the peach, which it greatly resembles in its growth. The long straggling branches should be shortened,

crowded or cross branches removed, and the tree kept open in the form of a cup. Plant twenty feet apart.

The fruit should be allowed to remain on the tree until the rind becomes quite brown and the kernel firm and solid, when it may be gathered, divested of its outer coat, and then gradually dried until the shell becomes sufficiently hard.

THE ANCHOVY PEAR—(Grias Cauliflora).

The anchovy pear is a native of Jamaica, growing in swampy places or shallow water, and attains the height of fifty feet. The leaves are oblong, and of two to three feet in length. The fruit is pickled and eaten like the mango, which it is said to resemble in flavor. It is propagated freely from the stones, and also from ripe cuttings.

THE APPLE.

The Apple is unquestionably the most valuable of European fruits, and may be cultivated with perfect success in the colder and more elevated parts of Queensland. It has been found that many sorts well repay cultivation in the Brisbane district; and others have been introduced which thrive in the Southern States of America and the south of Italy, and are now under experiment, with every prospect of success. Few fruits are easier of cultivation, and there are hundreds of acres in the positions indicated which might be planted with advantage, and from which the fruit might be forwarded by railway to supply the enormous demands of Ipswich and Brisbane, and thence by sea to the more tropical parts of Queensland.

The cultivation of the apple is as yet so limited that there scarcely exists sufficient data upon which to base any selection of sorts to be recommended for

planting; but a small and select list of sorts is appended, which, to the knowledge of the Author, have been proved suitable to the climate of Brisbane, and a few others of established reputation have been added for general cultivation. There are now, probably, over 2,000 varieties of the Apple, but it is not desirable to grow many sorts in a plantation; but rather select with great care a few which are known to thrive in a similar soil and climate; each sort having some marked difference in season of ripening, or of quality, to recommend it. The catalogues of local nurserymen afford ample scope for selection, and those should be preferred which resist American blight.

Select List of Apples.

Those marked thus * have been found productive in the Brisbane district, and might be tried with advantage at Maryborough and Rockhampton. All the varieties are suitable for cultivation at Drayton, Toowoomba, Warwick, and other temperate districts of the Colony.

**Blenheim Pippin:* Syn., Blenheim Orange, Woodstock Pippin. Size large, form roundish, color yellowish, stained with red on the sunny side; stalk medium length; eye open and very hollow; flesh yellow; flavor extremely pleasant; habit healthy and vigorous; and hence does not produce fruit while young, but is afterwards a great bearer; merits—one of the best of our large table fruit.

**Cox's Pomona:* Size above medium; skin yellow, streaked with crimson; flesh white, tender, and pleasantly acid. A first-rate and very handsome culinary apple. Tree hardy.

**Carolina Red June:* Size below medium; skin smooth, deep red to purple, covered with a light bloom; flesh very white, tender, juicy, with a brisk sub-acid flavor.

Cullasaga : Size, medium or large; skin, yellowish, striped with dark crimson; flesh, yellowish, tender, juicy, mild, rich saccharine flavor.

**French Russet:* Size, above medium; flattish; color, greenish yellow, with russet marks, and deep red next the sun; flesh, pale yellow; flavor, aromatic, pleasant, and acid; merit—a dessert fruit of the first class.

**Gladney's Red :* Size, below medium; skin, smooth, deep red; flesh, white, tender, pleasant sub-acid; tree, prolific, producing the fruit in bunches.

**Golden Russet :* Size, small; bearing in clusters; firm, juicy, sub-acid; tree, slender; prolific.

Gravenstein : Size, large; form, roundish; color, yellowish green, streaked with red; firm, crisp, and juicy; healthy, spreading tree, and good bearer.

Hawthornden : Size, large; color, pale green; firm, juicy, sub-acid; great bearer; trees soon come into bearing.

**Hockings' Greening :* Size, above medium; color, green, sometimes slightly tinged with red; flesh, white and firm; juicy, sub-acid; merit—a first-class kitchen apple; good bearer; resists American blight.

**Hockings' Canvade :* Size, medium, round; skin, deep crimson; flesh, yellowish, crisp, juicy, perfumed, and pleasant sub-acid; one of the very best table apples. The tree is most prolific.

**Irish Peach :* Size, medium; skin, smooth, yellowish green, dotted with brown, dull red next the sun; flesh, white, tender, pleasant flavored. Tree healthy and productive; resists American blight.

**Juneating :* Syn., early red Margaret; size, below medium, conical; greenish yellow, striped with red; flavor rich; flesh tender; good bearer.

Mobbs' Royal : Size, large, roundish, and flattened; skin, yellowish, striped with red; flesh, tender and agreeable; tree healthy and productive. The tenderness of the texture of the fruit exposes it sometimes to the ravages of insects.

**Triomphe de Luxemburgh:* Size, large, roundish, and flattened; skin, greenish yellow, bright red next the sun; flesh, white, crisp, juicy, sub-acid; tree, hardy and vigorous; bears well.

Winter Pearmain: Size, medium; form, same as other pearmains; color, green, slightly red next the sun; stalk, short and slender; eye, small; flesh, pale green; habit, moderately robust; good bearer. An excellent winter dessert fruit.

Propagation of the Apple.

The apple may be propagated by seeds, layers, cuttings, budding, grafting, or suckers.

Seeds: Propagation by seed is only resorted to for raising stocks upon which to graft known and approved kinds; or with a view to originate a new sort possessing some desirable quality which does not exist in any cultivated variety. As the latter is the more important object, it demands a few words. The greater part of Queensland being physically unsuited to the growth of this fruit, there is ample scope for efforts at acclimatisation. There are wanted a few first-class varieties of apples which will produce good crops in this climate; and, from the results already gained by the Author, it is quite clear that this may be accomplished. The great danger in raising trees from seed is that the gardens may get crowded with worthless sorts; as it is possible to raise a thousand seedlings and have only one or two worth preserving. All others should be eradicated. The most certain and scientific mode of raising new varieties has been described in the article on "Hybridization of Plants," to which the reader is referred.

As, however, there are so few sorts of apples which will bear in the tropical parts of Queensland, it would be desirable to extend the experiment by sowing seed from the finest selected fruit of the most esteemed sorts which thrive in the neighboring colonies. As an

inducement to patient perseverance, it should be remembered that if the cultivator only obtains one really valuable apple, adapted to the wants of the country, it can be increased to thousands of trees of the identical kind by budding and grafting; that it may thus exist to the end of time, extending the means of enjoyment to many generations, and probably form the basis of future experiments.

The seeds should be sown as soon after they are ripe as possible; the soil should be rich and light, and the situation damp, but well drained. Care is necessary to protect them from mice and slugs. In the following autumn they will be fit to plant out to stand for fruit: and for this purpose may be planted in similar soil, in rows eight feet apart each way. Williams, a successful cultivator of the apple, says he has found that such seedling apples as were allowed to retain their lateral or side shoots from the ground upwards, but so disposed that the foliage of the upper shoots may shade those under them as little as possible, came into bearing in one half the usual time required by those which were pruned to a naked stem.

Soil and Situation: The chief thing to avoid is a wet bottom. The apple will adapt itself to a variety of soils and situations, but there should be no water standing in the soil. A good loam two feet deep on a rocky, gravelly, sandy, or chalk bottom, in an open situation, would afford every prospect of success.

Planting: The season for planting extends from the beginning of May to the end of August; early planting to be preferred where practicable, and it should be done in calm, damp, but not rainy weather. Nothing can be more injurious to a tree than to have its roots exposed in dry, windy weather.

Deep planting is an evil much to be guarded against. A good criterion is, to observe the depth the tree had previously stood in the nursery; be careful that this mark is at least three inches above the general surface

of the soil when it is planted, and let the earth be heaped up to that height around it for a couple of feet or so, in the form of a little hillock. Trees of a larger size may be rather more elevated. This applies to soils of the ordinary description; but in damp soils the elevation should be still greater. In planting, the roots should be laid as flat as possible, radiating in all directions from the stem. If any leaf mould or superior earth is available, it may be put in between and among the roots, beyond their circuit, and just above them, but not below. When it is proposed to add manure, it should be thoroughly decomposed by keeping twelve months previously; it may then be mixed with an equal quantity of surface soil, and applied in the same manner, not under the roots. The distance for standard trees will be twenty to forty feet apart each way; but dwarf standards may be much closer, according to the system of pruning pursued.

Pruning: As the methods of pruning and training fruit trees are very numerous, it will not be possible to enter upon the subject in a mere handbook, but a few leading directions will be given. The trees should have a clear straight stem for three feet from the ground; a well balanced head should be trained from this, consisting of four or five equal shoots in the form of a cup. At the winter pruning, these may be shortened back two-thirds of their length, and two young shoots allowed to grow from each, which may, in their turn, be cut back in the same manner. The pruning for the following two seasons may be confined chiefly to summer pruning, and will consist of pinching back the young lateral shoots as they appear, at half-an-inch to one inch long. This operation will have to be repeated three or four times during the summer, according to the vigor of the trees; and the only pruning necessary afterwards will consist of the winter examination for the removal of cross branches, the shortening of long straggling leaders, and keeping the centre of the tree open.

Diseases: Plant healthy trees in well-prepared, well-drained land, and they will not be troubled much with disease. If a tree gets wounded, or a large limb has to be cut off, trim the wood and bark smooth, and cover the part with a mixture of Stockholm tar and grease.

When the American blight appears on apple trees it should be immediately exterminated, as it is most destructive if allowed to spread, which it will do very rapidly if its progress is not arrested. The blight is caused by an insect which pierces the bark of the tree, sucking the juice and causing wounds which ulcerate and corrode through all the sap-vessels, destroying the branch attacked. The presence of the insect is indicated by a quantity of cottony matter attached to the branches, which, on being touched, communicates to the finger a disgusting, chocolate-colored stain. The most diseased of the small branches should be neatly pruned off and burned. The older portions of the tree should have the blight scraped off with a piece of iron hoop, the earth being removed about the trunk of the tree, and all suckers carefully cut away close to their origin. The whole tree, especially the diseased parts, should then be scrubbed with a dandy brush, soaked in warm brine, having some potash or soda dissolved in it, taking care that all the crevices of the bark are thoroughly explored by the hairs of the brush. Some use warm lye, turpentine, ammoniacal liquor from the gas-works, and kerosine. The roots exposed to view, if diseased, should be treated in a similar manner. The ground all round the tree, as far as the roots are considered to extend, should be soaked with strong drainings from a dung heap, to poison whatever insect life had escaped the brine, and to stimulate the roots of the tree to new and healthy growth. If the tree is old and the soil exhausted, the latter should be renewed, being replaced with charred rubbish, old turf, the clearings of a muck pit, &c. It has been recommended

that the prunings of grape vines be turned in at the roots of apple trees, as a cure for the American blight. The effect is doubtless produced by the potash contained in the cuttings. The chloride of lime wash, recommended for the scale on orange trees at the end of that chapter, is also an effective cure for the American blight and mildew. Salt applied to the soil is a preventative of disease.

Thinning : When trees have a large crop of fruit set, thin out a large proportion, while very small, or there will be no fruit the following season.

Manures : Lime and ashes are good special manures for the apple, to the extent of half-a-peck each, applied annually to each tree. The ashes should be applied when fresh burned, or the potash will be lost, which constitutes their chief value for this purpose.

THE APRICOT.

THE native country of the apricot is not known, but it thrives in the south of Europe, in Egypt, Arabia, Japan, and China.

As far as our present experience extends, the apricot grows to perfection on the elevated Downs and colder parts of the colony; but we have no sorts adapted for cultivation in tropical Queensland. Efforts should be made to introduce suitable varieties of this delicious fruit from Italy, Egypt, and Japan.

Varieties.—The *Moorpark* is considered the best for general purposes, and the *Mignion* and *Pennant Hills Oval* will probably bear in favorable positions in the vicinity of Brisbane.

1. *Hemskirk*—Size, medium, nearly round; flesh, firm, clear deep orange; flavor, rich and delicate; stone, small; kernel, nearly sweet; habit, early and hardy; excellent bearer.

2. *Kiasha*—Size, medium; round; flesh, tender; sweet, and juicy; kernel, sweet; earlier than the Turkey.

3. *Lady Margaret*—Size, medium; round; flesh, firm; much resembles the Moorpark, of which it is probably a seedling.

4. *Mignion*—Size, small; form, round; flesh, firm; color, dull yellow, with brownish red spots next the sun; appears hardy, and indicates fruitfulness. Deserves a trial in Brisbane gardens.

5. *Moorpark*—Size, large; form, round; flesh, deep orange, separating freely from the stone; habit, strong and healthy in suitable positions; flavor, excellent: ripens late.

6. *Orange (Royal)*—Size, rather above medium; form, nearly round; color, deep orange, tinged with red, except where shaded; flesh, deep orange, firm, adhering to the stone; flavor excellent; stone small, smooth, thick in the middle; kernel sweet; habit healthy; good bearer.

7. *Pale Superb*—Supposed to be a Camden seedling. It is much esteemed in the southern colonies for the size, beauty, and delicate flavor of its fruit.

8. *Pennant Hills Oval*—A seedling apricot, raised near Parramatta, New South Wales; is hardy, fine flavored, and a good bearer.

9. *Turkey*—Size, medium; form, nearly round; color, deep yellow, with many brownish spots next the sun; flesh firm, pale yellow; flavor agreeable; stone separating freely from the flesh; kernel sweet; ripens earlier than the Moorpark, but so gradually that it remains longer in perfection than any other apricot; habit healthy; leaves large.

The *Mush Mush (Italian) Peach, Shipley's, River's Large Red, Oulins*, and other valuable sorts recently introduced, can now be obtained.

Propagation : The apricot is propagated by seed for obtaining new varieties, and by budding and grafting to multiply approved kinds. (See Peach.)

Planting : The directions for planting are the same as already given for the apple, except that these may be planted closer—say sixteen feet to twenty feet apart. The soil should be rammed firm about the roots.

Soil : A good sound loam, with a fair proportion of vegetable mould, resting on a well-drained sandy or chalky subsoil, would be suitable, especially if rich in lime.

Pruning : If properly managed, the summer pruning would embrace nearly all that was requisite. This operation consists of rubbing off misplaced shoots, and stopping the lateral branches while tender. It should not be commenced until the tree is well out in leaf, and the first pruning should be light. Winter pruning should be avoided as much as possible, as the apricot does not readily heal or cover wounds, and the removal of large limbs frequently causes canker.

Thinning the Fruit : Where the fruit sets well the crop should be gone over carefully and all superfluous fruit removed. It should not be nearer in any part of the tree than five inches asunder. A little care in thinning will be beneficial in two ways: large and better fruit will be produced, and the tree will not be exhausted.

THE BANANA—(Musa Sapientum).

The banana is one of the most wholesome and nourishing of fruits, and forms an important article of diet among the inhabitants of the numerous islands of the Pacific Ocean.

It is not estimated in Queensland at its true value, where it is only used in its raw state. It may also be used in fritters, pies, preserves, or dried as figs; and a

good wine is said to be made from it. The plant being hardy, its cultivation is much neglected; and, after planting it in the roughest and most careless manner, it seldom receives much attention beyond gathering the fruit. It is a common practice, also, to cut the fruit before it is mature, and it, consequently, seldom has its proper flavor. The common banana (*Musa Maculata*), when fully ripened on the tree, is so superior in flavor to those ordinarily sent to market (which are cut green and ripened in town), that a stranger tasting them would scarcely credit that they were the same variety.

Propagation: The banana is increased from suckers which spring up around the old root. These are planted at about ten feet apart each way. Where space is an object, some crop might be grown between them the first season, which would also pay for keeping them clean until they began to bear.

Soil: A rich, unctuous, fibry loam, inclined to sand, will grow the banana to perfection, provided it is deep, thoroughly trenched, and well drained. A *damp* soil is not objectionable, but it should *on no account be wet.* To determine if the soil is wet, and requires draining, let holes be dug three feet deep in the lowest parts of the ground, after a week's continuous rain; examine the holes the next day, and the ground may be considered more or less wet in proportion to the depth of water found in them. If they are free of water, the soil does not require drainage; but if the water is within two feet of the surface, it should be drained before any further cultivation is attempted. The soil for bananas can scarcely be made too rich; they should have a good top dressing of manure, and the surface be well forked over at least once a year; when the fruit is gathered, the old stems should be cut to the ground, and chopped up with the hoe into short lengths, and laid around the clump to rot down.

The purple variety differs from all others at present

in cultivation, as it does not succeed well on rich flats, but thrives admirably upon hill tops where the soil is good.

THE BARBERRY—(Berberis Vulgaris).

The barberry is a native of Europe, and only fit for cultivation in the coldest parts of this Colony.

It is propagated by layers and suckers; prefers a chalky or light dry soil, and requires little pruning. The plants should be eight feet apart. All suckers should be eradicated, and the head kept open. The fruit, when ripe, is gathered in bunches.

THE BENGAL QUINCE—(Œgle Marmelos).

The Bengal quince is a native of the East Indies, growing in the form of a shrub, eight feet high. It is allied to the citron. The fruit is represented as delicious, as possessing valuable medicinal qualities, and it makes an excellent preserve. It was introduced by the Author from Calcutta, but has not yet fruited in Brisbane.

It appears to require the same care and cultivation as the orange.

In a paper written by Dr. Bennett, of Sydney, the following particulars are given:—

"The tree producing the bael or bela fruit, valuable for its medicinal qualities, is the *Cratœva Marmelos* of Linnæus, and the *Œgle Marmelos* of Correa. It grows plentifully in various parts of India, more particularly about the Malabar and Coromandel districts; it is also abundant in Ceylon, where it is known as the 'Wood Apple,' and named Beli Gaha (gaha, signifying tree) by the Cingalese. A few words may be said on

the generic name *Ægle* (a new genus formed from *Cratœva* by Correa), which classical appellation was given to this tree by Correa, after one of the Hesperides; but now, from the well-known medicinal properties contained in nearly every part of the tree, it may be more appropriate to regard the name *Ægle* (signifying brightness or splendour) to have been given after one of the daughters of Œsculapius. The tree belongs to the natural family *Aurantiaceæ*. The fruit is about the size of an orange, generally round in form; the rind is of a yellowish brown color, with a shade of dark green; it is hard, and, when broken, the pulp is found surrounding the seeds, of a dark amber, varying to cherry red color; very mucilaginous, and of an agreeable aromatic odor. One which I recently received, and was in a very fresh state, weighed a quarter of a pound. The bark of the root, the bark of the stem, the leaves, flowers, and fruit, are all used for medicinal purposes in India; but the fruit is held most in estimation. It is only in the third edition of "Royle's Materia Medica," published in 1856, that a very short notice of the bael fruit was given; but recently more attention has been bestowed upon it, and it has now obtained a place in the new British Pharmacopœia of 1864, in which the fruit is described thus: 'Roundish, about the size of a large orange, with a hard woody rind; usually imported in dried slices, or in fragments consisting of portions of the rind and adherent dried pulp and seeds; rind about a line and a half thick, covered with a smooth pale brown or greyish epidermis, and internally, as well as the dried pulp, brownish orange, or cherry red. The moistened pulp is mucilaginous.' The preparation ordered in the Pharmacopœia is the liquid extract. The preparations of the bael fruit to be found in the shops of the apothecaries in Sydney are the liquid extract, the confection, and the extract; but I have been informed that the high price of the preparations of

this drug imported from England has very materially limited the demand. This circumstance renders it still more desirable that every endeavour should be made to naturalize the tree in the warm districts of Australia; and, in the meantime, the fruit could be readily imported in a very fresh state from Ceylon (where the price for them is from three to five shillings the hundred), and the different preparations made in the colony at a much cheaper rate than those imported from Europe. The Dutch and Portuguese residents in Ceylon distil a fragrant cosmetic from the rind and blossom, called by them 'Marmell Water.' Although the properties of the fruit have been mentioned by some author as astringent, it is really mildly aperient, and acts by removing the irritation of the mucous membrane of the stomach and bowels in diarrhœa and dysentery, and also obviates costiveness arising from debility. It has been regarded by some Italian practitioners as a valuable remedy in the scorbutic form of dysentery, and to succeed when all other remedies have failed. When the fresh and ripe fruit is used in Ceylon, it is at first slightly boiled, after which the rind is easily broken, and the pulp is eaten with a spoon. In a case of great irritation of the bowels, one was taken in that way every morning, and in about an hour relief was experienced, the disease diminishing daily, until the patient was quite recovered; at the same time a farinaceous diet was observed, at first without stimulants, and afterwards animal food without vegetables. It appears to act by removing the distressing straining, operating more gently even than olive oil. The fruit is also named, in some parts of India, 'Bengal Quince.' In Calcutta the pulp of the fruit is mixed with water, and drank in that form, and some persons use the dried fruit grated, or in decoction, when the recent fruit cannot be obtained. The fruit also makes an excellent jelly, which has been found very serviceable to obviate costiveness."

THE BRAZILIAN CHERRY—(Eugenia Unifolia).

This hardy evergreen shrub is deserving of cultivation, if only for ornament. Its deep green, shining leaves and compact habit, the young tender reddish brown shoots, and the profusion of white blossoms and bright red fruit, render it at all seasons a desirable plant for the shrubbery. The fruit has a resinous flavor when unripe, but afterwards acquires a sharp but pleasant acid, and is very juicy. It will probably be found valuable for preserving with other fruits.

Propagation: It may be propagated freely from seed.

Planting, Soil, &c.: It may be planted during May, June, July, and August, at eight feet from plant to plant, and will thrive in any good garden soil.

THE BRAZIL NUT—(Bertholletia Excelsa).

The Brazil nut of commerce is well known; but we have little information about the tree further than that it is a handsome evergreen, attaining one hundred feet in height, and requires a temperature similar to Brisbane.

THE BREAD FRUIT—(Artocarpus Incisa).

The bread fruit tree is a native of the South Sea Islands, and grows about forty feet high. The leaves are about two feet long, and the fruit (which might with more propriety be called a vegetable) is about the size of a small water melon. The surface is uneven, like the netted rock melon; the skin thin. It has a core running through the centre like a pine-apple. It is roasted before it is eaten; and, for convenience of

cooking, on account of its size, it is generally cut in half, or quartered. In color it is pure white, ranging to straw color, and in flavor and consistence it is midway between good new wheaten bread and sweet potato. When taken warm out of the native oven it is an extremely palatable food, and its wholesomeness is sufficiently attested by its general use. It grows freely from the root, and is propagated by suckers, of which abundance may be obtained around the old trees. It is well worthy of introduction, and is likely to thrive in the tropical districts of the colony, if planted in rich soil and warm aspect.

THE CAPE GOOSEBERRY—
(Physalis Peruviana—Alkekengi).

The plant is found growing wild in the scrubs in the vicinity of Brisbane, and many other parts of the colony. It is a rambling herbaceous plant, producing a profusion of fruit, which forms an excellent substitute for the gooseberry. In flavor it is agreeable, making a good pie fruit; a very fine jelly is also prepared from it.

The cultivation of this plant is identical with that of the tomato, which it much resembles in habit.

THE CHERRY.

The Cherry is not likely to prove of much value for cultivation in Queensland; but in those districts where it will mature its fruit, it will be a very welcome addition to the garden, in consequence of its ripening so early in the season. There are some good sorts, natives of the south of Italy, and, if they could be obtained from there direct, or from the Southern States of America, they might be found adapted to the climate of Brisbane.

Varieties.—The *Duke* and *Morello* cherries are said to be more hardy than the *Hearts* and *Biggareaus*, and some of the white varieties less subject to the depredations of birds than the red and black sorts.

Propagation by seeds: The cherry may be grown from seed when it is desired to raise new varieties; but, to effect this with any degree of certainty, artificial fecundation must take place. The late Mr. Knight was in this manner the originator of the following: *Knight's Early Black* (a hybrid between the Biggareau and May Duke), *Black Eagle*, *Downton*, *Elton*, *Waterloo*, *&c.*, *&c.* "The cherry," Mr. Knight observes, "sports more extensively into varieties, when propagated from seeds, than any other fruit, and is, therefore, probably capable of acquiring a higher state of perfection than it has ever yet attained. New varieties are also much wanted."

Soil and situation: The soil can scarcely be too dry—in fact there are few soils sufficiently dry for this fruit. A good sandy loam on a dry, well drained subsoil, in an open, elevated position, free from fogs, will be found the most suitable. The fine Kentish cherry orchards are usually in a fine deep loam, incumbent on rock.

Planting, pruning, &c.: The trees may be planted at twenty feet apart. The formation of the heads of young trees should be well attended to, and the pruning afterwards will be confined chiefly to thinning out crossed or crowded branches—severe pruning should be avoided—and all suckers should be carefully removed.

Manure: The application of about eight pounds of salt to each full-grown tree is recommended as a surface dressing in the spring.

THE CHESTNUT.

THE chestnut has never been much in favor as an orchard tree in the colonies, although, from its being a

native of the south of Europe, there appears, as far as climate is concerned, every prospect of its being fruitful. The Author has been informed that a tree at Kangaroo Point bears fruit, and he has received fruit from a garden at Dalby.

Planting: It may be planted on the outskirts of the orchard, in a sandy loam with a dry bottom, at a distance of thirty feet apart—a dry subsoil is indispensable. It should not be planted near a residence, as the smell of the flowers is not agreeable.

Pruning, &c.: The trees are allowed to make bushy heads, the irregular and overcrowded branches only being removed.

THE CITRON—(Citrus Medica.)

The citron is allied to the orange, to the article on which the reader is referred for more extended instruction in its cultivation.

The citron is an evergreen shrub, growing about eight feet high, and producing an abundance of fruit in any of the coast districts of the colony.

It is used in sweetmeats and preserves, and the juice, with sugar and water, makes a wholesome and refreshing beverage. It is also used in perfumery, dyeing, and in medicine.

It requires a free, rich soil, moist, but well drained, and is easily propagated by cuttings, layers, and suckers.

THE COCOA-NUT—(Cocos Nusifera).

The cocoa-nut palm grows by a single stem to the height of fifty feet. It is generally found growing on the sea beach surrounding the islands in the Pacific Ocean, and is converted by the natives to a variety of useful purposes. The green fruit is full of a delicious milk; the nut, when ripe, is used for food and for making oil; the shells make water bottles and drinking vessels; the fibre covering the nut is made into

cordage, matting, &c. ; the leaves of the tree are used for thatching their houses, and for torches when travelling by night, and the timber is valuable for building purposes.

It grows naturally in sandy soil, a few feet above the sea level, and should be planted in a warm spot sheltered from the cold winter winds. Half a bushel of salt should be mixed with the soil in which it is planted, if it is away from the influence of salt water.

At many points along the northern seaboard experimental plantings of the cocoa nut have been made, with most encouraging results; and there are, doubtless, many warm, sheltered spots on the southern coast and about Moreton Bay, where they might be grown with perfect success. It is scarcely possible to conceive a more deliciously refreshing beverage than the so-called milk of the green cocoa nut just plucked from the tree, as often enjoyed by the Author while travelling among the beautiful islands of the Pacific Ocean, in the years 1845–6.

All the products of the tree are so valuable, it bears so abundantly, and is so beautiful, that all who have suitable positions should plant some. The growing nuts are often obtainable in Brisbane at a low price.

Cocoa-nuts are growing wild on the beach at Cardwell, where they appear to have floated from the islands, and been cast on shore by the surf. At the Vale of Herbert there is a splendid clump planted, having every indication of health and vigor. This station is twenty or thirty miles inland ; and the owner has the cocoa nut trees occasionally dressed with salt, to compensate for their absence from the sea shore, where they usually grow. At Mackay, Mr. F. Barnes has made the first large plantation of cocoa nut trees in Queensland, consisting of about eight hundred trees ; and, as they stand at twenty feet apart, they cover an area of seven or eight acres. At the time of writing, the most of these had been planted four years ; some had been

planted five years, many of which were in fruit. The whole of them were in a most flourishing condition. In a garden near Rockhampton some trees are said to be in bearing : and even so far south as Cleveland Point, Moreton Bay, there are some half-a-dozen trees, which appear to be healthy and strong ; and, although their growth is not so luxuriant and rapid as in more tropical climes, they have given very early promise of fruitfulness.

With the view of more thoroughly acclimatising this valuable tree, the fruit ripened at Mackay and Rockhampton should be planted further south ; and the Author would be glad to procure some fruit ripened at Rockhampton for that purpose. The Government also would do well to have a few clumps of them planted in favorable positions on the southern coast islands—such as Frazer's, Stradbroke, and Moreton Islands.

THE CRANBERRY.

The cranberry is found wild in North America, the British Isles, and Madeira.

The American and Madeira varieties are the most approved, and, in a suitable climate and soil, are extremely prolific. The soil should be damp and peaty, rich in vegetable matters, with a slight mixture of sand, and be situated on the margin of a pond or stream of water.

It is easy of propagation ; it strikes readily from layers and cuttings ; the crop seldom fails, and, in favorable circumstances, a few square yards of ground will produce sufficient for a large family.

THE CURRANT.

The currant is a native of the northern parts of Europe, and can, therefore, only be cultivated with success in the coldest districts of this colony.

Propagation : Cuttings should be taken early in the autumn, while the leaves are on. Cut off all the buds except three or four at the top; insert the cuttings about half way in the mould, in rows one foot apart, and train one clear stem a foot high, from which four or five branches may be allowed to radiate at an angle of 40 or 45 degrees. The young wood only is used for this purpose.

Soil and Site : Any good garden soil, well manured, will suit the currant. The black currant prefers a damp, rich loam, rather shaded. They should be from five to ten feet asunder, and have a southern or eastern aspect if possible.

THE CUSTARD APPLE—(Anona Reticulata).

The custard apple and the cherimoya *(Anona Cherimolia)* have long been in our gardens, and have borne fruit for many years. Some other varieties have recently been introduced, and are being tested. The former are evergreen shrubs, growing to the height of about fifteen feet, and producing fruit on the previous year's wood. The fruit is about the size of an apple, and consists of a shell enclosing a soft, rich, agreeable pulp resembling custard, in which the seeds are embedded.

Planting : They may be planted from May to August, at fifteen feet apart, and trees which have been transplanted at the nursery should be procured if possible, as the roots are not naturally fibrous, and there is, consequently, great risk of their failure. Frequent transplanting while young encourages the formation of fibrous roots; and such plants can be removed to a distance with far greater safety than such as have only a long tap root.

Soil : The soil should be friable, rich, and well drained. Lime is said to be a good special manure.

Propagation : They may all be propagated by seeds, layers, cuttings, and grafting. The former is the most general, and the latter is adopted for increasing approved sorts.

THE DATE PALM—(Phœnix Dactylifera).

THE date palm attains the height of forty feet. It is perfectly hardy in the climate of Brisbane, and grows very freely from the seed. It takes ten or twelve years to arrive at maturity, and should be planted in clumps or clusters, to make sure of having among them at least one male plant, to fertilise the fruit blossoms, which would otherwise be unproductive.

In Persia they allot fifty female to two male plants, and, as soon as the pollen is ripe, commence to impregnate with the latter the blossoms of the former: alleging that their proximity is not sufficient to insure the production of fruit.

The first Queensland dates seen by the Author were grown at Gladstone, about the year 1849, and sent to him by Sir Maurice (then Captain) O'Connell. They are now less uncommon ; and, at the time of writing (March, 1875), there is a tree in Edward Street, Brisbane, loaded with a fair crop. It is to be feared, however, that the sure means of acclimatisation have not always been kept in view, and that the seeds so ripened have not been carefully re-sown for further experiment. A superior sort, known as the Tafilat date, imported by Mr. J. Smith Travers, of Hobart Town, was intrusted by him to Mr. Walter Hill for distribution here, in October, 1870, and, no doubt, many plants from that seed are now under experiment. The Author has three in his grounds, which are doing well.

Any good garden soil will suit the date.

THE DATE PLUM—(Diospyros Kaki).

The date plum grows and bears well in the neighborhood of Brisbane. There are several varieties of *Diospyros* producing edible fruit which have not yet been introduced; and the *Diospyros Ebenus* is the ebony of commerce.

The date plum may be propagated by seeds, layers, or cuttings. A rich, damp loam is suitable, and the plants (which grow about fifteen feet high) may be placed at eighteen feet apart. The only pruning necessary is, to clear the suckers and undergrowth, and to keep the centre of the tree open.

The tree is deciduous. Transplant from May to August.

THE DURION—(Durio Zibethinus).

The durion is a native of the East Indies, and grows to the height of sixty feet. The fruit is produced in bunches, and when ripe has a most powerful and unpleasant odour, somewhat resembling rotten onions, which offensive smell infects the breath of the person eating it. The fruit is very large, sometimes being the size of a man's head; the edible part is of a creamy substance, and of so delicate a flavor that it is stated to be "one of the most delicious productions of nature;" and that "when a person has once accustomed himself to eat the fruit, he generally considers it the most excellent of all."

THE FIG—(Ficus Carica).

The fig is one of the oldest known fruits; and in many parts of the old world has, from the earliest ages, been used as a highly valued article of food. The

foliage is said to exercise a very calming and soothing influence on the mind; and some authors, while urging that every man should "sit under his own fig tree," particularly recommend that those who have unruly tongues, or hasty tempers, should have a fig tree under which they could sit for a quarter of an hour when they feel an unkindly impulse.

Varieties: The sorts found most suitable to the climate of Brisbane are the *Turkey*, *Smyrna*, *Giant*, and *Province*.

Propagation: All the sorts may be propagated freely by cuttings, layers, and suckers; they may also be grown from seed.

Planting, soil, &c.: The *Giant* fig requires twenty-five feet, but the other sorts may be planted at fifteen feet apart. The soil should be rich, dry, and warm. In a wet soil the growth will be too luxuriant, and not fruitful; and in a poor sand the fruit is liable to crack and be shed before it is mature. In Smyrna, where the fig is grown to great perfection and dried for exportation, great care is taken to keep the ground well worked around the roots.

Pruning, &c.: After the formation of a good open head, very little pruning will be required. There are generally two crops in the season: one crop coming out with the first leaves in spring, and the second crop showing at every joint of the new shoots.

The fruit is rich and saccharine when gathered ripe from the tree, and the latter quality is much developed in the process of drying. This operation is effected by exposing the fruit for a certain time to a current of hot air, by which it is thoroughly heated through, and the vegetable principle destroyed. Before the fruit is cold it is pressed down tight into drums, and the juice is forced to the surface of the skin, where it candies into a sugary dust.

THE FILBERT—(Corylus Avellana).

The filbert grows in the form of a shrub or small tree to the height of ten feet, but under a thorough system of cultivation seldom exceeds six feet. In Kent, England, where it grows more extensively than in any other part, the average yield of nuts is about five bushels per acre, the crop generally failing three seasons out of five. The male and female blossoms are formed separate on the same plant; the male is the well-known catkin, and the female resembles a small brush, of a pinkish or pale red color. In many cases the trees are unfruitful in consequence of there being an insufficiency of catkins to fertilize the fruitbearing blossoms.

Propagation: The filbert may be propagated by seeds, cuttings, layers, and suckers; the two latter modes being the most in use.

Planting, soil, &c.: They may be planted in winter at ten feet apart, or in alternate rows with larger growing trees, allowing sufficient additional space. They will thrive in any good garden soil naturally rather damp, but well drained. The aspect should be cool (southerly); and they are only likely to succeed in the coldest parts of the colony.

Training, pruning, &c.: The plants should be allowed to grow to a single stem, unchecked, for the first season; and in winter, if they are strong, cut back to one foot from the ground. In the spring, see that about eight shoots are provided, which train into an open head the shape of a cup, carefully removing all suckers and other shoots below those forming the head. If the plant is not strong enough to furnish a good head the second year, the shoots must be cut back the following winter to two buds from their origin, taking care to cut back to an *outside* bud, to keep the head open; and from the shoots thence

springing select sufficient to form the plant as directed. If it does not take the required form, it may be necessary to fix a small hoop in it, tying the branches round the edge until fixed. The after cultivation consists of shortening back the strong leading shoots, at the winter pruning, about one-third or half, according to their strength; removing all cross or overcrowded shoots; pruning most of the lateral or side branches (especially in the centre of the tree) back to two or three buds, to force out fruit-bearing spurs at intervals all up the leading branches; and keeping down all suckers.

THE FLACOURTIA—(Flacourtia Cataphracta).

The flacourtia is a small evergreen tree, growing to the height of ten feet. It is a native of the East Indies, and perfectly hardy in Brisbane, where it produces its fruit (a small dark purple berry) in great profusion.

Being covered with a vast number of long thorns it is well calculated for a hedge plant, as it would, if properly trained while young, resist with equal success the attacks of both men and cattle. In its unripe state the fruit is astringent, and in taste somewhat resembles the wild sloe, but as it gets ripe it becomes a little mealy and of a very agreeable flavor. It ripens during April and May.

Propagation, &c.: It may be propagated by seeds, layers, and cuttings, the former being the most ready method. It may be planted in any average good soil, at ten feet intervals, and with very little trouble will form a handsome shrub; the foliage being a dark green, and the young shoots a reddish brown, the effect is very good.

There are other varieties which are said to produce larger fruit, but they are not sufficiently known to warrant an opinion as to their quality and productiveness.

THE GOOSEBERRY—(Ribes Grossularia).

The gooseberry is a native of the northern parts of Europe, and, therefore, unfit for cultivation in any but the coldest districts of this colony, and there only in carefully selected positions.

All the sorts may be propagated by cuttings, layers, and seed.

Soil: A deep sandy loam is preferable, but they will do in any ordinary soil with manure. The situation should be unshaded by trees, and drained of all stagnant water. They should be irrigated with liquid manure in the growing season. A good top-dressing of manure should be forked in round the bushes annually, but not nearer to the stem than the circuit of the branches.

Winter Pruning consists in removing suckers, and all over luxuriant growth; and crowded and very weak shoots should at least be shortened, so as to leave the bush the shape of a basin for the first few years, to admit the sun and air to ripen the fruit inside. The wood left to form the plant should be strong, but not over luxuriant, and well ripened; and no two branches should be allowed to touch. Plant in rows, eight feet asunder, and six feet apart in the line.

THE GRANADILLA—(Passiflora Quadrangularis).

This variety of the passion fruit has a square stem, as the name indicates. The fruit is the largest of the family, being the size of the rock melon. The skin is soft and very thick, totally different from the common passion fruit *(passiflora edulis)*, or a yellow sort *(passiflora ligularis)*, which is sometimes erroneously called the granadilla.

The true granadilla is prolific and hardy. The fruit agreeable in flavor, and sufficiently distinct to make it worth growing as a variety. In habit it is less robust than *passiflora edulis;* it makes its growth chiefly in autumn, and the fruit ripens in winter and early spring. The blossoms are very large and handsome, and appear during March and April.

A rich peaty soil, moist but *not wet*, would be the most suitable. Any ordinary open soil with manure would, however, grow it to perfection.

It may be propagated by seeds, layers, and cuttings.

If planted to run on an espalier, the roots should be ten to fifteen feet apart, and the branches carefully secured to the rails by woollen bands, to support the heavy fruit.

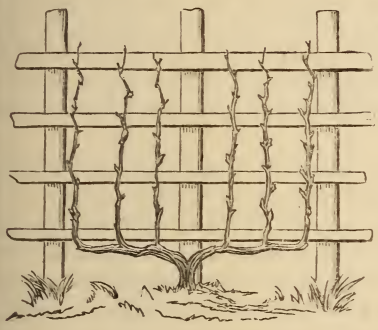
The *passiflora decasneana* (or small granadilla) is similar in foliage, but much more robust in habit. It seldom bears fruit unless the blossoms are artificially fertilised, when the produce is very great. The fruit is about two-thirds the size of the granadilla, the flavor very agreeable, and the plant being large and handsome, it would be useful for covering rough fences and other unsightly objects.

A gigantic variety, bearing fruit six pounds in weight, may now be seen at the Brisbane Botanic Garden. As Mr. Hill speaks well of its productiveness, and the quality of the fruit, it is likely to prove a desirable acquisition.

THE GRAPE VINE—(Vitis Vinifera).

The grape vine is subjected to a larger amount of mismanagement than any other fruit-bearing plant. Every grower has some theory of his own; and it is probable that a colonial vineyard left in succession to six different professed vine-growers, would be mismanaged by five out of the number. As this little

book is not intended for the instruction of those who already know how to cultivate the grape, it is not proposed to discuss the relative value of the different acknowledged systems of training; and the limited space will prevent their being even described; but the principle upon which the operations should be conducted, and the simplest method of accomplishing the desired object (*i.e.* moderate successive crops of good grapes), will alone be sought to be elucidated in the few brief directions here given.



Varieties: Out of upwards of ninety sorts grown by the Author, the *Black Hamburg* is decidedly the best black grape for Brisbane, and the *Sweet Water* the best white. Six or eight good sorts, ripening in succession, will generally be found sufficient for all the purposes of a private garden, and a few of the most hardy and prolific are here described, for general planting. It has not been thought desirable to mention wine grapes, as varieties which produce excellent wine, grown in certain soils and positions, will not show similar results under other circumstances; and persons about to plant vineyards for wine-making, will do well to test several sorts of grapes before they determine of which their plantation is chiefly to consist.

1. *Black Cluster (Pineau Noir)*—Bunches, small, shouldered; berries, small, round, and very compact on the bunch, so that they do not all get thoroughly colored; flavor, good when quite ripe; an abundant bearer, but of little value as a table fruit on account of the insig-

nificant size of the berries. It is valuable as a wine grape.

2. *Black Hamburg (Red Hamburg, Black Lisbon, &c.)*—Bunches, large and long; berries, round and large; color, rich dark purple; flesh, rather firm, rich, sugary, and delicious; habit, robust and prolific under favorable conditions. The best black grape for the Brisbane district, and probably the most useful grape in cultivation. Experiments have proved it to be a good stock upon which to graft the more tender muscats.

3. *Black Prince.*—Bunches, large and long; berries, very large, oval, and mostly set loose; color, dark purple, with fine bloom next the sun—greenish purple where shaded; skin, thin, and in wet weather very liable to decay; habit, moderate free grower; crop, rather uncertain, and in some seasons liable to blight; flavor, only medium; but in appearance the most handsome of all grapes.

4. *Isabella* (American)—Bunches, medium; berries, above medium and oval; flesh, firm, and adhering to the seed until perfectly ripe, musky, vinous, rich, and sweet; ripens unequally in some positions and seasons, and the ripe berries fall off the bunch; very prolific and hardy; resists the oidium.

5. *Lombardy (Flame-tokay, Wantage)*—Bunches, very large and handsome; berries, large, round to oval; flesh, tender, sweet, pleasant flavor; quality, second-rate; a vigorous grower and abundant bearer.

6. *Parsley-leaf Muscadine (Ciotat)*—Bunches and berries similar to the *White Muscadine;* a good early grape, but in some very hot seasons the fruit suffers from the foliage not affording it sufficient protection.

7. *White Muscadine*—Bunches, shouldered, medium size, and handsome; berries, round, rather large, and loosely set, allowing them to get perfectly ripe; skin, thin, and if exposed to the sun turning a pale yellow;

an excellent, early grape, hardy, prolific, and of a rich, fine flavor. This is commonly sold under the name of sweetwater.

8. *White Sweetwater*—Bunches, medium ; berries, large, round, and grow close on the bunches ; not so transparent as the *Muscadine ;* flesh, firmer ; skin, thin, and when exposed to the sun and fully ripe, pretty thickly dotted with light russet spots ; pulp, very juicy and luscious. This delicious grape is the best white variety for growing near Brisbane in ordinary seasons ; but it is sometimes attacked with blight, and may be considered less hardy than the muscadine.

The *Muscatels*, *Frontignans*, and other choice table grapes are to be found in our gardens, and are adapted for planting in the cooler parts of the colony, but are too tender for general cultivation.

Many indigenous and hybrid American grapes have of late years been introduced by Mr. J. G. Cribb, of Brisbane, among which some will, doubtless, be found which will be valuable acquisitions. Greater vigor of constitution will enable them to withstand the extremes of our climate better than the more tender European sorts ; and their new shades of color, their new flavors, extended season of ripening, great productiveness, and comparative immunity from disease, unite to recommend them for extended cultivation, as soon as they are procurable for general planting.

Among those which have thus far given fair promise, the following may be mentioned :—*Goethe, Maxatawney, Delaware, Iona, Catawba, Anna, Lindly, Salem, Rogers'* 2, *Rogers'* 12, *Allen's, Adirondiac, Wilder, Requa, Israella, and Creveling.*

For the Brisbane district and northern towns it would be desirable to introduce some of the best sorts from Greece, Southern Italy, &c., and more of the American sorts which thrive in the Southern States.

Soil, &c. : The vine will grow most luxuriantly in a deep, well drained, rich, friable mould, but will adapt

itself and thrive moderately well in a greater variety of soils and situations than almost any other fruit tree. In selecting a site for a vineyard, a cool aspect should have the preference in the warmer parts of the colony, and the soil (not too heavy) should either be on a porous subsoil or so situated as to admit of *thorough underground drainage*. Some red loams are excellent for grapes, and a fair proportion of small stones in a soil would be no disadvantage. The plantation or border should be trenched to an uniform depth of two feet six inches, or certainly not less than two feet, and drained at least six inches deeper than it is trenched, if the soil requires draining, which can be ascertained in the manner previously indicated. *Deep cultivation and a porous subsoil, or thorough drainage*, are the indispensable conditions of permanent success in vine-growing.

Some of the early planted vineyards in Melbourne were made in conformity with the recommendations contained in the Government Prize Essay on the subject—the land was only prepared by being ploughed. The folly of such mismanagement soon became manifest by the miserable appearance and decreasing production of such plantations. For the first few years after planting all went well, and there was abundant promise of future returns ; but as soon as the roots reached the undisturbed soil, and the vines had attained an age at which a full crop was to be expected, they began to languish, the produce *decreased*, and it became evident that one acre of vineyard properly trenched and drained was more valuable than ten acres ploughed in.

One-year-old rooted plants should be obtained where practicable ; they should be placed in the soil at the same depth they had previously been in the nursery, and at distances according to the mode of pruning and training intended to be adopted. If for close pruning, and training to single posts, they may be planted four feet by six feet apart, or six feet by eight ; but, if for

training to espaliers, more space must be allowed, according to their height. If planted eight feet by ten, about 430 plants would be required for an acre.

Manure : Lime, ashes, and bone dust are good special manures for the vine, and the plantation should have a top-dressing of salt every spring (before the plants bud out), at the rate of about two cwt. per acre.

If there is any appearance of disease in the fruit, a dressing of flour of sulphur, applied with a common dredging box, in the morning while the dew is on, will often be found efficacious.

Oidium : The foregoing directions, founded upon the practice of the most successful and enlightened vignerons of France, were given in the first edition of the Manual in 1856, before the oidium had made its appearance here. Since that time, much, very much has been written upon the subject, but apparently without adding anything to the above, as sulphur is still the most approved dressing for the oidium. Another favorite application is composed of 40 lbs. of fine ashes of wood (which have not been exposed to rain), 20 lbs. of flowers of sulphur, and 10 lbs. of lime, thoroughly mixed, and either dusted over the vines as previously recommended, or blown over them through the sulphuring bellows.

Chloride of lime, soft soap, and sulphur, prepared as directed for the diseases of the orange, and similarly applied, in the spring, before the fruit has stoned, will also be found effective.

Training, pruning, &c. : All the various systems of training have for their object the production every season of the largest quantity of first-class fruit, on the smallest space, consistent with the continued vigor of the plant. The vine has a tendency to make new growths from the end of the previous year's shoots ; and, if allowed to extend itself unchecked, would only bear at the extremities, leaving the largest part of the vine without foliage or fruit. The skill of the culti-

vator is exhibited in reducing this rambling habit ; and, by high cultivation and judicious pruning, obtaining fruit of improved quality and most abundant in quantity within the radius of a few feet from the stem. To effect this, the greater part of the wood produced each summer is pruned away in the winter, by which *the vine is renewed every year on almost the same spot*, its vigor is maintained unimpaired, and every branch produces fruit. It is impossible to lay down any rule for pruning vines which will suit all alike, as the different sorts vary much in habit, and even individual plants of the same sort will differ in constitutional strength. As among a family of children, some will need encouraging and some repressing : so in the vineyard, the intelligent pruner will learn to distinguish the individual characteristics of his vines, and modify his pruning to suit them. Mr. Hoare, a standard authority on this subject, after trying many experiments, came to the conclusion that the bearing capability of the vine was in proportion to the girth of its stem just above the surface of the ground ; and states that no plant should be allowed to ripen fruit until its stem is three inches in circumference, when it should be limited to five pounds weight (about ten bunches), which may be increased by a further five pounds for each additional half inch, as the stem grows. It is important to remember that the vine should not be allowed to bear until the second or third year after it is planted out ; and that all the bunches which appear before that time should be carefully removed ; for every pound of grapes, produced under such circumstances, will so overtask the plant as to cause the future loss of from twenty to forty pounds of fruit.

The young vines when planted should be cut back, leaving only one bud on small plants, and not more than two on the strong ones. The following season the former may be cut down to two eyes, and may then be treated as recommended by Downing, which mode

of training is figured at the commencement of this article :—

"The two buds left on the set are allowed to form two upright shoots the next summer, which, at the end of the season, are brought down to a horizontal position, and fastened each way to the lower horizontal rail of the trellis, being shortened to three or four feet, or such a distance each way as it is wished to have the plant extend. The next year upright shoots are allowed to grow one foot apart, and these are stopped at the top of the trellis. The third year, the trellis being filled with vines, a set of lateral shoots will be produced from the upright leaders, with from one to three bunches on each. The vine is now perfect, and it is only necessary at the autumnal or winter pruning to cut back the lateral shoots or fruit spurs to within an inch of the uprights, and new laterals, producing fruit, will annually supply their places. If it should be found, after several years' bearing, that the grapes fail in size or flavor, the vines should be cut down to the main horizontal shoots at the bottom of the trellis. New uprights will be produced, which treat as before."

In following the above directions, it must be observed that unless the vines are in full vigor it will be unwise to leave the two long shoots the first season. Unless very strong, they should each be pruned back to two eyes, from which select the following season the strongest shoots to train in as directed. As to the fruit, also, it will be necessary to prevent the vines over bearing the first few seasons, by removing the surplus bunches as they appear.

In all operations connected with the vine, see that the foliage is not injured, and in the summer pruning do not remove a leaf unnecessarily. The summer pruning consists of destroying all suckers, stopping with the thumb and finger the shoots three leaves beyond the last bunch of fruit, to forward the swelling, and removing or stopping all lateral branches.

To prepare currants and raisins, see "Fruit Drying."

THE GUAVA.—(Psidium Cattleyanum).

EVERGREEN shrubs bearing white flowers, and fruit of various sizes, forms, and colors. We have six sorts in our gardens, of which the *Purple* or *Cattley's*, the *Large Yellow* or *Egg*, and the *Green* guava, are the most prolific, and best adapted for general planting. They require a rich soil—moist, but not wet; they may be propagated by seeds, cuttings, and layers, and may be planted at from ten to twenty feet apart, according to the sort. They are used for dessert, and make an exquisite jelly. The large egg guava is considered by some persons to be much improved by baking. Time for transplanting, April to August.

HERBERT VALE CHERRY—(Antidesma Dallachyanum).

THIS is a handsome, umbrageous, evergreen tree, growing to the height of thirty or forty feet, and is found growing in alluvial soil on the banks of the Herbert River, Dalrymple Gap, and other places near Cardwell. The foliage is ovate-oblong, from three to six inches long, and the branches are very brittle. The fruit, which is borne in great profusion, on racemes about four to six inches in length, resembles in its appearance the Biggaru Cherry. It is about one inch in diameter; the skin is white to yellow, tinted and splashed with red; the flesh is juicy, with a sprightly, agreeable, acid flavor, it is reddish in color, and adheres to the stone; the latter is in form a disc, being thickest in the centre, where it is nearly a quarter of an inch thick. Mr. F. M. Bailey, who brought plants from the Herbert River for the Acclimatisation Society,

speaks very highly of the merits of this fruit, and considers it worthy of cultivation wherever the climate may be found suitable: and states that an excellent jelly is made from it. From his description of it, this must be by far the most valuable indigenous fruit yet discovered in Queensland.

THE HOVENIA DULCIS.

A DECIDUOUS tree of slender habit from Japan, growing to the height of twenty feet. It blooms in November, and the fruit is about two inches long, very narrow, twisted, and irregular. The flavor somewhat resembles an apple. It can never be of any commercial value, but is worth growing in private gardens of any size. It may be propagated by seed, layers, and cuttings; it is hardy, and grows freely.

THE JACK FRUIT—(Artocarpus Integrifolia).

THIS handsome evergreen tree is allied to the Bread Fruit, to the article upon which the reader is referred for its propagation and management. It appears perfectly hardy in Brisbane, producing, in the Botanic Gardens, a profusion of its enormous, rough, green-skinned fruit. This consists of a number of divisions of yellow pulp of an agreeable flavor, in the midst of each of which is embedded a seed about the size of a plum. The pulp is eaten in its raw state, and is used in curries; and the seeds, which have the flavor of beans, are boiled and used at table as vegetables.

JUBE-JUBE—(Zizyphus Ju-juba).

THIS quick-growing evergreen tree is known also as the Torres Straits plum, and is called in China "Ung-chaw." It is indigenous in China and in the Straits;

and in the former country the fruit is dried and forms an article of commerce. The foliage is a pale green, and the fruit, which is a drupe, is produced in abundance in its native countries. The tree has been largely planted in some of the northern coast towns for shade, in consequence of its rapid growth, and it there proves fairly productive; but in the Brisbane district it has not hitherto been very fruitful. The fruit varies much in quality, some being more agreeable in flavor than others; and this may be taken as a conclusive indication that it is susceptible of improvement by judicious selection.

THE LEECHEE AND THE LONGAN—(Nephelium Litchi and Nephelium Longana).

These are evergreen fruit trees with compound leaves, natives of China, Japan, and the East Indies. The latter has been fruited by the Author at Brisbane for many years. The blossom, which is insignificant, appeared in long spikes during October and November, and the fruit ripened in March following. It is white, semi-transparent, slightly glutinous, sweet, pleasant in flavor, and covered outside with a thin, tough, brown skin or shell. The fruit of the leechee is dried, and exported from China in large quantities, and is much esteemed. The trees grow from fifteen to twenty feet in height, and may be propagated by seeds, layers, and cuttings. The leechee is now procurable, and will be largely planted. Two plants have borne fruit in Brisbane.

THE LISBON LEMON AND THE WEST INDIA LIME.

These plants *(Citrus Limonum* and *Citrus Limetta)* are closely allied to the orange; the cultivation and management are the same. (See orange).

The refreshing acid juice of the former is applied to a variety of useful purposes, and the rind is preserved and imported under the name of "candied peel." The tree grows to the height of fifteen feet.

In India, where the lime attains perfection, the juice is thought more agreeable than that of the lemon, and it is used squeezed over fish and meat, imparting to them a pleasant zest. The lime juice of commerce, so favorably known for its cooling and anti-scorbutic properties, is prepared from this fruit. The tree grows to the height of eight feet.

They may both be propagated by seeds, layers, and cuttings, but the most usual course is to graft or bud them on common stocks.

THE LOQUAT—(Eriobotrya Japonica).

A HANDSOME evergreen tree, growing to the height of fifteen feet. It is the earliest of spring fruits, and the abundance of long racemes of bright yellow fruit, bending the branches in graceful curves, relieved by a background of large, dark green leaves, renders the tree a conspicuous and ornamental object. It is a native of Japan, as the name indicates, and is perfectly hardy in this climate.

It may be propagated by seeds, layers, suckers, and cuttings; and may be dwarfed by grafting upon the quince, to which it is allied.

It has been found to bear larger crops of superior fruit when planted in well-trenched ridge land (hilly, rather stony, forest land) than when planted in scrub soil.

The trees may be planted twenty feet apart. Prick in with the fork a light top-dressing of well rotted manure annually, as soon as the fruit is gathered. Thin out straggling and inside branches, when necessary, to keep the tree open. Watch the fruit as it ripens,

or the birds will gather the whole crop. It blossoms in Brisbane in February for the first crop, which ripens in June.

THE MAMMEE APPLE—(Mammea Americana).

The mammee is a tall, handsome, evergreen tree, attaining the height of sixty feet, with shining, thick, oval leaves. The fruit is called the wild apricot, from its resemblance to that fruit; it is round, of about the size of an egg, and is said to be so fine in flavor as to rival the mangosteen. The tree is tolerably hardy; requires a fibry, sandy loam, well drained; and may be propagated by seeds, layers, and cuttings. It is a native of the West Indies and South Africa.

THE MANGO—(Mangifera Indica).

The mango is a rather quick-growing umbrageous tree, rising to the height of twenty feet, the large, shining, green leaves of which emit a sweet, resinous smell. The flowers are white, and appear in long spikes at the extremity of the branches. The fruit varies much in size and quality, and is consumed extensively in India in every possible form; it is kidney shaped, has a soft, smooth, resinous skin, pale green, yellow, or red. When ripe it is delicious, slightly resembling an apple, but more juicy, and merits a prominent place in all gardens in tropical Queensland. A moderate degree of cold will not injure it; but the Author had a fine plant about seven feet high (which he had received from Calcutta in 1853) destroyed by frost. Other valuable sorts, however, received from Mauritius, Java, and Bombay, are now in bearing. It is frequently planted in India, as an act of piety, to afford shade, for which purpose its beautiful leaves, seven or eight inches long, render it particularly suitable. The

unripe fruit pickled is an article of export; and in India a large trade is carried on in the young green fruit, dried in the sun, it being a favorite condiment for curries.

The fruit should not be left on the tree until it is fully ripe, as it is liable to fall and get bruised; but should be gathered when mature, and beginning to change color; and, being carefully packed in clean, dry straw, should be left until quite ripe, and the fine flavor and aroma fully developed, which would be in about ten days or a fortnight. This quality in the mango will enable growers at the northern ports to ship this delicious fruit, when it becomes more plentiful, to Brisbane, Sydney, and Melbourne. And the command of such large and remunerative markets ought to induce the general planting of this beautiful and valuable tree. It produces fruit at about three years of age, when raised from seed. The only way to ensure having good sorts is to obtain layered or grafted plants from fruit bearing trees of approved quality. The seedlings sometimes turn out well, but more frequently they are inferior or worthless.

It may be propagated by cuttings, layers, and grafts.

A rich, peaty loam is the most suitable, and it is very sensitive to a retentive soil or stagnant water.

The seeds do not retain their vegetative powers for any length of time, but must be sown directly they are gathered, when they germinate very freely.

The timber is extensively used in India, and is applied to all the usual purposes of the fir in Europe.

THE MANGOSTEEN—(Garcinia Mangostana).

This tree is allied to the Mammee; it grows in a most beautiful and regular form to the height of twenty feet, with a taper stem, having branches on all sides

extending like a fir. It is an evergreen tree, with oval leaves about seven inches long. The fruit is about the size and shape of an orange, and is divided inside in the same manner, having an outside covering like the shell of the pomegranate. It consists of a "soft, juicy pulp, of a delicious flavor, partaking of the strawberry and the grape, and is esteemed one of the richest fruits in the world." Dr. Garcia, an eastern traveller, from whom the tree is named, says *(Phil. Trans.)* "it is esteemed the most delicious of the East India fruits; and a great deal of it may be eaten without any inconvenience; it is the only fruit which sick people are allowed to eat without scruple. It is given with safety in almost every disorder; and we are told that Dr. Solander, in the last stage of a putrid fever in Batavia, found himself insensibly recovering by sucking this delicious and refreshing fruit. The pulp has a most happy mixture of the tart and sweet, and is no less salutary than pleasant."

Soil, propagation, &c., the same as the mammee.

MATINGOLA PLUM--(Arduina Bispinosa).

The fruit of a thorny, evergreen shrub, having handsome, shining leaves. It grows here to the height of seven or eight feet, and bears white, perfumed flowers, resembling the jasmine, throughout the spring and summer.

It is a native of the Cape of Good Hope, where it has a summer temperatare of 60° to 65°, and does not often bear fruit in the higher temperature of Brisbane. The fruit has the form of a plum; it is about two inches long, and one inch in diameter, and is full of small seeds.

It is propagated by seeds, cuttings, and layers, and it thrives best in a sandy loam.

THE MEDLAR—(Mespilus Germanica).

The medlar is only adapted for private gardens, as the fruit is not considered fit for use until it begins to decay.

The culture is similar to the apple, which see. Soil, loamy, but well drained.

THE MULBERRY—(Morus Nigra).

The *Black* or *English* mulberry is the sort most esteemed for the quality of its fruit; but an inferior variety, known as the *Cape* mulberry, is the most generally cultivated, as it is more hardy and prolific. The mulberry is an ornamental tree, easy of cultivation, producing an abundance of wholesome fruit early in spring. It is said that the fruit does not undergo the acetous fermentation, and is therefore a proper fruit for those affected with gout and rheumatic diseases to indulge in; it is cooling and rather laxative. An excellent jam may be prepared from the English mulberry; a palatable domestic wine may also be made from it; and a syrup is obtained from the unripe berries, useful in cases of ulcerated sore throats. "The root of the tree has an acrid, bitter taste, and has been used, it is said, with great advantage, in cases of worms, particularly the tape worm."—*M'Intosh.*

The *Morus Alba* and *Morus Alba Multicaulis*, Chinese varieties of the mulberry, have been recommended for feeding silkworms, in consequence of their luxuriant growth, and their leaves being very large and tender. Silkworms so fed are said to yield silk superior both in quantity and quality. Some worms reared by the Author, usually fed upon the Cape mulberry, were offered some of the Chinese leaves with the others, but would not eat them. This incident is

only mentioned to induce a fair trial of the different sorts for silk culture, and is not intended as a proof of the superiority of the sort used; but it may be found that the worms thrive here on a variety of mulberry not so well adapted for their food in a different climate. A small-leafed mulberry is used in Italy for this purpose, and if silk culture is ever carried on here to any extent, it may be found desirable to introduce it.

Propagation: The mulberry may be propagated by seeds, cuttings, grafting, budding, layers, or suckers. The first is only used when it is either desired to raise stocks upon which to bud or graft known sorts, or to obtain new varieties. Cuttings one foot long, inserted ten inches in a damp, sandy loam, will strike readily and grow with great rapidity.

Planting, soil, &c.: The mulberry is often planted on a lawn, that the fruit as it ripens may not be injured when it falls. Berries falling without damage are superior to those gathered. The trees should be twenty feet apart; and the soil most suitable for them is a deep, rich, sandy loam, damp, but not wet. There must be no stagnant water in the soil.

Pruning: All crossed and crowded branches should be removed at the winter pruning, and all straggling shoots shortened one-third or one-half, according to their strength.

Manure: If grass covers the soil under the trees, a liberal supply of liquid manure should be given every autumn; but if cultivated, a dressing of solid manure should be turned in lightly with a fork.

THE NECTARINE.

The nectarine is classed by most English and French gardeners along with peaches; and considered merely a smooth-skinned variety. It is, however,

sufficiently distinct in flavor and appearance to command a place in every garden, where the climate is suitable. Hitherto its cultivation has been found remunerative only in the colder parts of the colony; and the growers in the vicinity of Brisbane and the northern ports have been unable to produce this delicious fruit. It will require time to prove whether it is capable of acclimatization; but, from the success which has resulted from similar experiments with the peach, the Author has every confidence in the ultimate issue of his present attempt to acclimatize the nectarine.

At the present time all the finest sorts grown in England and France are in our gardens, including the sweet-kerneled Syrian variety, the *Stanwick*.

The soil, cultivation, &c., required for the nectarine being similar to the peach, the reader is referred to the article on that fruit for further information.

THE OLIVE—(Olea Europa).

The value of the olive for manufacturing purposes is so great that no apology is needed for its introduction here. It is an evergreen tree, rising twenty to thirty feet in height, hardy, and easy of propagation. There are numerous varieties, but most of the best sorts are obtainable in the colony.

Propagation: This is effected by seeds, layers, cuttings, and roots; and the latter method is generally preferred.

Soil, &c.: The olive is most prolific in a dry, stony, calcareous, or sandy soil, and could therefore be planted profitably where few other fruits would be remunerative. It grows luxuriantly in a rich soil, producing abundance of wood but little fruit, and, like all oil crops, it impoverishes the soil, which should be well manured every third year.

Planting, &c.: Some authorities recommend the trees to be planted ten feet apart, trained to a single stem for five or six feet, and then to form the head. The ripe fruit is bruised between stones which do not crush the kernel; the pulp is put into rush bags and gently pressed to obtain "Virgin Oil," and is afterwards pressed a second and third time to obtain oil of other qualities. It deposits a white, fibrous, and albuminous matter, and may then be drawn off into clear glass flasks.

The value of the crop and the longevity of the tree unite to recommend it for general purposes of shade or shelter. Enquiry is often made for suitable trees to plant, singly or in clumps, either as shade for stock, or for landscape effect, on large, naked areas; and this tree appears well suited for the purpose. It would also be valuable, both for shelter and profit, if planted as a breakwind on the boundaries of runs and large plantations.

Since the foregoing article appeared in the first edition of this work, a pamphlet on "*The Olive and its Products,*" by Mr. L. A. Bernays, one of the Vice-Presidents of the Queensland Acclimatisation Society, has been issued from the Government Printing Office; and all who propose to cultivate the tree for commercial purposes should consult its pages for much valuable information as to the progress of the industry in the southern colonies, and for useful diagrams illustrating the cultivation of the tree, the extraction of the oil, &c.

THE ORANGE—(Citrus Aurantium).

The orange is an evergreen tree, growing to the height of twenty feet, and often attaining a great age. At Versailles, it is said, there are orange trees over 400 years old. It is a native of the temperate zone, and will probably not thrive very far north, unless on

elevated country or in cold aspects. The pure white, odorous blossoms are produced in great abundance in spring, attracting the bees from all directions to prepare from them their choicest honey. The old trees frequently bloom at intervals throughout the year; and it is no uncommon thing to see ripe and green fruit and blossoms on the same tree at one time.

The orange is used with advantage in fevers; it is also manufactured into marmalade, and the rind, when prepared, is known as candied peel. The *Seville* orange is esteemed as preferable for medicinal purposes; and it is from the highly odoriferous flowers of this kind that the orange flower water is distilled. The outer part of the rind is a grateful, warm, aromatic bitter, often used as a stomachic and corroborant. Seville oranges also produce the best marmalade and the richest wine, and, preserved whole, are a fine sweetmeat, and are justly admired.

It is to be regretted that so little success has hitherto attended the cultivation of this valuable fruit in Queensland, possessing as it does a climate at least as favorable for its growth as New South Wales. The inducements to renewed efforts are very great, as—in addition to the large home consumption, which at present necessitates its importation to the extent of several thousand pounds sterling per annum—it is a fruit capable of being exported, and there is likely to be a good market in the northern ports for many years.

In the majority of instances this want of success appears attributable to the nature of the plant not being understood, and thus it has been put in places where it could not possibly thrive.

To insure the profitable cultivation of the orange, two facts must be kept prominently in view: first—that a small quantity of water in the soil will rot the bark off its roots, and cause the tree to sicken and die back; and second—that the most important of the roots are "surface roots." The extreme tenderness of

the bark of the root indicates that no soil is fit for its growth which will retain water, but should be free and open at all seasons, allowing the rain to percolate freely through and away from the roots almost as fast as it falls.

In the year 1868, Mr. C. Moore, the curator of the Botanic Gardens in Sydney, was sent by the Government of New South Wales to visit the orange countries in the old world, to inspect and report upon orange cultivation generally, but with special regard to the diseases of the tree and their cure. Much valuable information was collected at that time, and we will endeavor to summarise from that and other trustworthy sources, a few hints as to the nature and requirements of the tree, which the orange-grower will do well to note.

In the Azores, some of the best trees are produced from seed selected from trees which are robust and prolific, and bear fruit of choice quality; but they are longer coming into bearing than grafted trees. The trees worked upon citrons and lemons were the first to be attacked with a destructive disease called "tears," or the exuding of sap near the bottom of the stem. The seedlings also suffered; but those worked upon Seville orange stocks were least affected. The cure was to strip and expose the surface roots for a short time, to cut out the bark, wood, and roots effected, *and to drain the land.* The sooty fungus was cured by washing with lime water.

The soil in the Azores is of volcanic origin, being a good, friable loam, plentifully intermixed with stones and rocks. The most favorable position for an orangery is the side of a hill, and the aspect facing the rising sun.

Analysis of the ash of the orange tree and fruit gives a very large proportion of potash and phosphate of lime. Fresh wood ashes, especially of mangroves and other trees known to yield much potash, should, therefore, be mixed with bone-dust and applied to them

as a special manure, carefully pricked in with a fork—particularly for sickly trees. Other suitable manures are sea weeds, bone manure, and animal refuse, stable dung, and lime. Lupins are grown in the orchards, and turned in as a green manure. The trees are pruned annually, to thin out crowded branches. The superior quality of the fruit arises from the age of the trees; the fruit gradually improves with the age of the trees.

In Egypt and other countries, the mandarin oranges, budded upon the Seville stock, form quick-growing and fine trees; but, when worked on the shaddock, they bear fruit of very superior flavor.

The Bahama Islands and some districts in Jamaica are celebrated for the delicious sweetness of the oranges they produce. The islands and districts referred to are formed of calcareous or limestone rocks, and this indicates the necessity for lime in the soil.

Many young trees, grafted from the choicest orange trees in the countries visited by Mr. Moore, were introduced by him on his return to New South Wales, and were entrusted to Mr. Pye, of Rocky Hall, near Parramatta, that they might have the advantage of his skill and experience. Grafts from the most robust of these have been distributed, and the Author secured young trees of the six best sorts.

Varieties: The sorts which have hitherto proved most hardy in Brisbane district are—the *Emperor Mandarin*, *Canton Mandarin*, *Sabina*, *Siletta*, *Saint Michael's*, *Parramatta*, and *Poor Man*.

Propagation: It may be propagated from seeds, grafts, budding, or layers. The former method is only resorted to for the purpose of raising stocks upon which to graft approved varieties, or to obtain new sorts. When the latter is intended, the seeds should be taken from fruit gathered from the topmost branches of lofty old trees, heavy and compact, with rich, fine-flavored juice, and thin skin.

Planting, soil, &c.: It is presupposed that the soil is thoroughly trenched to the depth of two feet six inches before planting, and that, if draining is requisite, the whole space has been drained at least six inches deeper than it has been trenched. The trenching should be done some months before planting time if practicable, as the texture of the soil gets greatly improved by the action of the atmosphere. Where the trenching has been faithfully performed, it will be desirable, when digging out the holes in which to plant the trees, not to disturb the earth too deep, or else when it sinks down the tree will be taken too far below the surface. The holes should be dug to suit each tree, so that it is not set deeper in the soil than it stood in the nursery; and if the earth is rough, or for other reasons it is deemed prudent to cover the roots with a greater depth of earth, it should be brought round the tree in the form of a mound, or it may be supplied as a mulching. On planting, the roots should be spread out parallel with the surface, and radiating from the stem to all points; and, if the earth is not naturally fine and of good quality, some first-class mould should be provided to place in immediate contact with the roots, filling up the interstices, and covering them, gently pressing it down. The trees may be sixteen to twenty-five feet apart.

Digging should never be permitted nearer the trees than the tips of the outside branches, as the roots are on the surface, and, if injured, the branches will die back.

Some successful growers use the knife very freely upon young trees, at the winter pruning, with good results. The tree, while young, appears liable to outgrow its strength, and the long unripened shoots produced one year die back the next, leaving it in a debilitated state, a ready prey for disease. Observing this tendency, it should be the object of the intelligent cultivator to assist nature, by reducing all long, strag-

gling shoots, and removing neatly all superfluous ones, especially where there is any appearance of exhaustion. In such cases, one-third of the previous year's wood may be removed. Trim all the wounds neatly, and apply liquid manure to the roots at the same time.

The necessity for this mutilation would be obviated by a proper attention to summer pruning, which consists of nipping off the ends of all over-luxuriant shoots, and rubbing off all those which are not required, as soon as they appear. No wounds are left by this treatment, and the same end is attained.

Some young plants seem preternaturally prolific, and come out in a mass of blossoms, with scarcely any foliage. Where this occurs, every blossom bud should be carefully removed, and the tree well watered with liquid manure.

The orange should not be exposed to high winds, as, in a state of nature, it grows under the shelter of larger trees. An abundant supply of water is also a desideratum ; and so necessary is this considered in orange growing countries, that the first step towards planting an orange grove is to provide for an ample supply of water for irrigation. The lower branches should be trained so as to protect the roots from the sun without touching the ground.

A light mulching of well-rotted cow dung, with a little sheep or fowl dung, may be laid round the circuit of the stem, to the extent of one foot beyond the longest branches, about one inch thick. A lighter dressing of the same material may be added at the spring and fall, extending the circuit as the tree increases in circumference, and never allowing this part to be dug.

Diseases : The orange is subject to attacks from the coccus or scale insect, the aphis, and a black blight like smut. These scarcely ever appear on trees in moderately good ground, trenched and drained, where water is supplied in seasons of drought. The most effectual

application yet discovered is Gishurst Compound, which seldom fails. It has been used with the best results by several growers near Brisbane. Two ounces of the Compound to one gallon of boiling water is applied with a syringe when it is quite dissolved, and the liquor partly cooled, so as not to injure the young leaves. In New South Wales, some growers rub them off with a sponge dipped in warm soap and water. The following treatment has been very successfully adopted in the northern districts for the cure of the scale and other diseases of orange trees:—Take one tablespoonful of soft soap, thoroughly dissolve it in one gallon of hot water; add one tablespoonful of flowers of sulphur, and boil ten minutes; then add one tablespoonful of chloride of lime, and mix thoroughly. Add one gallon of water to each gallon of the liquid, and in the evening syringe the affected trees over head with it while as hot as the hand can bear. This compound is said not to injure the foliage, to effectually destroy scale and fungus, and to impart increased health and vigor to the tree. The removal of dead wood, and a liberal dressing of manure forked in at the roots at the same time, would tend still more to secure a satisfactory result.

PAPAW APPLE—(Carica Papaya).

The papaw tree is highly ornamental, partaking of the character of the palm tribe. It frequently rises with a single stem to the height of twenty feet, carrying a cluster of its handsome, deeply serrated leaves near the top, the leaf stalks being about three feet in length. The effect is very striking, and is sure to arrest the attention of those to whom the wonders of tropical vegetation are new. The blossom of the female fruit-bearing tree is abundant, and beautiful; in color it is a greenish white, and the odor is delightful. The

fruit is about the size of a rock melon, which it resembles somewhat in appearance and flavor. As they are mostly raised from seed, the quality of the fruit varies considerably; but the choice sorts rank high, and are eaten raw and boiled, pickled and preserved. If any part of the leaf, stem, or green fruit be punctured with a needle, the white milky sap flows out freely; and if a couple of drops be put into a cup of milk, it will very shortly be transformed into curds and whey. It is also stated that a few drops of the sap, or part of a leaf, put into the pot with an old fowl, it will boil quite tender, or that the same effect may be produced by hanging tough meat of any kind for a few hours among its leaves. Care must, however, be taken not to use too much sap, or allow the meat to hang too long, or decomposition will set in. The sap is also said to be a cure for ringworm. Some growers convert the fruit into jam, adding one-third the quantity of citron.

THE PASSION FRUIT—(Passiflora Edulis).

The passion fruit is so well known that it needs no description. It is hardy, prolific, of agreeable flavor, and wholesome, and should have a few yards of espalier devoted to it in all gardens.

For cultivation, &c., see "Granadilla," to which it is allied.

THE PEACH—(Amygdalus Persica).

The peach is a native of the temperate zone, now in course of acclimatization in the latitude of Brisbane. Many valuable sorts have been raised or introdnced to

public notice by the Author, during the last twenty-seven years; some of them equal to the wall-grown peaches of England. Such results should induce extended experiments, and the issue would, doubtless, be the acclimatisation of this and other fruits through the medium of seed, giving life to new sorts—natives of the climate—which, while possessing most of the good qualities of the parent, would prove hardy and productive in a clime in which the parent was unfruitful. The same course was adopted in America, by which some of the most valuable apples now in cultivation were originated. In growing seedlings, however, one point should be kept steadfastly in view, namely: on the tree fruiting, if it does not prove *superior* in some particular to what was possessed before, *cut it down*—do not be satisfied unless some advance has been gained, or else the ground will be filled with worthless varieties. A hundred trees may stand for fruit, and not one prove worth saving as a new variety.

The peach is grown extensively in America for drying, for making brandy, and for feeding pigs. The wood of the tree produces the color called rose pink; and the leaves boiled in milk will, it is said, destroy worms in young children. The drying is performed thus: a small room, in which an oven is provided, is fitted up with drawers round the sides, lathed at the bottom; each tier of drawers has an interval between. The peaches (which should be ripe) are cut in two and laid in single layers on the laths, with the skins downwards, to save the juice. They are soon dried by the air of the stove. See also "Drying Fruits."

Varieties: The following are a few of the choicest English, French, and New South Wales peaches, suitable for cultivation in New England, N.S.W., Darling Downs, and other parts of Queensland of a similar temperature:—*Noblesse*, *Royal George*, *Mignonne*, *Roman*, *Royal Kensington*, *Camden Excellent*, *Camden Large Red*, *Bell's Freestone*, and numerous others. In

sheltered situations, in the same localities, we would recommend the following to be tried on account of their early ripening :—*Flat China*, *Common China*, and *Double Blossom China*.

For the neighborhood of Brisbane, Ipswich, Maryborough, and the nothern districts, the *Flat China* is the peach most especially adapted, as it is a slipstone peach of good flavor, and ripens so early as generally to escape the worm, which sometimes destroys the late sorts. The following successional varieties should be found in every collection ; their merits in this climate can scarcely be over-estimated :—

Hockings' Swentoa : Size, medium ; flavor, good ; freestone ; flesh, white, pink next the stone, juicy, and rich ; very prolific ; ripens at Christmas. This peach is a decided advance upon those previously possessed, as it has the agreeable flavor of the Persian peach, and is free from the peculiar acidity and bitterness which characterise the common round China peaches. It is an acquisition, and marks an era in the acclimatization of the peach. (New.)

Hockings' Remlet : Size, medium ; flavor, excellent ; clingstone ; flesh, white, tender, melting, juicy, and rich ; color, deep red where exposed to the sun ; form, good ; very prolific ; ripens first week in January. This handsome and delicious peach is also of the Persian strain, and, when ripe, it is as tender in texture as a freestone peach. (New.)

Hockings' Klumper : Size, medium ; flavor, good ; freestone ; flesh, yellow at the stone ; prolific bearer ; ripens at Christmas to middle of January.

Hockings' Shointon : Size medium ; flavor, delicious, juicy ; color, good ; downy ; freestone ; flesh, red at the stone ; prolific ; ripens throughout January and part of February.

Hockings' Metuah : Size, very large ; luscious apricot flavor ; color, fine ; flesh, rich yellow ; freestone ; fruit often ten inches round ; ripens latter part of January.

Hockings' Drallab: Size, very large; flavor, rich, sugary, and juicy; freestone; flesh, white and tender; fruit often ten inches round; ripens first week in February.

Hockings' Rheny: Size, large; juicy, fine flavor; color, good and handsomely mottled; skin, downy; clingstone; ripens second week in February.

In addition to the foregoing peaches, which ripen in succession in the Brisbane district in the order in which they stand, and provide an uninterrupted supply of this luscious and useful fruit, from the end of the crop of flat China peaches at Christmas, until the end of February, there are many other useful sorts well worthy of cultivation, which will be found in the writer's catalogue. They embrace slipstones and clingstones, early and very late (two good sorts ripening in April), white and yellow flesh, of greatly improved flavor, some of them approaching the exquisite quality of the best English wall-grown fruit.

Propagation: The peach is propagated by budding and grafting, to continue or extend improved sorts.

Planting: The trees may be planted from sixteen to twenty feet apart. Sixteen feet will be sufficient if the pruning is regularly attended to. From April to August is the season for removal, and early planting is recommended where the plants have not far to go from the nursery. On planting the trees, only take out sufficient earth to allow depth for their roots, and be careful that they are not put any deeper than they had previously stood in the nursery. Let the roots be spread out as flat as possible, radiating from the stem in all directions; fill in between the roots with some of the finest and best mould procurable, pushing it into the interstices of the roots with a stick; cover the roots with a thin layer of the same mould; fill in a little of the surrounding soil, tread it down gently but firmly, and draw the remainder around the stem in the form of a mound, with a flat top. Give a little

water if requisite, and protect the trees from the sun and wind until they begin to grow.

Soils : The peach should have a rich, open soil, on a dry, stony, or gravelly subsoil. It should, under any circumstances, be deep and well drained ; and if it is not rich, the surface should be kept in good heart by a dressing of cow dung every spring and autumn, with the addition of bone dust, wood ashes, lime, and a little salt. Lime is an important constituent in the soil for peaches.

Pruning, &c. : The peach should have all its leading shoots stopped two or three times during the summer, and the centre of the tree be kept open by rubbing off the shoots as they appear. In the winter remove sickly or cross branches, and shorten back all the strong shoots about half their length, and the weak ones two-thirds. Keep the centre of the tree open.

Peach trees in pots or tubs.

Quite a new feature has been introduced into fruit culture in England during the last few years, in consequence of the extraordinary success attending some experiments made with fruit trees in pots protected in a green-house. The great points appear to be, an abundant supply of manure, sufficient water, and forming the tree into a very compact growth. Great vigor is thus induced, which, not being allowed to expend itself in wood shoots, and the buds being fully developed and well ripened, fruit is formed in abundance and perfection. The object of introducing the subject here is that by this means persons who can afford the luxury may be enabled to produce the flat China peach on the Downs, where the blossoms are now generally destroyed by frost, and the delicious late peaches in tropical Queensland where they are now frequently destroyed by the worm.

Mr. Thomas Rivers, the enthusiastic advocate of orchard houses, in the course of his directions for the

management of fruit trees in pots, says:—"I now propose a mode of culture for orchard houses by forming peach and nectarine trees into close, compact pyramids, like an upright cypress. For this purpose, maiden trees with straight stems, and well furnished with lateral shoots, should be selected and planted in eleven-inch pots. They should not be more than from four to five feet high; if more, their tops may be cut off to that height. Each lateral shoot should be cut into two buds; these and the buds on the stem will in spring give numerous shoots. As soon as they have made four or five leaves, pinch off the fourth leaf with the end of the shoot, leaving three, not reckoning one or two small leaves generally found at the base of each shoot, which are without buds in their axils, and will not put forth a shoot. These pinched shoots will soon put forth a fresh crop; *every shoot of this second crop should be suffered to grow till it has made four or five leaves, and then be pinched to two leaves; and all succeeding crops of shoots must be pinched off to one leaf as soon as four or five leaves are formed, unless larger and more spreading pyramids are desired. In such cases three or even five leaves may be pinched down to with advantage.*"

It may be remarked that, if from any temporary neglect of pinching, the shoots are allowed to grow long, they should be cut back to within three or four leaves of the main stem, and afterwards subjected to the treatment previously described.

It is probable that larger pots would be necessary in this climate, and experiments are now being made with those measuring sixteen inches.

Mr. Rivers states that peach and other trees may be grown in pots, and preserved in perfect health and fruitfulness for twenty years without re-potting, by the liberal use of liquid manure, and an annual top-dressing of rich compost. He recommends one pound of guano to twelve gallons of water, and that the trees have a good soaking of this once a week, pure water being

used on all other occasions. For the compost, see "Compost for top-dressing," which follows.

Compost for fruit trees in pots.

Pare off three inches from a pasture with a tenacious, loamy soil, chop it up into pieces about the size of a walnut, and expose it to the air for two or three months in the summer, and it is fit for use. Two-thirds of this loam, with one-third of rotten manure, should be well mixed, but not sifted or broken fine; leave it in lumps. After the tree is planted, ram the earth down firmly; many trees fail through inattention to this.

Compost for top-dressing.

Horse and cattle droppings, equal portions, thoroughly mixed, thrown into a ridge and saturated with strong liquid manure. Spread a thin layer of finely powdered charcoal over the whole, and in two days thoroughly mix and use. There is no surface-dressing equal to this; the effect is almost magical. In early spring every year the surface earth should be removed from the pot and replaced with this compost, filling the pot to the rim, and pressing it down.

THE PEAR—(Pyrus Communis).

The pear is preferred to the apple by many persons, and, in point of merit, may fairly be classed next to that fruit. It is more hardy and durable than the apple, taking longer to arrive at maturity, but existing for centuries in health, vigor, and productiveness. In France and other continental countries, the pear is cut into slices and dried over an oven, and, when well prepared, will keep in good order and preserve its flavor for several years; and the sorts best adapted for this

purpose are such as are the least valuable for dessert. Perry is also made from the juice, and the best sorts are said to be little inferior to wine.

The instructions for *propagation*, *planting*, *soil*, &c., and the first formation of the head of the tree, are similar to those given for the apple (which see). The subsoil must be dry or well drained.

Seedlings : In raising pears from seed, the proportion of good sorts out of a given number is very small, and many will be utterly worthless. They take from eight to sixteen years to produce fruit, unless grafts are put upon old established trees. Dr. Van Mons, of Brussels, recommends that trees be raised from the fruit of seedlings, as the second generation of seedlings, if subjected to high cultivation, is likely to produce an improved variety.

Mr. Rivers, of Sawbridgeworth, has introduced a mode of pruning and cultivating fruit-trees, which, if generally adopted, will cause a revolution in the management of orchards. He recommend that the trees be worked (grafted) on dwarfing stocks—the apple on the paradise stock, the pear on the quince, &c. ; that the trees be kept small by continually nipping off the ends of the young shoots, by which they are never allowed to exceed the size of small bushes ; and that they be planted closer together. Eight feet is the distance for trees thus pruned, and twenty feet for standards. The mode of pruning he recommends is the same as he directs for trees in pots, which will be found in the article on the peach (which see).

Pruning : The pear requires but little pruning. The head may be formed as recommended for the apple, and then it will only be necessary to shorten the long shoots half or two-thirds, and to keep the head open at the winter pruning. As the fruit is produced on short, thick branches or knobs (called spurs), clustered in bunches about the two-year-old wood, they should be encouraged, at proper intervals, all over the tree.

Manure: The pear requires manure rich in potash and phosphates; these can best be suppled in bone dust and wood ashes. Sulphate of iron is also said to be a valuable special manure.

THE PINE-APPLE—(Ananassa).

THE pine-apple is said by some of its admirers to combine the flavors of several of the choicest European fruits. When grown to perfection, and eaten fresh from the garden, it is one of the most delicious of fruits.

There are numerous varieties of the pine-apple, each possessing some marked distinction: many of them valuable either for size, beauty of form, or season of ripening. Among these may be enumerated the *Black Jamaica*, the *Green Providence*, the *Brown Sugarloaf*, the *Enville*, the *Black Antigua*, the *Ripley*, and the *Smooth-leaved Cayenne*; but for general cultivation none of these are equal to the old *Queen* (which is commonly planted about Brisbane) for productiveness, hardiness, or flavor.

The pine-apple is propagated by seeds, crowns, and suckers. The seeds are sometimes found in the pips, and may be sown to raise new varieties. This is seldom attempted; but as some of the very best sorts have been obtained from seed, there is every encouragement for those who have the time and opportunity to try further experiments. With regard to crowns, some gardeners assert that plants so propagated produce large, handsome fruit, with broader and flatter pips; but that they take one season longer to come into bearing in open field culture than when grown from suckers, which is the almost universal practice.

Soil: Any soil will suit the pine-apple which is *warm, rich, deep*, and *well drained.* A rich, sandy loam, a gravelly or schistose ridge, would each produce the fruit in perfection if the above conditions were

complied with. The soil may be damp, but *never wet; no water* should at any time *stand in the soil.* It should be trenched to the depth of two feet six inches (leaving any inferior soil at the bottom), and well manured, unless naturally very rich. Drains should be put in six inches deeper than it is trenched, unless the sobsoil is so porous as to render it unnecessary, which should be proved by the test previously given.

Planting, &c.: Pine suckers may be planted any time during spring and summer, in rows six feet apart, the plants being four feet apart in the rows. It is of great importance that the plant receives no check to its growth after it is once rooted. In winter, wherever there is any risk of frost, a good handful of long grass should be placed close into the heart of each plant, and a little more scattered loosely over the leaves. There should also be a provision for watering in hot, dry weather, with liquid manure. The ground must be kept clean, and a good annual top-dressing of manure be given.

Gathering: This fruit should never be gathered for exportation until the channels *between the pips,* for a distance half-way up from the stem, be turned yellow, or a yellowish green. For immediate use, let them be taken when the whole fruit is of a *pale yellow,* directly all the green has disappeared. If left longer, they become very juicy, the flesh a dark yellow, the *delicacy of flavor* is gone, and a slightly stinging or pricking sensation may be observed in the month, which arises from fermentation having commenced.

Pine-apple wine.

The following is stated to make a rich, strong wine, which keeps well:—Take freshly gathered pine-apples, which are quite ripe; press the juice from them, strain it carefully, and mix sugar with it until it will support an egg; boil the whole gently for fifteen minutes,

keeping it well skimmed; ferment it in an open tub for three days, and cask it.

THE PLUM—(Prunus Domestica).

The plum has not hitherto been productive in the Brisbane district, and there are very few instances of seedlings being raised, as, in consequence of the imported fruit being gathered before it is mature, the seed does not grow. The first step towards obtaining acclimatized sorts would probably be the introduction from the south of Italy of the best varieties which thrive there, and a few also from the Southern States of America. The *Newman* and *Wildgoose* plums, lately introduced from the latter country, promise to be fruitful here.

In our local nurseries the kinds most esteemed by English and French growers are also now to be found.

The directions given in the article on the peach will apply to the general treatment of the plum.

The blossoms appear on small fruit spurs in most of the varieties of the plum, and these spurs will, therefore, require a little care and attention. In pruning, the straggling and over-crowded branches should be removed or shortened.

If the land is poor, apply animal manures, and a surface dressing of salt around the tree to the outside limit of its foliage, to the extent of half a peck, is recommended to be applied every spring. Lime is also a good special manure.

THE POMEGRANATE—(Punica Granatum).

The pomegranate is highly esteemed in the East, where it attains a great age. It is an ornamental shrub of great merit, and, on account of the beauty of its foliage, relieved by the brilliant flowers and handsome fruit, deserves a place in all large gardens.

The rind of the fruit and the flowers are used medicinally. The wine of the sweet pomegranate, or the recently-expressed juice, was formerly recommended in pulmonary complaints; the latter is also given with great advantage in cases of fever.

Propagation: There are two sorts commonly grown in Queensland—the double-flowering, for ornament only; the single-flowering, for ornament and fruit. They are both easily propagated by layers and cuttings. Any ordinary garden soil, if well drained, will be suitable. It is sometimes used for edging; it is rather too robust for that purpose, but might be advantageously planted for a dwarf hedge.

THE QUINCE.

The quince is not held in much esteem, but among the ancients it was greatly valued, as much for its medicinal properties as for its culinary uses. Philips relates the case of a gentleman in Sussex, England, who was completely cured of an asthmatic complaint of long standing by the use of quince wine, which was made in the following manner:—"Cut large quinces in quarters, and core them; grind them in the same manner as apples for cider, and put to every gallon of pummace a gallon of water; let it stand a day or two, and strain it off; to every gallon put three pounds and a quarter of moist sugar, tun it, and stop it quite close; the following spring rack it off, cleanse the cask of sediment, and put it back again; and in the second year bottle it off."

Quince marmalade, when well made, is most excellent, and so wholesome that it may be given to children almost without limit.

Propagation: It may be propagated by seeds, layers, cuttings, suckers, and grafting.

Soil: The best soil for the quince is a rich, damp, peaty soil, which will not contain water. Contrary to the generally received opinion, the quince requires manure and cultivation. It will grow and produce fruit *without* either but it will do *better with* them. Large quantities of barn-yard manure should be mixed with the soil, and abundance of salt. Liquid manure should be given freely in dry weather. Plant the trees ten feet apart.

Pruning: Train to a single stem for three feet; destroy all suckers, and thin out crowded branches.

THE RASPBERRY.

THE raspberry is a delicious berry fruit, which is best adapted for growing in the colder parts of Queensland. It will, however, grow to tolerable perfection around Brisbane with ordinary attention.

It is said to possess valuable medicinal properties, as, like the strawberry, it does not undergo the acetous fermentation in the stomach. It is recommended in scorbutic cases, and in gouty and rheumatic disorders. The wine made from it is highly spoken of, and raspberry jelly is in general repute.

The raspberry is propagated by suckers planted in autumn or spring.

Soil: A deep, rich, humid soil, slightly shaded, is the most suitable for this fruit: damp, but no water standing in it.

Planting, &c.: The suckers are planted in stools, three or four in a stool, at six inches apart, and the stools to be four feet apart each way.

Pruning, &c.: In the winter pruning cut out the old stems which have produced fruit; preserve three or four of the strongest of the new shoots to each stool to stand for fruit, cutting off about a foot of the top,

and tie them to a stake. During the summer keep the bed clean, and destroy all superfluous suckers.

If a late crop is required, cut down the plants to within a few inches of the ground in spring.

To improve the fruit, remove the old canes as soon as the fruit is gathered.

When the pruning is completed, dung the bed well, giving it a dressing of salt, and fork it in.

THE ROSE APPLE—(Jambosa Aquea).

The rose apple is a beautiful evergreen tree, which attains the height of twenty feet. The leaves are lanceolate, shining deep green, and the ends of the young shoots are a bright chocolate color; the flowers appear in clusters, are white, and rather peculiar and attractive, from the vast number of long pendant stamens with which they are furnished. The fruit is of a pale yellow, of the size of a walnut, and the effect of the whole contrast of colors, together with the slender and graceful character of the branches, is to form one of the most ornamental of evergreen shrubs. The fruit is produced in abundance, and consists of a soft shell, not very juicy, covering one or more large seeds. It has an agreeable flavor, somewhat resembling sweetened rose-water.

It will thrive in any good garden soil; may be propagated very easily from seeds or by layers, and may be planted after rain any time from April to August, at sixteen feet apart. It blossoms in September.

The only pruning necessary will be to remove any crowded or cross branches, and occasionally to shorten long straggling shoots.

THE SHADDOCK or PUMPLENOSE. (Citrus Decumana).

The pumplenose is a native of Java, the leaves and

fruit of which are the most handsome of the citrus tribe. There are numerous varieties—some with white and some with red flesh, some acid and some sweet, and the quality so diverse that some of the best sorts almost rival a good orange, while others are worthless. The fruit is said to grow as large as a child's head in Japan, and another traveller states its weight to be fourteen pounds, and its size two feet in circumference. It is very valuable on sea voyages, as, from the thickness of its skin, it keeps longer than the orange. The sherbet prepared from it is a most grateful drink to the sick.

It is easily propagated by grafting, layers, or cuttings, and is said to bear abundantly in India and other places. It has been some years in the Author's garden without bearing; but it is probably in an unfavorable position. The original plant was received by him from Calcutta.

Since writing the foregoing, some growers have succeeded in getting small crops of this fruit.

The cultivation, &c., is the same as the orange (which see).

THE STRAWBERRY.

This favorite fruit is a native of Great Britain, northern Europe, and some parts of America; but, although coming from a much colder climate, there have been sufficient instances of success attending its cultivation in the neighborhood of Brisbane to warrant the assertion that this delicious and wholesome fruit may be produced in perfection in this climate, if the same amount of care is bestowed upon its culture which the successful growers in England and America consider necessary.

Propagation: This is generally effected by suckers or runners. In selecting suckers for this purpose, some

judgment should be used, for, among the cultivated varieties, numerous plants will be found by the observant grower which produce a profusion of blossoms, but little fruit. There are, in fact, three sorts of blossoms produced by strawberry plants—one, in which the stamens and pistils are properly formed, which are, consequently, the most certain croppers; the second, in which the stamens or male organs are excessively developed, and which are often unfruitful; and third, those in which the pistil is well formed, but the stamens or fertilizing parts being deficient, they do not prove fruitful unless the wind or insects carry the pollen from some staminate blossoms near them.

It is not proposed that amateur gardeners shall be troubled to reduce these scientific details to practice, except in the most simple and easy manner. The most ordinary observer can see that certain plants in a bed produce more fruit, and perhaps larger and better flavored, than others. We would recommend that little sticks be firmly placed to all such, and suckers preserved from them *only* for making the new bed. Any plants which are found to be unfruitful should be dug out.

Some of the best of our cultivated varieties have been raised from seed, and it would be a worthy undertaking for any enthusiastic amateur to endeavor to obtain a few sorts by this means, suitable to the climate of Queensland.

Planting: From April to August, if the soil is damp, plant the strawberries eighteen inches apart, in rows distant two feet to two feet six inches. They should be planted with all their roots extending laterally, and pressed firmly down, but not crammed together, into a little hole. The beds should not contain more than three or four rows, having an alley two feet six inches in width at each side, to obviate the necessity for trampling upon the bed.

Soil and Cultivation: A very deep, rich, free soil, damp, but well drained, in an open situation, is that best suited for the strawberry. It should be trenched two feet six inches deep, leaving the bottom spit where it was, after being well broken, as previously directed. The top spit should be *well manured with vegetable manure* and ashes. The whole of the soil should be lightly strewed with hay, straw, dry leaves, or cut grass, when the plants begin to fruit—partly to protect the roots from the heat of the sun, and partly to prevent the rain beating the soil on to the fruit: the supply should be sufficient therefore to effect both purposes. Irrigation is absolutely necessary for the strawberry—water, water, water; but it must not be stagnant. The runners should be removed as they appear, unless required for the formation of a new bed. After the fruit is all gathered, give the surface of the bed a good dressing of *vegetable* manure, forking it in lightly between the rows.

THE TAMARIND—(Tamarindus Indica).

A BEAUTIFUL spreading deciduous tree, well suited to the climate. It has long been an inhabitant of our gardens, and has borne fruit in Brisbane and Gladstone. The fruit consists of the dark pulpy matter in which the seeds are embedded in the pod. It is separated from the shell, is placed in layers in casks, and boiling syrup poured over it. The flavor is an agreeable sweetish acid, and the infusion of the pulp forms a grateful refrigerent beverage, valuable in febrile diseases. The tree thrives in a loamy peat, and is highly ornamental. Distance, twenty feet.

THE WALNUT—(Juglans Regia).

THE fruit of the walnut, when ripe, is in esteem for the dessert, and in its green state is used for pickling.

The wood is valuable for gun-stocks and other similar purposes, being lighter in proportion to its strength than most other woods. The tree grows to the height of fifty feet, and may be planted at intervals of thirty feet. It is easily propagated from fresh seeds and layers, and comes into bearing in six or eight years. It requires a deep soil of fair quality, resting upon a dry subsoil; and the only pruning necessary is the removal of crowded or cross branches. The fruit is produced on the extremities of the previous year's shoots.

THE WAMPEE—(Cookia Punctata).

This esteemed Chinese fruit is the produce of a small evergreen tree, having compound leaves, which is a native of China and the Indian Archipelago. It grows to the height of fifteen feet, and bears fruit in China at three years, from the seed. The approved sorts are propagated by layers, but may also be increased by cuttings of ripe shoots in heat, under a bell-glass. For the purpose of raising new varieties, recourse must be had to the seed; and it is to this means of propagation, the only true method of "acclimatising," that we must look for its ultimate naturalisation to the soil of Queensland. It has not yet borne fruit here; but, as the Chinese speak of it as superior to the litchi, which is a universal favorite with them, it is likely to prove a valuable addition to our fruits. The tree is allied to Murraya. The soil most suitable for its cultivation is peat and loam. There are two or three distinct sorts grown in China.

New Chinese fruits.

The productive character of all the Chinese fruits hitherto introduced into Queensland should encourage

further efforts to extend the list, so as to embrace all that would prove of value. Travellers mention apricots as being indigenous, and the Chinese speak of a kind of plum, of which they have several kinds, as being hardy, prolific, and most delicious. These, the mangosteens, and several others, would prove of value, and every effort should be used to secure them, now such facilities exist, by means of the junction of the Torres Straits and China mail services.

WINE PALM—(Elais Melanococca).

From Elaia, the olive. The natives of Guinea express an oil from the fruit, in the same manner as the Continental nations do from the olive. It is used in Europe in enormous quantities in the manufacture of soap and candles, and for other purposes, under the name of palm oil. The leaves are made into mats, &c., and from the sap of the tree an agreeable intoxicating liquor is made, called palm wine.

This valuable palm, which is a native of New Grenada, grows to perfection in the Brisbane Botanic Garden, where it produces its large bunches of delicious fruit in great profusion. It comes into bearing at about seven years, from the seed. The bunches of fruit are rather lax, and are frequently about four feet in length by eighteen inches in diameter; the fruit, which is about the size of a plum, hanging pendant from the flexible foot stalks. The fruit is juicy, and has a most agreeable aromatic and spiritous fruity flavor.

The tree thrives in a rich sandy loam, and may be increased by suckers and by seed. Being a native of the tropics, it will probably grow to even greater perfection in all the northern coast districts than it does in Brisbane.

THE FARM.

THE FARM.

MAIZE or INDIAN CORN.

A GOOD rich loam is suitable for this crop. Let the ground be well ploughed, and both surface and underground drainage provided for.

It is generally sown in rows four feet apart, the hills being three feet apart in the rows, into which five or six seeds are placed at a depth of one and a-half or two inches. The plants are ultimately thinned out to three in a cluster. Let the weeds be kept down, lest they smother the young plants, drawing them towards the corn hills, but not too close until the second cleaning, when the corn is "hilled up." The crop is much improved by two or three ploughings between the rows during its growth, even so near as to tear out part of the roots. It should always be cleaned and earthed up by the light one-horse plough, and, if the rows are up and down hill or a sideling fall, the furrows will answer for surface drains in case of long-continued rains.

Another method is to grow it in rows four feet apart, dropping the seed into drills two inches deep, at distances of eight inches apart. This practice has only been tried by a few cultivators, but the result is stated to be satisfactory.

A full crop is from fifty to eighty bushels; an average crop not more than forty bushels; and it takes about four months to mature.

Some growers cut the tops off the corn when dead, and use them for fodder for their cattle. The inside husks make good stuffing for mattresses. The stalks are best burned on the field in heaps, with as much earth gathered round as the fire will be able to char. Ashes are valuable as manure for all farm crops.

Seed and time of sowing : Too much care cannot be bestowed on the selection of seed. Select the largest and best cobs, and only sow the seeds from the centre. Endeavor to procure the longest grain, as the yield will be greater, the number and width of the grains being the same. One-tenth greater length in the grain will give you one-tenth more crop, or fifty bushels more in five hundred. Sow the common maize in July and August for summer crop, and in January for winter crop. The ninety-day maize may be sown in February.

Sir William Macarthur, Camden Park, N.S.W., grows excellent varieties of early and late maize, which he is careful to preserve pure.

EARLY WHITE TUSCARORA CORN, &c.

This fine flour corn was introduced here several years since, and is still cultivated to a small extent. The pure white flour from this corn, boiled in milk, would make a most agreeable and heartening breakfast for the family of the agriculturist, and it is to be regretted that an unreasoning prejudice should interfere with the extended use of this wholesome grain, in its various forms as an article of diet. It is of dwarf habit, ripens in ninety days from the day of sowing, and may be sown as late as March. An experiment was made in the season of 1864 by the Author, as follows :—On August 26th some seed of this corn was sown ; the season was backward and nights very cold, and the corn was consequently much retarded. On November 24th the crop was gathered ripe and dry, and a row of selected seed was sown. On February 24th

the crop from this was gathered ripe, and a row of selected seed again sown, the crop from which, much retarded by heavy rain and floods, ripened and was gathered on the 31st May. Three crops in succession in 278 days.

The American pop corn, Darling's early sugar corn, and Burr's large sugar corn—all much used in America for culinary purposes—ripen here in ninety days.

WHEAT.

Advantages of selecting seed.

The very satisfactory results which have always followed the judicious *selection* of both seeds and animals for the purpose of propagation, when improvement of the original stock was desired, have left the question beyond dispute; but few persons attempt to reduce it to practice on their own farms, and those who do seldom publish the particulars of their success.

The experiments of Mr. Hallett, of Essex, England, are probably as interesting and instructive as could be desired for an illustration.

Space will not allow a detailed statement of his mode of cultivation, but the result has been very striking: he now has wheat which produces ears eight and a-half inches long, and having up one side eighteen ranks of spikelets of grains. The seed is recommended to be drilled in at the rate of only four bushels to ten acres. The following extract will explain the mode of selection adopted for "*Hallett's Pedigree Nursery Wheat:*"

"In every plant of wheat, barley, or oats there is always ONE BEST EAR, and in every ear there is always ONE BEST GRAIN, which is that one found at the following harvest to produce the best plant, *all* the grains having been planted in competition with each other. The best of all the competing plants of any 'family' of a cereal is ascertained by the most studious comparison

of the good qualities they visibly present, *and of the notes of the peculiarities exhibited by each during the whole course of its growth*, such as—the rapidity with which the parent seed germinates; the manner, time, and extent of the 'tillering' of the plant; the periods of its earing, blooming, and ripening; its powers of withstanding disease, frost, wet, &c.; the *toughness* of its straw, and any other characteristics which are essential to forming a correct decision, and which cannot be determined by even the most careful inspection of the perfect plant. This best plant is called '*the selection*' of the year (say 1861) in which it is thus obtained, and consists of numerous ears, containing many hundreds, and even thousands of grains, which are planted separately, those of each *ear* being kept quite distinct, as, although the best grain of any plant is nearly always found to lie in the best ear, it may be otherwise, and the successive parent *ears* must be preserved. At the following harvest (1862), the best plant forms '*the selection of* 1862,' and its produce is continued on the experimental ground, while that of the remaining plants furnishes the annual seed for the farm in the autumn of 1862, and the crops are in 1863 offered to the public. Thus, the selection sold is that of 1861, or in any year that of two years before; *the latest selection, that of the year immediately preceding, is not sold, being solely employed as the home seed.* The separate ears of a plant are designated by different letters, numbers, or names, as A, Z, &c.; and each, with its descendants, form a '*family*' which may develop some valuable peculiarity. Thus, all the 'Pedigree Nursery Wheat' hitherto sold has been of a family called 'A,' while another family of the same wheat known as 'Z,' having been observed to exhibit marked superiority, has been continued separately, and has given a greater progress during 1862 than has been before obtained in any single year. The original ear ('A') contained up one of its sides 16 'ranks' (spikelets) of grains, while the

'Z family' has produced ears of 18 'ranks,' and this without any increase in the *length* of the ear, the 'notches' of the axis on which the spikelets grow being placed more closely together. In a small field of this 'Z' family, ears with 17 'ranks' were quite common, while in other fields of the family 'A,' *not one such ear could be found.*"

Cultivation of wheat.

The land most suitable for the cultivation of wheat is a moderately rich loam, which should be free of weeds, in good tilth, and subjected to a proper rotation of crops. On some soils wheat may be grown alternately with a green crop, where manure is abundant. Wheat is exhausting to the soil, and therefore requires manure; too large a dose, however, will sometimes cause the crop to lodge, and in some instances the presence of rust has been attributed to over-manuring of that crop, and the manure is consequently more generally applied to one of the other crops in the rotation. The manures most suitable for wheat are animal matters and lime. Thorough draining is of the utmost importance.

The land being prepared by a fallow and several ploughings, the seed should be pickled as follows:— Dissolve the salt in a very small quantity of water; some lime is slacked with this brine, and the wheat candied with it, having been previously moistened with pure water. Wheat prepared in this way is found by experience to be more free from smut than when any other preparation is employed.—*Young.* Stale urine is preferred by some growers.

Method of setting wheat: "The lands on which it succeeds best (Norfolk, England) are either after a clover stubble or those on which trefoil or grass seeds were sown in the spring before the last. The grounds, after the usual manuring, are once turned over by the plough in a long extended flag or turf, at ten inches

wide, along which a man called a *dibbler*, with two setting irons, somewhat bigger than ramrods, but considerably thicker at the lower end, and pointed at the extremity, steps backwards along the turf, making holes about four inches asunder every way, an inch deep ; into these holes the *droppers* (generally boys) drop two grains of wheat, which are quite sufficient. After this, a gate, bushed with thorns, is drawn by one horse over the land to close up the holes. Seed—three pecks per acre."—*Young.*

Weeding should be attended to, so that the young plants be not choked.

If the land is sown broadcast, from one to two bushels of seed will be required, according to the soil.

Sowings may be made during March, April, and May. The crop should be cut when thoroughly mature, but before it is quite ripe, as the grain is a better color, and it saves waste by scattering.

Salt is a good special manure for wheat, and is a preventative of rust.

THE POTATO.

The potato is propagated by the tuber, either whole or cut into "sets" with an eye to each ; since the great failure, however, many intelligent growers have devoted attention to raising new varieties from seed contained in the berry or potato apple, and valuable results have followed their efforts in the introduction of some new sorts, said to be free from the disease, hardy, early, floury, and productive. This is an object well worth the attention of Queensland farmers, as we are not yet possessed of an acclimatised variety of this valuable root. The apples are produced more abundantly in the spring than in the late crops ; they should only be saved from potatoes of the best quality, and as they sport into innumerable varieties, each root should be

numbered and kept separate. The seed may be sown in shallow drills in February, and when about three inches high thin them out to about eight inches or a foot apart. The tubers from the seedling plants will be very small. On digging them up, select the best roots to experiment with, keeping each cluster separate and numbered, or otherwise distinguished. On planting them in the following spring, select an equal quantity of the best formed tubers of each root, giving them equal space and attention. When the crop is ripe, the tubers will be of a sufficient size to determine their properties.

Having considered not merely the flavor of each new variety, but the size, shape, and color, the comparative fertility and healthiness, earliness or lateness, reject or retain it for permanent culture accordingly.

Propagation by tubers: When tubers are intended to be cut, this operation should be performed several days before planting, and the sets spread out in a shed to dry. The cutting should be from end to end, and not across the potato, as the root end is said to be a fortnight later than the others, and this would cause the crop to ripen unevenly.

Time of planting, &c.: The land being well drained and properly prepared, potatoes may be planted in March and August, in drills two feet six inches apart, and the sets twelve inches apart in the rows. The drills should be four inches deep, and the sets carefully covered. Medium sized whole potatoes are generally preferable to cut potatoes, especially for the August sowing. The season for sowing necessarily varies, not only with the district, but with the aspect.

The crop should be kept free of weeds, and for this purpose the scarifier would be found useful. The potatoes should be earthed up with a light one-horse plough as they advance; and if at the second earthing up, the furrows are left pretty deep, they will be valuable as surface drains in case of heavy rains.

Shirley Hibbard, a successful grower, who gets nineteen tons to the acre, free from disease, gives many valuable directions for the cultivation of the potato, which might, with advantage, be tried here in gardens. He recommends a fresh, crumbly loam, so situated as not to suffer from heavy rains, which had been *manured heavily* for cabbage the previous season, so as to be very rich and light. It is dug a full spade deep, and the whole potatoes, about two or three ounces each, are lightly trenched in—that is, laid along in drills, opened by the spade at proper distances, and covered by the spade in making the next trench. The soil above, around, and under them cannot be too loose and friable, and from the moment the sets are in, not a foot should be set on it, until the time comes for hoeing them over. At the time of planting, the sets should be firm, slightly sprouted; the sprouts close, very stiff, and strong, and dark green or purple. Charred rubbish, to the depth of two or three inches, is scattered over the whole bed after the first hoeing, and the crop is not earthed up. The potatoes are dug before the haulm is quite dead.

A large number of new sorts have been imported, but have not yet been grown to any considerable extent. A round, white variety, received some years ago, known as *Webster's Best*, has earned for itself a good reputation for flavor, earliness, and productiveness; and an American potato, called the *Early Rose*, which caused quite a *furore* there when it was first made known, has been introduced here by Mr. Cribb, and has produced very satisfactory crops.

THE SWEET POTATO.

This valuable esculent requires a rich, dry, loamy soil, inclined to sand. The land should be ploughed deep, and well manured. Potash and the phosphates

are the special manures indicated by analysis as particularly required.

It is propagated during September and October, by suckers or runners, which are planted three feet apart, and the sets eighteen inches distant in the rows. Some growers throw the land up into flat ridges, and plant on the top.

In the interior, or in districts where a supply of runners or vines are not obtainable, some small roots should be procured, and planted in a well-prepared bed in May, and they will throw up an abundant supply of shoots for transplanting early in spring. If frost is expected, the bed should be strewn with litter during winter. Care should be taken to secure the best quality, as they deteriorate from bad culture. New varieties may be raised from seed.

THE YAM.

THE yam requires a very deep, rich, sandy soil, which should be dug at least three feet deep, and well manured if not sufficiently rich. It is propagated by seed or by the crowns of the old roots. They may be planted in September and October, five or six inches deep, and three feet apart each way, placing a stick firmly in the ground by each plant for the young shoots to climb up. When the tops die down the crop is fit to dig, which operation may be performed by opening a trench at one side of the bed, about two feet six inches deep, the whole length of the row, and trenching the bed. By this method the roots may be got out without breaking; and, if a good dressing of manure is first put on the surface of the bed, this trenching will be a good preparation for the next crop, nothing further being necessary at the planting season than a good surface digging, and setting the seed or crowns as first directed. Some growers recommend

the beds to be thrown up in ridges, and the sets planted along the top, to save the trouble of such deep digging; but in dry seasons this might endanger the crop. The whole yam is covered with eyes, and may be cut up into "sets," and not the crown only, as is generally supposed.

THE DIOSCOREA BATATES, or CHINESE YAM.

The botanic name is here made most prominent, as it is by that this useful tuber is most generally known. This plant is a native of Japan and China, producing long slender tubers about two feet long, which are esteemed by many persons as superior to the common yam. The tuber may be cut up into small pieces for planting, as the exterior is set all over with eyes or buds. The sets should be laid by in a warm place to start the buds, and while they are progressing the ground should be prepared for their reception. The soil should be very rich or highly-manured sandy or fibry loam, and is recommended to be thrown up in ridges eighteen inches apart, along the top of each of which the sets are planted six inches apart and four inches deep. The tops soon cover the soil and smother the weeds, and, being planted upon ridges, will be found to greatly facilitate the digging.

THE CASSAVA—(Jatropha Manihot).

An evergreen shrub from South America, growing to the height of three to five feet; tubers somewhat resembling parsnips in size and shape are produced at the root in great abundance, from which the cassava flour is manufactured in the most primitive manner.

The cassava is also made from other varieties of the jatropha, but the Jatropha Manihot is more generally cultivated for that purpose in consequence of the tubers being free from a tough fibre which passes through the

others. The tubers, on being dug, are washed and peeled; they are then ground down to a pulp through a rough grater, placed in wicker baskets, and subjected to a heavy pressure by lever to express the juice or sap from the mass; this is turned out on skins, exposed to the sun, and, when dry, is baked over a slow fire on earthen plates. The root in its raw state is said to be an acrid poison, but the flour and bread prepared from it are not only wholesome, but pleasant.

Tapioca is prepared from this root, and a flour equal to arrowroot may also be made from it.

It is supposed that heat alone is sufficient to dispel its poisonous quality, as the Indians merely roast the root in the embers.

The plant requires rich, well-drained soil, and as it is an exhausting crop, the plants should have plenty of room, and not be put twice in the same bed. The produce is very great, and the flour nourishing.

ARROWROOT.

Arrowroot, in Queensland, is manufactured from two different plants; the *Maranta Arundinacea* or *white*, and the *Canna Edulis*, or *purple*. Both kinds yield white arrowroot, and the distinguishing color mentioned has reference only to the skin of the root or tuber.

A rich sandy loam is the most suitable for its cultivation, and it should be prepared by deep digging or ploughing, not less than twelve inches deep. Small well-formed tubers should be selected and planted in October, in rows four feet asunder, and two feet apart in the rows. During the growing season the plantations should be frequently hoed and kept perfectly clear of weeds; a little earth may also be drawn around the plants. A slight frost greatly accelerates maturing of the crop, which generally occupies the ground nine months. When the bulbs are dug they are thoroughly

washed to remove all earthy particles, after the roots have been rubbed off. The washing may be performed either by hand or in a cylinder revolving in water, according to the extent of the plantation. The bulbs should be immediately reduced to pulp by hand or horse-power grater, or by pounding in a large wooden mortar. The pulp is thrown into a quantity of clear water and thoroughly agitated, when the fibre may be gathered and removed. After the starch has settled the water is drawn off, more water is added, the residuum is thoroughly disturbed, and the whole strained through a sieve to remove any pieces of fibre remaining, and it is allowed to settle as before. This operation is again repeated if it is intended to prepare a fine article. The arrowroot is then spread out on clean white cloths to dry in the sun, and when quite dry is ready for packing.

The plant is of easy cultivation, and the chief expense is incurred in the manufacture. Its profitable production, therefore, depends upon the extent to which machinery and horse-power may be made available to economise manual labor; and to this point we would particularly direct the attention of growers, as upon it depends our ability to compete for the supply of all the civilized world.

TOBACCO.

A LIGHT rich soil is best suited for this plant—land which would produce potatoes and turnips in perfection. It must be free of water, and, if not rich, it should be well manured with thoroughly decomposed manure.

In August, having prepared a suitable bed, mix the seed with six times the quantity of sand, scatter it evenly over the bed, and cover it slightly with a little sand sprinkled or sifted over it. A little protection should be given in case of late frosts. When the plants have so far advanced as to have leaves four

inches long, they are fit to transplant, and their longer continuance in the seed bed would be injurious. Plant them out at three feet apart each way. Every morning and evening they require to be looked over, in order to destroy a worm which sometimes invades the bud. When four or five inches high they are moulded up. As soon as they have eight or nine leaves, and are ready to put forth a stalk, the top is nipped off, in order to make the leaves longer and thicker by directing all the energies of the plant to them. After this the buds which sprout from the joints of the leaves are all plucked, and not a day is allowed to pass without examining the leaves, to destroy a large caterpillar which is sometimes very destructive to them. When they are fit for cutting, which is known by the brittleness of the leaves, they are cut with a knife close to the ground, and, after lying some time, are carried to the drying shed, where the plants are hung up in pairs upon lines, having a space between them that they may not touch one another. In this state they remain to sweat and dry. When perfectly dry, the leaves are stripped from the stalks, and made into small bundles tied with one of the leaves. These bundles are laid in heaps and covered with blankets. Care is taken not to overheat them, for which reason the heaps are laid open to the air from time to time, and spread abroad. This operation is repeated till no more heat is perceived in the heaps, and the tobacco is then stowed in casks for exportation.

The crop is about three months coming to maturity. The plants, when cut down, will throw up other shoots, one of which should be preserved for a second crop.

At three feet apart, there will be 4,840 plants per acre, and the average yield on good soil is stated at a quarter of a pound per plant, or about 1200 lbs. per acre. The ground must be kept perfectly clear of weeds.

For different modes of culture and manufacture, the reader is referred to *Loudon's Encyclopædia of Agriculture*, p. 936.

COTTON.

Varieties: There are many varieties of the cotton plant, and probably some very valuable sorts may yet be produced by hybridising and selection. The Sea Island or Long Staple and the Egyptian, New Orleans or Upland are the sorts most cultivated.

Soil: The soil should be rich, friable, and deep, and free of water for two feet six inches in depth.

Cultivation: The land should be well ploughed, and the subsoil broken up if possible. The seed is sown three or four in a hole, at four to eight feet apart, according to the richness of the soil, in September, or as soon as it considered the frost is over. Great care is necessary to keep the crop clean by an early weeding, or it may be smothered by the weeds or destroyed by caterpillars. In weeding, the plants are thinned out, leaving the two strongest in each hole. The second weeding may be done with a light plough or scarifier, when the plants may be earthed up. If the earth is stirred as soon as the weeds are a quarter of an inch high, two or three times during the early growth of the young cotton plants, the crop will require but little further trouble.

Cotton picking commences in March, and should be proceeded with without intermission, as serious damage often occurs from rain when the ripe bolls are allowed to remain on the tree, and the sample is much damaged by dirt and pieces breaking into the cotton from the dried pericarp.

Notwithstanding the superior quality of the Sea Island cotton produced in Queensland, and the consequent high price which it commands, the New Orleans is growing into favor, as it is stated to possess

three advantages over the former:—It is said to be more umbrageous, by which the growth of weeds is checked and labor saved; to produce a much larger crop, by which it compensates to a considerable extent for the difference in price; and to ripen the crop more uniformly, by which it requires picking less frequently, to the great saving of labor.

The Queensland farmer has fairly tested cotton as a crop, and much valuable knowledge has been gained as to the nature and habits of the plants, the varieties best suited for the climate and soil, and the probable returns; and, at the present cost of labor, it cannot be made to pay.

In addition to the cotton fibre, there are two other products of the cotton plant at present almost always wasted, but which are capable of being utilized, namely, the seed, and the fibre obtainable from the bark of the plant. Dr. Coxe, of New Orleans, states that "an increased value of more than £7,600,000 sterling might be given to the cotton crop of the United States by utilizing the cotton seed, which is now almost wholly wasted." He says—"100 lbs. of cotton seed will yield two gallons of oil, equal to that of Italy termed 'salad oil'—and it sells in New Orleans at four shillings per gallon (in New York, six shillings per gallon); 48 lbs. of oil-cake (equal or superior to linseed-cake), and 6¼ lbs. of soap stock, which, with ingredients of small value, will make 20 lbs. of soap, equal to the best European kinds,"

The stalk of the cotton plant contains a fibre not unlike coarse flax, and an experiment in America upon 120 lbs. of stalk resulted in producing, when steeped and dressed with flax machinery, forty pounds of thread suitable for weaving bagging and other coarse cloth. If the stalk were properly macerated, it could, doubtless, be made into paper.

Ridge planting: Where the land is flat, the practice of throwing it up into high ridges or beds, and sowing

on the top, as is done in America, may, no doubt, be followed with advantage.

Manure: As most of the land of the Sea Island plantations is so much impregnated with salt as to be apparent to the eye, and some of it but recently reclaimed from salt marshes, it is but reasonable to suppose that saline manures would be most suitable to the Sea Island cotton crop in this colony.

COFFEE.

The coffee plant thrives and bears most abundantly in rich friable soil on the slopes of hills, protected from high winds; but the small berry produced in the sandy, dry, hot soil and arid climate of Arabia has the advantage in flavor. In the West Indies the mango and other fast-growing, umbrageous trees are planted on the upper part of the land to protect the plantation from wind. Bananas are also used for shelter, planted in rows about every fourth row of coffee. The plants at present in a bearing state in the vicinity of Brisbane do not appear to have suffered from the absence of shelter; but it is as well to observe the practice of other countries where the plant is successfully grown, and only plant on the sides of hills where they will be protected from prevailing winds.

Plant in good soil at eight feet apart, giving shelter and water if required until the plants are well established. March or April would be a good time for transplanting in favorable weather, as the plants would make new roots before the winter stopped them, and there would be less risk of loss from a dry spring; in dripping seasons, transplanting may be performed as late as August and September. As the plants grow, the tops are generally stopped, to prevent their growing too tall, and to encourage the production of lateral

shoots. The berries are gathered when they begin to fall, and, after having the outside pulp removed, are dried on cloths or mats under sheds until the husks shrivel; they are then passed through between wooden rollers, which separate the seed from the husk; are then winnowed, sifted, cleaned, dried in the sun for a few days, and barrelled up for market. The produce in Jamaica is about one and a-half to two pounds per tree; but the return is much greater from the single trees grown near Brisbane. An industrious man gathers three bushels a day.

There are several varieties of coffee, and in Ceylon they have a small sort called the peaberry coffee, which the planters keep for their own use, the flavor of which is said to be very superior; but, as the produce is not so great as the larger variety, it is not much grown for market.

In Ceylon the coffee is planted among the stumps and fallen timber. It is not found to thrive there in low situations, or on table lands, although they may be of the requisite elevation. The planters assert that abundance of rocks are almost indispensable to the proper growth of the shrub; and the best estates have been invariably those which, well sheltered and shaded, are situated in such an amphitheatre-like depression on the side of a lofty mountain as ensures a rich soil—the accumulation of ages—a plentiful supply of moisture, and perfect drainage.

The infusion of coffee is seldom tasted in perfection. The subtle aroma which resides in the essential oil of the berry is gradually dissipated after roasting, and still more after being ground. In order to enjoy the full flavor, the berry should pass at once from the roasting-pan to the mill, and thence to the coffee-pot; and again, after having been made, should be mixed, when almost at boiling heat, with the hot milk.

TEA.

THE tea plants may be placed on a gentle slope, at the distance of six feet apart. Transplanting may be done in August if the ground is in a favorable condition, and the plants should have shelter and water if requisite until they are established. In China the plants are three years old before the leaves are gathered; there are then three gatherings, at one month apart, on which occasions three classes of tea are gathered. This is performed with great care : the leaves are picked off one by one. At the first gathering, only the unexpanded and tender are taken ; at the second, those that are full grown; and at the third, the coarsest. A picker collects from 30 to 50 lbs. of green leaf per day.

The tea leaves are cured in houses which contain from five to ten or twenty small furnaces, about three feet high, each having at the top a large, flat iron pan. There is also a long, low table, covered with mats, on which the leaves are laid, and rolled by workmen who sit round it ; the iron pan being heated to a certain degree by a little fire made in the furnace beneath, a few pounds of the fresh-gathered leaves are put upon the pan, and it is the business of the operator to shift them as quickly as possible with his bare hands, until they become too hot to be easily endured. At this instant he takes off the leaves with a kind of shovel resembling a fan, and pours them on the mats before the rollers, who, taking shall quantities at a time, roll them in the palms of their hands in one direction, while others are fanning them that they may cool the more speedily, and retain their curl the longer. This process is repeated two or three times, or oftener, before the tea is put into the stores, in order that all the moisture of the leaves may be thoroughly dissipated, and their curl more completely preserved. On every repetition the pan is less heated, and the operation performed more

slowly and cautiously. The tea is then separated into different kinds, and deposited in the store for domestic use or exportation.

One choice kind of tea is scented with orange flowers when fully expanded. Forty pounds of the flowers, fresh gathered under the trees, are mixed with one hundred pounds of perfectly dry tea, and they are left together for twenty-four hours, when the orange flowers are sifted out.

The tea leaves are gathered when full grown, but tender. If left to get hard they are useless for manufacturing or rolling. Four pounds of the green leaf will make about one pound of manufactured tea.

The plant sports considerably by seed, and careful and intelligent selection would result in obtaining some very superior sorts. The Indian tea planters appear to be paying some attention to this.

Some rather extensive plantations have been made in America, and tea of excellent quality has been prepared. The Americans, as usual, have shown their originality by departing from the universal method of preparing the leaf by rolling it, and merely dry it. Long usage has so accustomed us to see the tea rolled, and to expect the best quality to be the most compactly compressed, that the unrolled leaf would not at first command a high market price. The prejudice would, however, soon be dispelled if the quality was found to be good: and the Americans found this to be the result.

GINGER.

The ginger of commerce is the tuberous root of a perennial plant. It delights in a rich peaty soil, pretty moist, in which it will grow luxuriantly, extending under ground, and sending up at each joint its rush-like stalks. It is propagated by division of the roots, and may be planted in rows two feet apart

during October and November; plants one foot apart in the rows.

To prepare the white ginger for market, dig it up when quite ripe and the stalks are dead; select the finest and soundest roots; carefully wash, scrape, and dry them.

To make preserved ginger, dig the roots up when nearly full grown, and quite tender; after being washed, scald and scrape them. Let them stand in cold water about twenty-four hours, changing the water three or four times; boil in syrup for twelve hours; make fresh syrup and boil again for twelve hours; pack in jars and cover with the syrup.

CHICORY—(Chicorium Intybus).

THE vast quantity of chicory imported, and subsequently retailed under the name of coffee, should afford sufficient inducement to some enterprising farmer to enter upon the cultivation of this plant.

Soil and situation: The soil should be rich, light, and moist, but not wet; and the situation open.

Cultivation: Prepare the soil early in August, and sow in drills two feet apart; cover slightly. When the plants are large enough to handle, they may be transplanted in wet weather. If the surplus plants are not required, they will have to be hoed out to nine inches or one foot apart in the rows, according to the richness of the soil. The leaves may be blanched and used as endive, *and the surplus will be found valuable at fodder.* If too luxuriant, and the foliage is not used for the foregoing purposes, it should be thinned to prevent the plants smothering each other. As the seed is slow to germinate, it should only be sown on clean land, or it will be smothered by quick-growing weeds. The produce in Victoria is said to have been as much as twenty-five tons per acre—the average at home being about fourteen tons.

CULTURE OF HOPS.

THE hop is a hardy perennial rooted twiner, growing to the height of fifteen to twenty feet, the top being annual. The male and female flowers are produced on different plants; the female is the one used for planting, with a few male plants to form seed, which adds greatly to the flavor of hops. It is, probably, the most precarious crop that is grown, being liable to disaster from the moment of sprouting in the spring until the hop is ready for the kiln, and the market value is therefore very variable. Considerable success has attended its cultivation in Tasmania, New Zealand, Victoria, and South Australia, the returns not only being fairly satisfactory, but the quality being good, and, therefore, effectively competing with the imported article.

The cost of cultivation in the southern colonies has been from forty to sixty pounds sterling per acre, the produce varying from 300 lbs. to 1,600 lbs. per acre.

Some experiments have been made in hop cultivation on the Darling Downs, to test the suitability of the soil and climate, and with such results as to induce extended planting.

A hop farm generally lasts in full vigor for ten years. It is a most exhausting crop, and requires to be liberally manured in all its stages. Superphosphate of lime, guano, stable manure, fresh wood ashes, and salt would provide most of the wants of the plant. The hop plant ranks high as an ornamental climber, the growth being luxuriant and the foliage handsome. In garden culture it may be propagated by cuttings of the ends of the shoots.

INDIGO.

THE indigo plant is well suited to the soil and climate of northern Queensland, and, where cheap labor is available, it may be grown to profit.

Soil: Heavy soil produces the best return; but it grows well in the lighter soils, and they are easier cultivated.

Cultivation: The land should be well worked, to prepare it for this crop.

Sowing: After the prepared land has been again ploughed and harrowed, if the soil is damp in the beginning of September, sow the seed broadcast at the rate of 35 or 40 lbs per acre, harrowing it in and rolling the surface. During the first two months the crop must be well cleaned once or twice, and the horse-rake may be passed over it to loosen the surface and destroy the young weeds. The crop is ripe in about ninety days, and should be cut without delay, or some of the lower leaves will fall and be lost. The appearance of the ripe plant must be learned by experience.

Manufacture: An interesting paper on this subject, written by an indigo-planter, will be found in the *Queenslander* newspaper of November, 1873.

THE SUGAR-CANE.

THE the ten years which have elapsed since the appearance of the first edition of this work, have sufficed to establish the sugar industry as one of the most important in the colony. And as the cultivation of the sugar-cane is now more generally understood, it will not be necessary to give any very minute instructions on the subject.

Forty or fifty varieties of cane have been introduced and tested; but these have been grouped in classes, and are generally spoken of as ribbon, Bourbon, and purple canes. The Bourbon and purple canes are easier to trash than the ribbon. In coming to maturity the purple canes are earliest, ripening in from ten to fifteen months; the Bourbons follow next in rotation, and the ribbons last.

A fair average crop of cane would be about 25 to 26 tons, which, at a density of the juice marking 10° Baumé, would yield about 3 tons of sugar and 5 cwt. of molasses per acre.

Soil, &c.: A deep, rich, loamy soil, damp, but *not retentive of water*, is the most suitable for the growth of sugar-cane. The situation should be warm in the southern part of the colony, to guard against injury from frost in severe winters; and it should be such as to afford shelter from high winds.

Planting, &c.: The soil should be drained of all stagnant water, at the least six inches deeper than it is intended to plough it; the depth to which it should be ploughed is eighteen inches; and on a porous subsoil no drainage will be necessary. To prepare for planting, run a light plough over the land, and mark furrows four feet six inches to five feet apart, and cross furrows at the same intervals. At each intersection of the lines make a hole about two feet long, and a clear foot deep, being two inches wide at the bottom. See that the earth is carefully banked up, so that it will not fall into the holes. All is now ready for planting. The best sets are pieces of healthy, well-grown, ripe cane, containing four well-developed buds and joints; the smooth, hard covering over the buds, which is part of the foot-stalk of the former leaf, should not be removed. The cane being cut into lengths containing four joints, one may be placed along the bottom of each hole, and covered one inch deep with soil, *not deeper.* The cuttings should not be exposed to the sun and air, but be planted immediately they are cut. The shoots will generally appear in ten or fourteen days, and, when six inches high, one inch more earth may be carefully drawn on to the sets. Avoid putting too much earth upon them, as it would greatly interfere with their growth and vigor, but gradually fill up the holes as the *joints* of the cane become visible. In young plantations the hoe should be almost incessantly

at work, as the stirring of the soil stimulates the growth of the crop; after rain it is very important. In older plantations the soil is covered with thrash, and the surface is kept continually light and open. The planting should not be less than twelve inches deep, or the crop might be destroyed in a season of drought or by a gale. The *ribbon* cane is said to require one or two feet more space than other sorts, in consequence of its lateral growth after the first season.

Some growers recommend the canes being planted closer than is here directed. If such a course be adopted, extra vigilance will be required in keeping the canes well trashed, by constantly stripping off all dead leaves.

Planting may be performed during August, September, October, and November. When deferred to a later period, the shoots have not time to make much growth before the cold nights check them; but they form a number of buds and a mass of roots, which enable the plants to push out vigorously early the following season.

The plantation should be manured every year, and the surface broken up with the light plough or cultivator.

LIQUORICE—(Glycyrrhiza Glabra).

From the roots of this plant the well-known liquorice of commerce is prepared. The roots extend a considerable distance, and send up strong herbaceous stems four feet to five feet high. It thrives in a rich light soil, at least thirty inches to three feet deep, trenched the full depth and manured. The situation should be open, and the soil must be rich.

Planting: In July or August take the horizontal roots which run from the crown along the surface of the ground, and cut them into lengths of six inches; lay these, eighteen inches asunder, along trenches two

inches deep, the rows being three feet apart; cover the whole with earth. A single crop of lettuces or other salad may be taken between the rows the first season, the bed being kept quite clear of weeds.

The only cultivation is to cut down the dead stems annually, and dig with a fork between the rows to refresh the surface.

After three or four years the crop is ready to take, in doing which a trench must be thrown out along the first row to the full depth of the roots, probably three feet—trenching the whole bed in the same manner, to get out the roots unbroken and without waste.

THE CAPER—(Capparis Spinosa).

The caper is a hardy, deciduous, trailing shrub, growing to the height of three feet, of the flower buds of which the well-known pickle is formed. In the south of Italy and other places it grows wild on old walls, rocks, and ruins; from which it may be inferred that it requires rather a dry, open soil. It may be propagated by seeds, cuttings, or pieces of the root; it has the habit of the bramble; and a plant growing in the open air in England is said to have attained the age of nearly one hundred years. The root has such vigor that, although the plant may be cut down annually by the frost, it covers the space with fresh shoots the next season, and produces a crop of buds. It grows freely in the Brisbane district, and may be propagated in spring by striking the lateral shoots when one inch long, in sand.

THE CINNAMON TREE—(Cinnamonum Dulce.)

The cinnamon tree is perfectly hardy in Brisbane, and grows with great luxuriance. A peaty loam is recommended as the most suitable soil for it; but in

Ceylon it grows in white sand. It is a handsome evergreen shrub, and is propagated by layers, cuttings, and seed.

The preparation of the spice from the bush is very simple. Sticks, as straight as possible, three or four feet long, are cut from the bushes in large numbers—the thickest not much stouter than one's thumb, the thinnest not so small as one's little finger; these sticks are held by the operator in his left hand, resting lengthwise on his forearm, whilst, with a sharp knife prepared for the purpose, he cuts the bark down the entire length of the stick, and then peels it off, endeavouring to retain the pieces of as great a length and breadth as possible; the strips of bark are then thoroughly dried in the sun, rolled up into thin cylinders, the smaller ones being placed within the larger, and packed for exportation.

A spurious camphor is prepared from the roots of this tree, but the camphor of commerce is the produce of the *cinnamonum camphora.*

THE CASTOR OIL PLANT.

(Ricinus Communis).

This plant grows with great luxuriance over a large area of the country, especially in rich, well-drained soil, and produces heavy crops of seed. Like most plants which are raised from seed, it sports into many varieties; and in countries where it is grown for manufacturing purposes, they possess special sorts which are highly valued, some of which were received by the local Acclimatization Society, and distributed several years ago. The most approved sorts were rather small seed, but very solid, and rich in oil. Size is no recommendation, as the large seed is often hollow, and does not yield much oil. Another very important quality has also to be considered in selecting seed for planting,

namely, the manner in which the plant casts its seed. Some sorts ripen few seeds at a time, and shed them directly, by which much of the crop is lost; others are so difficult to shed, that the seed is injured in thrashing. To obtain the greatest combination of good qualities, Dr. Bancroft, after numerous experiments, by hybridising the plant, succeeded in raising a variety which he considered to be worth preserving, and, with that object, the writer grows a few plants of it.

As the tree would grow and produce heavy crops on sandy wastes, otherwise sterile and valueless, and there is a ready market for the oil, it offers some inducement to utilise such positions in this manner. The return would be about £10 per acre.

ARTIFICIAL GRASSES.

With the occupation of the Agricultural Reserves, it is to be hoped a more perfect system of farming will gradually be introduced. Hitherto, it has been common to find men, after a few desultory attempts, relinquishing cultivation, because they made more profit from their few heads of cattle (feeding upon unsold Crown lands) than they did from the cultivation of the soil; but the sort of farming we want, and which would yield the best return to the farmer, would include the growth of fodder for the cattle, that they might supply manure to increase the crops. Is is the opinion of the writer that every farm should have a certain number of cattle, sheep, and pigs, the manure from which would double, and in many cases treble, the produce of the fields. No farm can be carried on successfully for any lengthened period without manure. The same crops year after year impoverish the soil,

and the farmer complains that the land is "worn out;" this can only be cured by manure, growing a totally different crop, or giving it rest by laying it down in grass for a few years. Sheep farming is known to pay well; but we feel sure that if the farmers were to add a small flock of sheep to their stock they would get a far better return, in proportion to the capital invested, than the large squatters do.

Clover and grass paddocks would enable our farmers to supply good butter throughout the winter, or fatten their spare stock for the shambles.

Lucerne mown for hay will yield five or six cuttings in the season, which, at the present price (£8 to £10 per ton), affords a very tempting return. Take the average cuttings as only four per annum, and the weight only one and a-half tons, at £8, we have a return of forty-eight pounds sterling per acre per annum; and one sowing will last for twenty years. Some enterprising farmers have tried it successfully, and their example should be followed.

Most encouraging results attended an experiment with a flock of sheep fed in a lucerne paddock. The wool was much longer, and the fleece half as heavy again, as from sheep in a similar flock fed in the usual manner on the natural grasses. This, however, was not the only advantage, as the wool sold for a higher price per pound in consequence of its extra length.

The value of lucerne for grazing is so well understood now by all improving squatters, that extensive lucerne paddocks are provided for their stud flocks, during winter and spring, and larger areas are being sown.

The native grassses have hitherto been found unfit for cultivation, and in the rich agricultural districts of New South Wales they are everywhere giving place to imported grasses. The consequence is that *five* beasts can now be *fattened* on the same land that would have *starved one* previously; and their dairy produce is so abundant that the teeming thousands

residing in Sydney and Melbourne depend on them for a supply of butter during the greater portion of the year.

A good mixture for ordinary soils (sub-soiled, and manured if necessary), is—*rye-grass, cocksfoot, cow-grass, ribgrass, sweet vernal, oat-grass, birdsfoot trefoil, soft grass, perennial rye-grass, Alsyke clover,* and *prairie grass.* This mixture would suit both horses and cattle, and give early and late feed.

For sheep-paddocks, a little mustard-seed mixed with the grasses would be beneficial, and, for stock, mix some parsley.

Mr. Moore, the Director of the Botanic Gardens, Sydney, in the course of a lecture on "Structural and Systematic Botany," in remarks upon the comparative value of imported grasses, made the following suggestions as to the mixtures best adapted for the different soils and situations. He said:—"In the Illawarra and Camden districts, whence the best dairy produce was received, the farmers were not depending upon Australian grass. The two most valuable grasses for this colony would be the *Poa pratensis* and the *Festuca pratensis.* The advantage they had in this country over all others was, that they would grow in the most exposed situations, and the first, even under trees. It would stand the hot weather even better than the common couch grass, and in winter grow in great luxuriance. The grasses, then, that he should recommend were—for dry soils: *Poa pratensis* smooth-stalked meadow grass; *Poa trivialis,* rough-stalked meadow grass; *anthoxanthum odoratum,* sweet vernal grass; *festuca ovina,* sheep fescue grass; *festuca duriuscula,* hard fescue grass; *festuca pratensis,* meadow fescue grass; *festuca elatior,* tall fescue grass; *dactylis glomerata,* cocksfoot grass. For wet soils: *Holcus lanatus,* meadow soft grass; *holcus mollis,* creeping soft grass; *agrostis abba,* moist bent grass; *agrostis stolonifera,* creeping bent grass; *Lolium perenne var, Itali-*

cum, Italian rye-grass. Grasses, as a general rule, possessed no poisonous qualities; but there was one species, the *olium temulentum*, that was, unfortunately, becoming very common here. The kangaroo grass of this colony was fast disappearing. In the northern districts *Cynodon dactylon* had followed in the steps of man. So valuable had this grass been found in Moreton Bay, that a friend had written to him to say that now, "instead of having to enclose a hundred-acre paddock for horses, a small paddock of four acres sown with this grass has been found sufficient to provide feed for half-a-dozen horses."

The prairie grass is now highly valued in the adjoining colonies, and the more it is known the better it is appreciated. It requires a deep rich soil, prepared as for oats. If sown alone, twenty pounds of seed per acre will be sufficient; but to make a thorough good bottom, about three pounds of cow-grass (perennial red clover), three pounds of perennial rye-grass, with fifteen pounds of prairie grass, will be required. It produces a great quantity of seed, which it sheds very freely; and the quantity of fodder produced per acre is almost incredible. Its feeding and fattening capabilies are very great, and if the crop is cut green, it will yield four to six good cuttings in suitable soil. It is rapidly spreading in some parts of the Darling Downs, the flooded water-courses floating the seed away, and distributing it in every direction.

LUCERNE.

The soil for lucerne should be deep, rich, and friable, with a porous subsoil, in which no water could stand in the wettest seasons; it should be free from weeds and weed seed, and thoroughly pulverised. These being all necessary conditions to success, and the absence of one or other of them being the cause of

most of the failures in the attempts to cultivate this valuable plant, it is thought by many to be unworthy of their attention; but the Author fearlessly asserts that, under favorable circumstances, it yields a larger return per acre, and for a longer period, than any other fodder-plant in cultivation.

The land should be prepared during summer by thorough exposure to the sun in high ridges, taking care to cross-plough and harrow before the weeds begin to seed. The land being prepared by deep ploughing and minute pulverization, the seed may be sown broadcast, from February to July, at the rate of twenty-five pounds per acre, and may be covered about an inch deep by the use of a light harrow. Some growers prefer a spring sowing (as it makes little progress during the winter), and consider July the most favorable period for sowing. Others recommend a light crop of oats to nurse the young plants.

If, when sown by itself, weeds should come up thickly, and threaten to choke the crop (which is very tender the first six months, until the tap root has time to get hold of the soil), mow the field carefully *before the weeds seed*, and the most of them, being annuals, will then perish. Before a succession can have time to rise up and do any damage, the lucerne will have gained sufficient strength to make head against them.

Lucerne may be transplanted to fill up blanks.

A large quantity of forest land would return good crops of lucerne by the aid of manure, and, not being so liable to injury by floods, might, in the long run, pay better than the richer flats. A good double ploughing and cross-ploughing, following with a second plough in the bottom of the furrow at the first ploughing, and turning in sixty or eighty loads of manure to the acre with the second ploughing, would be a fair preparation of the land; and, if time would allow a crop of maize to be taken from the land, the additional cultivation would improve its texture.

The growing field of lucerne should be frequently examined, and all yellow, stunted, or unhealthy patches noted, that the necessary cure may be immediately applied, whether it be a dressing of manure, or the draining of a hollow.

Land that is *lucerne sick*, through the long continuance of the crop on the ground, and not through want of manure or bad cultivation, is thoroughly recovered by two years' rest. Either fallow a season, and the following year take a crop of potatoes or corn, after which lucerne may be sown again; or green fallow the land for two years, taking one crop of some cereal each year.

The after culture of lucerne, sown broadcast, consists in harrowing to destroy grass and other weeds; rolling after harrowing, to smooth the soil for the scythe; and a top-dressing of manure once a year.

One great enemy to lucerne is *dodder (Cuscuta Australis)*, a parasite plant which infests the crop in New South Wales, and has been introduced here with the seed from that colony. Wherever it makes its appearance over the field it should be carefully cut out, and every little piece removed and burned. Whatever plants may have been destroyed by it should be replaced by transplanting in the first favorable weather.

THE SORGHUM MILLET.
(Sorghum Saccharatum).

This valuable fodder plant is easy of cultivation, and is more hardy and productive than other crops raised for that purpose.

The soil should be rich, not too heavy, and well and deeply ploughed.

If intended for fodder cut green, the seed may be sown broadcast; but if for seed, it should be sown in rows three feet apart, the seed being not more than one

inch deep, two or three in a hole, twelve inches apart in the rows. By this arrangement the plough or cultivator will have room to pass between the rows to keep down the weeds.

In July prepare the soil, and sow the seed in August. Other sowings may be made in suitable weather during February and March. The crop takes about four months to ripen the seed, and, for green fodder, will yield several cuttings in favorable seasons. It is not liable to lodge in heavy rains, withstands high winds with little damage, is not injured by frost, and will exist and even thrive in a season of drought which would prove destructive to most other crops. The green stuff is easily cured by stacking it after it is dried, and the cattle eat it as greedily dry as green.

The average yield of seed is said to be thirty bushels per acre, and the seed coverings are valuable for dyeing; the exterior pellicule gives a dark purple, and the inner coat a bright yellow.

NATURAL GRASSES, &c.

Two essays upon this important subject competed for a prize offered at the Toowoomba Show in August, 1875. They were written respectively by Mr. Angus Mackay, the indefatigable editor of the *Queenslander*, and Mr. F. M. Bailey, the talented author of the *Ferns of Queensland.* While the country is but partially occupied, a practical consideration of this question will not be forced upon the people; but the time is near when its immense importance will be felt, and when that time has arrived, the information collected in the two papers referred to will be found useful as the basis of further investigation.

HOVEN CATTLE.

CATTLE are liable to be injured by eating excessively of young grass, and from other causes. As the distention of the beast is chiefly occasioned by carbonic acid gas, any substance which will combine with that gas will reduce it. Such a substance is readily found in ammonia (hartshorn), a spoonful of which, in water, forced down the animal's throat, completely removes the distention.

FIBRE PLANTS.

WITH the rapid extension of agricultural operations consequent upon a large and continuous influx of population, it has been thought desirable to introduce to public notice in a brief manner several plants suitable to the climate, from which an article could be manufactured, by simple machinery, for which there would be an unlimited demand. If all the farmers of a certain district grow one or two articles of local consumption, it is very probable that the competition will soon reduce the price until the cultivation is unremunerative. This is nearly the state in the Brisbane district at present, and if any additional article of export can be profitably grown, it will be a great relief to the farming interest.

CHINESE GRASS CLOTH.

(Bœhmeria Nivea, or "Ramie.")

THIS hardy plant grows with the utmost luxuriance in Queensland in any good soil, and, as it produces abundance of suckers, and the smallest piece of root

will grow, its cultivation could be extended indefinitely in a short time.

Great improvements have recently been made in the Southern American States in the machinery for preparing the fibre, by which the plant may be cleaned on the field, the refuse being left for manure. The fibre is then dried, becoming comparatively pure, white, and silky, divested entirely of gum, and prepared for baling and for spinning. With the improved machinery, one laborer can clean the product of ten acres, and one acre will yield at least two tons, making a total of twenty tons to the hand. The fibre is estimated to be worth £40 per ton. Some cultivators of Alameda got Gilbert Lyman to report upon an improved machine. He reports as follows:—"I found Lefranc's machine at work on the stalks of ramie raised in Louisiana. It turns out 600 lbs. of clean fibre per day—doing its work with ease and perfection; I send you samples. This is an improvement on the first machine by this maker, and it costs more. The price is $500, if boxed for shipment. It has made a revival of interest among planters, and there will be a large increase of production. I find that moist land is preferred, where the ramie yields three cuttings a year. I have seen several fields that have been cropped the third year, and they expect it to bear many years without replanting. It seems to give less trouble than cotton.

In Louisiana some of the planters are replacing the sugar-cane with ramie, which does not require replanting, demands comparatively little labor in cultivation, and entails no great expense for machinery to prepare it for market. So far as known, it has no insect enemies; its fibre is less bulky and more easily transported than cotton, and it is sure of a ready sale at remunerative prices. The fibre, which forms its commercial product, is the inner bark of the stem, and, when exposed to view by separation from the husk, presents a brilliant, pearl-white lustre. This fibre is longer and

more uniform than any other except silk ; it is stronger and more elastic than either hemp or flax ; takes color as well as a good quality of silk ; and, when properly prepared from the raw material, may be spun into fine yarn, suitable for mixing with wool in the manufacture of delaines, worsteds, and other light fabrics. Without admixture it can be woven into fabrics, which, it is said, will surpass the finest linens in beauty, strength, and durability. The ramie fibre has also the felting quality superior to either fur or wool."

Large tracts of land in the south of France and Algeria have been planted with China-grass ; but the demand is so great for the fabrics manufactured from it that the markets cannot be supplied. The stalks must be stripped in their green state, as this plant is not steeped like hemp and flax. The exquisitely fine and silk-like muslins and cambrics made of this fibre are familiar in France and Algiers, though their present costliness places them only within the reach of the rich.

MUSA TEXTILUS, or MANILA BANANA.

It is from the leaf stems of this plant that the Manila hemp is made. The fibre is in great demand for a variety of purposes, and is generally sold at £50 to £60 per ton. The machinery by which the fibre is prepared in Manila is of the cheapest and most primitive description : full particulars, accompanied with tracings, were received from there some years ago. The removal of the cellular tissue was the great difficulty experienced here in the preparation of the fibre, some of which was sent to the Great Exhibition. This sort of banana is grown in Brisbane, and may be distinguised by the red skin of the fruit. Several of the bananas yield fibre, and that prepared from the *Musa Dacca* (pear banana), and *Musa Maculata* (the

large common variety), are said to be quite equal to this. The estimated produce of fibre is a "picul" of 133 lbs. per 100 plants.

PHORMIUM TENAX, or NEW ZEALAND FLAX.

This plant grows well in Queensland, the demand is unlimited, and the preparation simple. It requires a damp, rich, sandy loam. It seeds freely in the Brisbane district, and persons desirous of growing it could therefore soon provide themselves with a supply of young plants. It is used in the colonies for cordage, wool lashings, &c., and by upholsterers for stuffing, and numerous other purposes.

THE COTTON PLANT.

The cultivation of this plant is simple, its growth luxuriant, and its stems yield a good fibre.

THE PINE APPLE.

A fibre of the most beautiful description is prepared from the leaf of the pine apple, producing a fabric as light as gossamer.

THE HOP.

From the fibre of this plant a strong cloth is made. It is not yet cultivated in this colony, but in Tasmania and the neighboring colonies it grows to perfection, and the climate of the Darling Downs is likely to suit it.

The hollyhock, tree mallow, hemp, white mulberry, aloe, and numerous others, might also be mentioned as

producing good fibre. Most of the leading fibre plants of commerce may be seen growing in the season, in the Brisbane Botanic Garden, and Mr. Hill is ever ready to explain their merits.

DRYING FRUITS.

The preparation of dried fruits forms an important industry in many countries on the Continent of Europe, and has assumed gigantic proportions in some of the American States. South Australia, among the Australian colonies, appears to take the palm in drying fruits for commercial purposes ; but, for home consumption, this method ought to be largely resorted to throughout the southern districts of Queensland, to save from waste the surplus apricots and peaches which now annually go to decay in the height of the season, especially near Brisbane and Toowoomba.

In America, the "fruit drier" is a necessary adjunct to farm-houses in the fruit-growing districts. It consists of a box eight feet long and two feet square, connected at one end with a hot air stove. The box is fitted with trays with wire bottoms, and is elevated at the other end about two feet, so that the hot air entering in at one end traverses the whole length, and passes out at the other. Freestone peaches and apricots are split open and the stones removed. The round part of the fruit is placed downwards on the trays, and, when partially dried, the trays nearest the stove are removed to the further end of the box, the others being pushed down to take their place. Figs could be preserved in the same manner. Apples and clingstone peaches are cut into slices and dried.

Figs appear to find in Aidin (Smyrna) a soil peculiarly suited to them. When perfectly ripe they fall off the trees, and are gathered up every morning, and

spread upon ground prepared for the purpose, where they are left to dry. Great care is taken that no water or dew falls upon them, or they gradually decay. Many plantations made in adjacent districts produced good figs; but they would not keep when packed, the skin was thick, and was destitute of the delicate flavor and sweetness of those grown at Aidin.

The heavy dews and sudden showers to which we are liable will, doubtless, prevent figs being dried by exposure to the sun's rays only; but it might be accomplished by means of the "fruit drier."

The "prune d'Angen" and two others are dried successfully at Camden Park, New South Wales. The former fruit falls from the tree as soon as ripe—that is, early in March. Fine litter is placed under the trees, and, if the weather is fine, the plums are allowed to lie as they fall, being turned over every two or three days; in about ten days they are ready to pack. Slight showers only retard the drying; but continued wet hot weather will turn them mouldy. In such cases a hot closet is used to dry them, heated from 100° to 120°, by hot water pipes.

Muscatel raisins and Zante currants are dried at Camden on straw hurdles, but they require several weeks. If first dipped in boiling lye of wood ashes they dry much more rapidly, but lose their bloom and fine appearance, and part of their flavor. The currants dry very rapidly in fine weather, and prove a very productive crop if in a good situation and well managed. The plants should be vigorous, and have ample room; and at pruning, six times the usual quantity of bearing wood should be left. They should be well matured before being gathered.

The hurdles are made of tough sawn pine, 5 feet by 3 feet; the two heads should be 3 in. by 2 in., and the cross-bars, with centre stay, be $2\frac{1}{2}$ or 3 inches by $\frac{3}{4}$. Long straw is woven in between the bars, or otherwise

secured to them close enough to prevent the fruit from falling through. In showery weather the hurdles can be stood on one another, and covered from rain.

The sorts of grapes generally grown in the south of Europe for making raisins are—*muscat of Alexandria muscatel gordo blanco, larga of Malaga* ("sun raisins"), *pance*, or *passe*, and *arignan of Provence.*

Bananas stripped of their skins and dried make a most excellent and palatable addition to the dessert.

Bottling and Canning fruits would also be a highly remunerative industry connected with large orchards; but as the business requires more extensive appliances than the space at command will permit us fully to describe, we must be content to direct attention to some practical articles on the subject which appeared in the *Queenslander* newspaper on September 18th, 1875, and previously.

SERICULTURE.

THE SILKWORM—(Bombyx Morus).

The first step necessary on entering upon this enterprise, is obtaining a sufficient plantation of the best sort of mulberry. The different kinds vary much in quality, and those which are most rich in seric matter should have the preference. The mulberry grows very freely from cuttings, and may be propagated throughout the spring and summer. The sorts recommended for this purpose are the white mulberry *(morus alba)*, the moretta *(morus morettiana)*, and the Manila *(morus multicaulis)*. The latter is particularly suitable for growing in the form of a shrub; and it and the moretto are best for the young worms, but the white for feeding off with. The distance at which they are

planted for this purpose is six to nine feet; and it is considered necessary to allow the trees three to seven years' growth to acquire established vigor, before the leaves are taken. It is possible that in Queensland, where the mulberry grows with so much luxuriance, and is in leaf for eight months out of the year, that it might bear denuding at an earlier age, during the forty or fifty days the worms are feeding.

Construction of Magnanneries or Breeding Houses.

The following is the description of the largest-sized magnanneries, capable of accommodating 20 ounces of eggs, or 760,000 worms. It is from the pen of Mr. G. E. Cerruti, now managing one of the largest silk factories at Ning-po, who, while in Victoria, endeavored by his writings to promote sericulture there. It will be remembered, however, that the number of worms mentioned would require fifty acres of young mulberry trees to feed them, and that therefore such a building would only be required in a large establishment. In small undertakings of this nature, any building or chamber well ventilated, thoroughly dry, and free from bad smells, will answer the required purpose—these three conditions, and especially the last, being in all cases the essential qualifications of a proper breeding house. In describing the building he says:—

"This edifice should be about thirty or thirty-four yards in length, by eleven to twelve in breadth, having the principal front to the east, on which side must be left ten or twelve openings; on the opposite side half that number; on the north side four, and on the south side two. The height of the building should be eighteen or twenty feet, with a roof so elevated as to be almost perpendicular, to preserve the interior from the direct influence of the sun, which would create too much heat during certain hours of the day, and at all

times produce an injurious variation in the temperature. The interior is to be divided into three parts, of which the central one, twenty-one yards in length, is to contain the shelves; the side compartments, about five yards each, must be reserved—the *southern* as a depôt for the leaves, the *northern* as the hatching room. Internal communication must be provided between the three compartments, each of the smaller rooms having two doors—one leading into the large room, the other into the open air.

"The arrangement of the hatching room is of the greatest importance, and it will be necessary to surround it with a double lining of stout planks, and erect two stoves in the corners of one end. This end of the room must be appropriated to the hatching of the worms, having little stands prepared to place the worms on after they are hatched, so as to regulate at pleasure their distance from the fires.

"The large room should be furnished with wooden uprights, supporting sets of five shelves, four yards by one and a-half, placed one above another, and disposed in four rows, so as to leave a passage of one yard in width between them, to facilitate the operations of the attendants, and ensure free ventilation throughout. Shelves, consisting of wooden frames filled with a network of iron wire, and covered with wrapping paper, are, according to the opinions of the best cultivators, the most economical, as well as the best and most healthy. The third room, or depôt for leaves, must be so arranged as to preserve an atmosphere constantly fresh, without being damp. A few tables for preparing and cleaning the leaves will be all that is required in the way of furniture. The cost of the entire building as described may be about £150."

Hatching.

"The hatching chamber being heated to about 77° Fahrenheit, the eggs are placed on flat sheets of card-

board, at the distance of at least two yards apart, and in such a position that they cannot come under the direct influence of the fire, taking care to distribute each ounce over one or two square feet of surface. Afterwards the temperature may be raised from 86° to 89° Fahrenheit, gradually, moving the eggs from time to time, until, having become whiter, they will display about the seventh day the first indications of vitality, which will be still plainer on the eighth and following days. If the operations have been properly conducted, and the eggs selected in perfect condition, the hatching will generally be completed by the ninth day; but it is usual to leave undisturbed those which may happen to remain unhatched until the twelfth day, after which they are thrown away to avoid too great a difference in the ages of the worms, and also because there is considerable doubt whether such eggs may not be diseased or imperfect.

"On the first symptoms of the hatching having commenced, leaves must be carefully placed on the eggs, selecting for the purpose the tenderest that can be found; and care must be taken to separate the worms of the first day's birth from those of the second, and so on with the rest, in order that their growth may be afterwards regulated by placing the youngest nearest to the fire, and increasing the distance according to the age of the worms."

In the Brisbane district the worm appears early in September, when the mulberry trees are getting into full leaf, and as the temperature is naturally all that is required in the daytime, it is probable that a well closed building would provide the requisite warmth during the night.

The life of the silkworm is divided into five stages, which are marked by four seasons of partial torpor or sleep, after each of which the skin is cast off. The first stage lasts six or eight days from the hatching,

during which period they should be kept warm, and have fresh *tender* leaves six or seven times a-day. The first sleep lasts about a day and a-half, and on their awakening they should be carefully classified as to age, as it saves much time when the whole on one shelf or compartment pass through their several stages together. The second stage lasts four to six days, during which the temperature may be reduced to an average of 72°; the torpor lasts about thirty-six hours. During the third stage the worm eats voraciously; the room should be well ventilated, the beds kept clean, and food supplied four times a day, chiefly of white mulberry. After a rest of about thirty hours the worm issues into its fourth stage, which lasts seven or eight days, and during which it should be fed exclusively on white mulberry, or other sort equally rich in seric matter; and the apartments should be kept thoroughly ventilated. The fourth sleep lasts about thirty-five hours, after which the worms eat enormously, and their treatment should be the same; great cleanliness being necessary to preserve them in health. After eight or nine days they will acquire a yellowish tint and cease to feed. Small bundles of twigs, ferns, &c., should be placed round the frames, in which they will spin their cocoons, which will take about eight days to complete. Within ten days of their commencing to spin, select the cocoons which it is intended to preserve for breeding; choose them for fineness of thread, of oblong form, slightly contracted in the waist or middle, solid in construction, and avoid those pointed at the extremities.

About 250 cocoons will be required to produce an ounce of eggs; one ounce of eggs will produce about 38,000 worms, which yield one hundred pounds weight of cocoons, worth 2s. per lb. In reeling off the silk four threads should be wound together. Six hundred pounds weight of cocoons will produce about 100 lbs. of silk.

The worms produced from an ounce of eggs are estimated to consume all the leaves which can be taken without injury from two acres of mulberry trees, during the first season of picking, which would be the second or third year after planting out, according to their vigor. Each additional year's growth will enable the trees to sustain the worms from a further half ounce of eggs.

In consequence of the large demand in France for floss and similar silk, for toys and fancy-work, that country presents the best market for perforated cocoons, from which the moths have emerged. And the possibility of making profitable sale of such cocoons for "carding," gives further inducement to direct some attention to the exportation of grain.

The Japanese provide the greater part of the grain which is imported into Europe, and appear to dust the grain over a coarse card, 14 inches × 9 inches, which had been sized, and to which it adheres. The cards are supposed to contain an ounce of the eggs or grain each, and are saleable in France at an average rate of about 12s. each. One of these Japanese cards, with the egg-shells on it, which was sent to the Author some years ago, is still in his possession, and will show to those interested the manner in which they prepare their grain for shipment to France—a trade which is of such magnitude as to rank among their chief exports. A trade in silk-worm grain has also attained some proportions in California.

Where facilities exist for safe transit to a good market, the exportation of grain appears very suitable to the circumstances of a people entering upon the industry, and unskilled in reeling the silk.

As previously stated, the first year's picking of leaves from two acres of mulberry trees will feed the worms from one ounce of grain—about 38,000 or 40,000—and as 250 cocoons produce an ounce of grain, there is a probable return from these worms of at least 140

cards, besides about 80 lbs. of perforated cocoons, which, together, would yield an amount sufficiently encouraging, considering the short period during which the worms require attention. When, however, it is remembered that, with the increasing age of the trees, they will be able to support a very much larger number of worms, there appears every reason to believe that, with a ready market for the grain, the pursuit would be very remunerative under skilful management.

On most large farms space could be found for a few thousands of mulberry trees, without interfering with the ordinary crops, and the silk harvest might be made a very acceptable addition to the income.

The probable returns have here been purposely based upon the lowest estimate, and still give fair promise of being remunerative. Local experience may yet prove the profits to be much greater; and, if we are spared to issue another edition of this work, we shall be glad to record the fact.

AILANTHUS GLANDULOSA—
(Varnish Tree of Japan).

This plant has been introduced to public notice in consequence of its affording acceptable food to the *bombyx cynthia*, now known as the ailanthus silkworm. This plant is one of the easiest shrubs to grow—there is no soil, however bad, in which it will not thrive. The seed germinates almost as quickly as wheat; and as it grows freely from cuttings of roots, and also sends up abundance of suckers, it is easily propagated. The plants should be about three feet apart each way, and cut down every year, so that the young shoots may spring up and afford tender leaves for the worms; and, by planting them so close that the shoots join each other, the worms are enabled to go from one plant to another.

THE AILANTHUS SILKWORM.

The cultivation of this silkworm in France is said to have been attended with great success ; the hardiness of the plant and worm, and the simple management having greatly recommended it.

From the information contained in a pamphlet translated by Lady Nevill, from the work of M. F. E. Guerin, Manerille, it appears that three generations of worms could be produced in Brisbane and the tropical districts of Queensland. The eggs do not keep through the winter, but the live chrysalis remains inactive during that period, ready to become a butterfly in the spring. About forty-five days will elapse between the laying of the eggs and the formation of the cocoons, and these latter will remain inactive about twenty-six days, at the temperature of 70° to 80° Fahrenheit. The cocoons to be kept during winter are recommended to be strung up, 100 on a line, and kept in a temperature not lower than 60°. The eggs hatch at 80° Fahrenheit, and the ailanthus leaves should be laid on them, that the young worms may climb on them and commence feeding ; the leaves ought then to be placed in a bottle of water, the ends well stuffed in to prevent the worms getting down into the water. When the worms are put on the ailanthus trees they should be well distributed, not placed too close together, or too many on a tree. When once the worms are fixed on the leaves of the tree there is no further trouble except to see that ants and wasps do not carry them off. The cocoons may be gathered about eight or ten days after the beginning of the spinning.

Of the Silk.

The great drawback to the cultivation of this worm is, that no method has yet been discovered of reeling off the silk, and it consequently has to be sold as

"floss." This floss is, however, of very superior quality, being much more glossy than any other; it also bleaches well, is said to last double the time of the silk from the mulberry worm, does not spot so easily, washes like linen, and takes a good dye. It is manufactured in France under the name of galette or fantaisie, and of which there is an immense consumption. Mixing it with thread and wool, it is largely employed in manufacturing fancy stuffs. The strength of this silk is remarkable, and to this is attributable the great durability of the Indian foulards, which are composed exclusively of it.

GARDENING CALENDAR.

CALENDAR

OF OPERATIONS IN THE

GARDEN, THE ORCHARD, AND THE FARM,

FOR EACH MONTH IN THE YEAR.

JANUARY.

Kitchen Garden.—Water the vegetable beds freely in dry weather, occasionally giving liquid manure. When water is required, give a good soaking, or none, as a mere sprinkling is rather injurious than otherwise. Where water is scarce, much protection may be afforded by mulching the ground with stable litter, grass, or straw. If a slight dressing of salt was given to the beds in spring, as recommended in August and September, the advantage will now be felt. All the beds now unoccupied should be dug, carefully turning in at the bottom of the trench all cabbage leaves, turnip tops, and such green refuse, which form a valuable manure. Heavy land should be thrown up roughly, giving the large lumps a sufficient blow just to break them asunder. The exposure to the sun will greatly improve the texture of such soils. In favorable weather sow French beans, brocoli, cabbage, carrot, cauliflower, celery, mustard, cress, lettuce, endive, okra, peas, parsnip, parsley, radish, salsafy, scorzonera, prickly spinach, turnip, Brussels sprouts, and a few cucumber and melon seeds for late crop. At this season particular care must be devoted to the seed beds. The seed should be sown thickly in small beds, under a portable calico cover, and the beds kept well watered until the plants are strong. Tobacco water

or Gishurst Compound should be applied on the first appearance of aphis. Gather herbs for drying; gather onions, garlic, and eschallots as the tops die down. Plant out cauliflowers, cabbages, &c., in favorable weather, laying a leaf over each, secured in its place by a piece of earth, to protect the plant from the sun for a few days until the new roots are formed. Watch the bee hives, lest the swarms go astray.

Orchard.—Keep the surface of the ground open by lightly forking it over where there is any appearance of binding; and straw or other litter under the trees to the outer circuit of the foliage will greatly protect their roots in dry weather. The fruit should be gathered as it ripens. Stop long shoots by pinching off the ends. Vines should be tied as they grow or break loose, as the wind greatly injures the foliage by dashing the shoots against the espaliers. Very vigorous branches may be checked and rendered productive by giving the point a downward tendency, or curving the shoot downwards. Thin out the fruit on those trees which are over burdened. Remove suckers, laterals, and water shoots from vines every ten days.

Farm.—Destroy weeds before they seed; break up land in preparation for future crops; sow Cape barley for green fodder, and maize for late crop.

FEBRUARY.

Kitchen Garden.—This should be a season of activity, and the store of manure will now be required. Dig roughly all the unoccupied beds which have been previously trenched, adding well decomposed manure. The land not immediately required will be improved by the exposure, and the remainder will be ready for use the first shower. Transplant cabbages, Brussels sprouts, cauliflowers, celery, &c. Sow French beans, beet, Brussels sprouts, carrot, cauliflower, celery,

mustard, cress, lettuce, endive, onion, peas for main crop, parsnips, radish, prickly spinach, and turnips. Former sowings should be carefully thinned out and kept clear of weeds, that the air may pass freely through. Mulch round the melon and cucumber holes, to the depth of five or six inches, with a good dressing of long stable manure; draw a small ridge of earth round them, at about two feet from the stem, to prevent the water running away; and, if the weather is very dry and the plants appear to suffer, give about ten to twenty gallons of water in the evening to each hole. This will probably not have to be repeated during the season. It is easier and cheaper to do the work effectively at once. Light waterings are generally very injurious in dry weather; either water copiously or not at all. It is better to depend entirely on mulching than to give a mere sprinkling of water to plants exposed to the sun at this season. Seeds of plants previously selected should be collected as they ripen, and before the pods are too brittle. Cucumbers, melons, French beans, &c., should be looked over every day and gathered as soon as they are ready, whether they are required or not; for, if left on to perfect their seeds, the plants soon cease to be productive, or form only ill-shaped inferior fruit.

Orchard.—Tie up loose shoots of the vine, extending them out to the sun. If the points are gathered up to a stake (a very bad practice), be careful that the foliage is not bruised or injured. In banana plantations, see that all the plants are cut to the ground when the fruit is taken, and remove all dead leaves and superfluous suckers, that there may be a free circulation of air among them. Prop up such plants as require support. If young trees are to be planted out during the approaching season, procure a good supply of leaf mould, or fine virgin soil, for placing among the roots; lay it up in heaps to sweeten.

Farm.—Continue to prepare land, ploughing it deeply. Early potatoes may be planted whole, giving them plenty of room, or they will be drawn up. Lucerne may now be sown in clean, well-ploughed, deep soil. Vetches or tares, Cape barley, and sorghum should be sown for green food for stock. White tuscarora maize may be sown during the first week. It is hardy, and ripens in 90 days from the time of sowing.

MARCH.

Kitchen Garden.—Keep the beds clear of weeds by frequent and deep hoeing. Plant out cabbages, cauliflowers, Brussels sprouts, celery, &c., for succession, in favorable weather. Always have beds dug in dry weather, full depth, and manured, so that every shower may be availed of for transplanting. Where possible, the plants should be lifted carefully with a garden trowel, and planted with a ball of earth attached. Rows of cabbages, &c., on sloping ground, should be made across the hill; slight ridges drawn to the stems to keep them upright would give the plants the advantage of every slight shower, and openings could be made at proper intervals for the escape of superfluous rain water. See that the rows of vegetables are not too close; a free current of air should pass among them to bring them to perfection. Give asparagus beds a dressing of salt. Sow English beans, French beans, beet, carrot, mustard and cress, celery, lettuce, endive, leek, onion, peas, parsnip, radish, prickly spinach, turnip. Transplant eschallots. Lettuce runs to seed.

Orchard.—No crops should be grown near young fruit trees—never nearer than one foot beyond the outer circuit of the foliage. Orange trees are often killed by digging near them; the roots upon which the lateral or fruit-bearing branches depend extend in

all directions near the surface of the ground; when these roots are injured, the branches either die back or become diseased. All land intended to be planted with vines or fruit trees during the approaching season should have been trenched, manured, and cropped, if possible, by this month, to put it in the best state for planting. If not already trenched, no time should be lost, being careful to drain all retentive soils six inches deeper than they are trenched. Orange trees with the shoots in a state of rest may be transplanted in favorable weather.

Farm.—Autumn commences on the 20th of this month, the sun on that day entering the autumnal equinox. Sow lucerne, clover, rye-grass, prairie-grass, oats, barley, wheat, vetches or tares, and sorghum. Plant main crop of potatoes. Watch cotton plantation, and house the cotton as fast as the bolls expand, to secure the crop against injury from rain, and from damage by broken pieces of the over-ripe pericarp. Gather maize as it ripens, and cut tobacco as the leaves arrive at maturity.

APRIL.

Kitchen Garden.—Hoe continually among the crops in dry weather; let no weeds appear. Have beds dug for transplanting the various vegetables now coming on. Thin out all crops that are overcrowded, as directed last month. Divide and plant out pot-herbs, giving a little water if requisite until they are established. Sow English beans, mustard, and cress, lettuce, endive, leek, onion, peas, radish, &c., &c. Early celery should be earthed up in dry weather; in this operation draw the leaves upward one by one, without straining them, until they are all upright and in their regular positions; be careful that no earth gets between the leaves, and, while holding them together with one hand, fill the earth round the

plant with the other to within six inches of the top. Fill up occasionally as the plant grows, and it will be ready in about six weeks.

Orchard.—Where practicable, the transplanting of young fruit trees should now be proceeded with, and, if done with care, they will soon make a little new growth, emit roots, and be established in their positions before the final fall of the leaf. A full season will often be saved by this, and the risk of loss by a dry spring considerably reduced. This applies to nearly all fruit trees, but especially to the evergreens, such as lemons, oranges, dates, loquats, olives, tamarinds, bananas, &c.

Farm.—Sow vetches, lucerne, wheat, barley, oats, and maize. Gather sorghum seed as it ripens, or the birds will either consume or scatter it. Cotton will require constant attention as directed last month. Cut and house tobacco as it arrives at maturity.

MAY.

Kitchen Garden.—Transplant onions, and keep the seed beds clean. Plant out cabbages, &c., for succession; and sow lettuce, endive, leek, onion, peas, radish, mustard, and cress. Dig beds intended for asparagus. (See Asparagus). Transplant garlic, eschallots, rhubarb, salsafy, scorzonera, &c.

Orchard.—Transplant fruit trees in the manner directed in the article on the apple, which see. Do not plant too deep; put fine mould among the roots, and protect the trees until they start afresh, watering overhead lightly every two or three days, to prevent too much evaporation, until the roots begin to act. Transplant strawberries into leaf mould, or two-year-old cow dung; when growing give abundance of water. In cold situations, protect tropical fruit trees, cover bunches of bananas, and throw a handful of straw into the heart of every pine-apple plant.

Farm.—Sow vetches, barley, oats, wheat, lucerne and other grasses. Cut tobacco. Pick cotton. Earth up potatoes.

JUNE.

Kitchen Garden.—At this season no colonial-grown cabbage seed should be sown, as the plants will run to seed just as they are hearting. English cabbage seed will not run the first season, and should therefore be exclusively used until September, when the danger will be past. Give new asparagus beds the second digging. Hoe well among the growing crops. Transplant horse-radish, eschallots, rhubarb, strawberries, seakale, &c. Dig over old rhubarb, seakale, and asparagus beds, giving them plenty of good rotten manure. Sow brocoli, Brussels sprouts, cabbage; also, red cabbage, cauliflower, lettuce, endive, peas, English beans, radish, salsafy, scorzonera. Water-cresses may be planted in trenches as celery, and will grow well in the neighborhood of Brisbane during the winter and spring months. Dig abundance of well-rotted manure into the bottom of the trench, sift a little fine soil over it, dibble the cuttings in at a foot apart, filling up the holes lightly with rich mould, and give the whole a good watering from a fine rose watering-pot. In a month or six weeks they can be cut, when the bed should have a thin dressing of manure all over, and a good watering. Repeat the treatment each cutting, watering well in dry weather.

Orchard.—In early situations prune grape vines, the several sorts of China peach trees, and other early fruits. Transplant fruit trees, giving a little protection in situations exposed to the dry westerly winds; support them with stakes where necessary. Cover bunches of bananas and tropical fruit trees where there is any risk of injury from frost. In preparing new land for planting, see that drainage is amply provided for to the depth of three or four feet.

Farm.—Winter commences on the 24th of this month. The arrowroot fills out very rapidly after the frost checks the growth of the top. Sweet potatoes, ginger, yams, &c., should be dug. Sow oats, lucerne, rye-grass, vetches, prairie-grass, &c., &c. Prepare land in warm situations for planting and sowing next month with potatoes and maize.

JULY.

Kitchen Garden.—Asparagus roots may now be planted as directed. Sow cauliflower, carrot main crop, beans, lettuce, endive, radish, spinach, &c. In sowing seeds after rain, see that the land does not clog, or it will be very injurious to move it about. The soil should never be walked over, or disturbed by sowing or digging the crops, until it is sufficiently dry to be friable. Plant out onions and eschallots. The soil for onions being necessarily rich, the crop is often in danger of being smothered by weeds in the seed bed. This may be guarded against to a considerable extent when sown in drills, by lightly raking over the bed a few days after it is sown; this will destroy a vast number of weeds, which, being of rapid growth, will be up some days before the onions have made a start. This should not be done except in very fine weather. If rain falls upon recently raked-land, the surface runs into one, and the whole cakes over. Hoe among the crops continually in fine weather, while the weeds are small, or a few days' rain will give them such advantage as to permanently injure the crops. Foul land harbors slugs, grasshoppers, and other garden pests.

Orchard.—This is a good time to brush over the stems of all fruit trees and vines with a strong preparation of Gishurst Compound, as a cure and preventive of disease; four ounces of the compound

dissolved in a gallon of boiling water, and applied quite warm with a brush to the trunk and main branches—the head being well syringed—will be found to promote the health of fruit trees and vines, and tend greatly to protect them from the attacks of fungus and insects. Transplant young trees, especially early growing sorts. Prepare land hitherto neglected, that all planting may be finished by the end of next month, if possible. Plant grape vines. A general inspection of every fruit tree and vine should take place this month, removing all suckers, shortening back long shoots, and cutting out all crowded or cross branches. Eradicate docks, and give a dressing of salt to the vines and fruit trees, lightly forking in some well-decayed manure where necessary—not immediately round the trunks of the trees, but where the small roots are to be found, in a line with the outside circuit of the foliage.

Farm.—Some of the most successful cultivators of lucerne in the Brisbane district consider this month the most favorable for sowing that seed. Sow oats, vetches, &c. Prepare land for potatoes, maize, tobacco, sugar-cane, carrots, mangel wurzel, chicory, and other crops. Potatoes and maize may be planted in early positions, sheltered from the south-west.

AUGUST.

Kitchen Garden.—Peas sown this month should be in beds with a cool aspect, as south or south-east. A few French beans may be sown in a sheltered spot, open to the north-east. At this season great advantage would be gained by sowing the land with salt before digging, at the rate of about 7 or 8 lbs. to the perch; it would tend to sweeten the land, destroy insects, discourage weeds, fungus, and mildew, and retain moisture. The latter would prove very im-

portant should the weather be dry. Sow beet, brocoli, melons, Brussels sprouts, cucumber, lettuce, endive, okra, parsley, pumpkins, radish, rhubarb, round spinach, tomato, tobacco, carrots (large sowing), leek, cabbage, cauliflower, chervil, turnip, parsnip, &c., &c. Plant out horse-radish, rhubarb, herbs, seakale, asparagus, Jerusalem artichokes, ginger, &c. Keep the crops clear of weeds, and destroy plants infested with aphis. Those which are slightly attacked wash with Gishurst Compound.

Orchard.—Every effort should be made to complete the transplanting of fruit trees, as many casualties, and much labor in watering and shelter, will be caused if the early growing kinds have to be removed after this month. Any work left over from last month should be completed. Keep the land clean, and the surface open to receive the dews and showers. Look over the orange trees, and, if troubled with the aphis, syringe them well with a solution of Gishurst Compound. Young orange trees showing too much bloom, it should be carefully removed by sharp-pointed scissors, and the tree have a dressing of liquid manure to encourage foliage. They often die back after excessive blooming. Dress the vines with lime and sulphur in the morning when the dew is on them.

Farm.—Clean the crops put in last month. Plant potatoes, white and yellow maize, rice, yams, &c. The sweet potato can best be sent to distant parts by forwarding the tuber at this season, to be planted when it arrives at its destination; the suckers will soon appear, and can be planted out. Sow sorghum and tobacco in seed beds. Silk-worms will now require constant attention, feeding them frequently with young and tender leaves. Hoe up potatoes before the tops are too high, by drawing the earth towards them at each side—but not to a sharp ridge, or it will throw the rain off instead of allowing it to find its way to the roots.

SEPTEMBER.

Kitchen Garden.—All vacant land should be trenched, and left to mellow down by exposure to sun and air. Take every opportunity to collect manure of all sorts, to be thrown into well-puddled tanks to rot down for use in autumn and winter; weeds and green refuse of every description, with the drainage of the stable, &c., should be carefully secured in covered tanks. Manure for use in the garden during summer should be in the liquid form. Sow all newly-dug beds with salt, as directed last month. See that the crops are not crowded and are kept clean. Sow a few peas on a cool spot. Sow English and French beans, parsley, beet, capsicum and chilli, cardoons, mustard and cress, lettuce, endive, egg-plant, okra, Cape gooseberry, radish, rhubarb, round spinach, tomato, tobacco, cucumbers, melons, pumpkins, vegetable marrows, carrots, parsnips, &c. Transplant cabbage, eschallots, cauliflowers, &c. for succession. Water asparagus beds in dry weather. Plant out Jerusalem artichokes, rhubarb, herbs, seakale, asparagus, ginger, earth-nuts, &c. Sow rosella seed in sheltered early positions.

Orchard.—Recently-transplanted trees will require careful attention, being mulched and protected until they are established, giving water in dry weather. Orange trees may be transplanted in calm cloudy weather, but only those which are in a state of rest; they should on no account be disturbed if budding out with young shoots; and ample protection, mulching, and a little sprinkling of water *overhead*, with a fine rose watering-pot or a syringe every afternoon in dry weather will greatly assist them. Mulch fruit trees which appear to suffer from dry weather, to the circuit of their foliage. Grape vines should be gone over every week to remove all suckers and other shoots nearer than one foot to the ground. All super-

fluous shoots should be rubbed off, and, in early situations, the new wood should be secured as a protection against injury from high winds. Plant out strawberries.

Farm.—Clean and earth up growing crops. Plant out yams, earth-nuts, coffee, sugar-cane, arrowroot, sweet potatoes, white maize, potatoes. Sow sorghum, prairie-grass, cotton, &c.

OCTOBER.

Kitchen Garden.—Keep the crops clean, and mulch and water where necessary. Sow parsley, English beans, French beans, mustard and cress, lettuce, endive, okra, radish, round spinach, beet, vegetable marrow, melon, carrot, cucumber, tomato, &c. A few cabbages may be put in, taking care to check the aphis on its first appearance. Sow rosella seed.

Orchard.—Thin out the fruit on China peach trees and others where the crop is heavy; prop up the branches. Remove suckers from vines, as directed last month, tying up the branches as they extend, but so as not to crush or bruise the leaves; remove superabundant fruit. Plant out bananas and pine-apples. Thin out the water shoots from inside of fruit-bearing trees, to let in the sun and air to ripen the fruit equally. Dress vines with sulphur on the first appearance of oidium.

Farm.—Keep the ground loose and clean among growing crops. Plant sweet potatoes, yams, ginger, sugar-cane, arrowroot, earth-nuts, &c. Plant out tobacco. Sow sorghum.

NOVEMBER.

Kitchen Garden.—As the season advances, the advantage of having trenched the garden land will become more apparent. Shallow worked land, unma-

nured, will scarcely grow anything worth collecting. The beds should now be laid out, with the ridges across the hill on sloping ground, to catch every light shower, openings being made at convenient distances to allow of the escape of surplus water in heavy rains. The full space must be allowed between the crops during summer, or they will be drawn and worthless; ample room and high cultivation are the most economical in the long run. Cucumber and melon plants should be thinned out where over-crowded, the earth loosened among them, and the branches as they extend be fastened down with small wooden pegs. Keep the ground clean and open by the free use of the hoe and digging fork. Sow French beans, melons, brocoli, Brussels sprouts, mustard, and cress, cucumbers, lettuce, endive, celery, okra, radish, rosella, pumpkin, &c. Transplant for succession in cloudy, calm weather.

Orchard.—The China peach tree should have the crop thinned as soon as the fruit can be used for cooking, to relieve the trees and improve the size and flavor of the remainder. Mulch such trees to a considerable distance around the stems, if not previously done. Clear out all superfluous shoots to throw the whole strength of the plant into the crop, not removing or injuring any of the foliage unnecessarily. Prop up such trees as require it. Remove suckers from grape vines, stop straggling branches, and rub off weak, ill-placed shoots, to throw vigor into the leaders for next season's fruiting, as well as the advantage of the present crop. Plant out bananas and pine-apples, for which operation some of the most experienced growers consider this month the most suitable time. Trench land intended for planting next season, to give it the advantage of the summer's sun to sweeten it.

Farm.—Constant attention should be given to the crops to keep them clean, using the horse-hoe and

cultivator to economise labor. Watch the tobacco closely, removing caterpillars, and stopping the plants as required to direct the sap into the leaves intended for the crop, that they may attain the utmost luxuriance. In making oaten hay, cut the crop when well in ear, but before the seed is near mature; the whole plant is then in its most nourishing state, and the seed will not shed.

DECEMBER.

Kitchen Garden.—French beans, cucumbers, vegetable marrow, &c., should be gathered immediately they are fit for use, whether they are required or not; for, if left on, the plants will soon cease to bear. Sow cabbage and cauliflower seed; great difficulty will be experienced in getting it to grow at this season, and the plants will consequently be more valuable in proportion. Sow also French beans, mustard, and cress, lettuce, endive, okra, radish, &c. All vacant ground should be well manured and dug two spits deep; none should be allowed to remain idle, or occupied with stumps, weeds, and rubbish, to harbor insects, vermin, and disease. Manure and dig as the crops come off, and the land will be ready for use after the first shower.

Orchard.—Attend to last month's instructions. Place straw under the trees, upon which the fruit may fall without bruising. Tie up the shoots of the vine as they extend, not injuring the leaves. The China peaches, as soon as the crop is off, may have their new wood shortened back a third of its length, cutting to an outside bud. The centre of such trees should also be looked to, that they be preserved of the shape of a cup. This pruning greatly improves the next season's fruit. Trench land intended to be planted next season; one crop taken from it, clean, will greatly improve the texture of the soil, and prepare it for receiving the young fruit trees.

Farm.—Too much care can scarcely be bestowed upon potatoes dug up this month, to protect them from the sun. They should be dug up as soon as the skin is firm, as they are liable to rot in the ground from the great heat. Keep the crops clean, and thin them out where too much crowded. Attend to the tobacco as directed last month.

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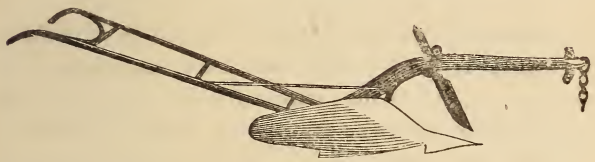

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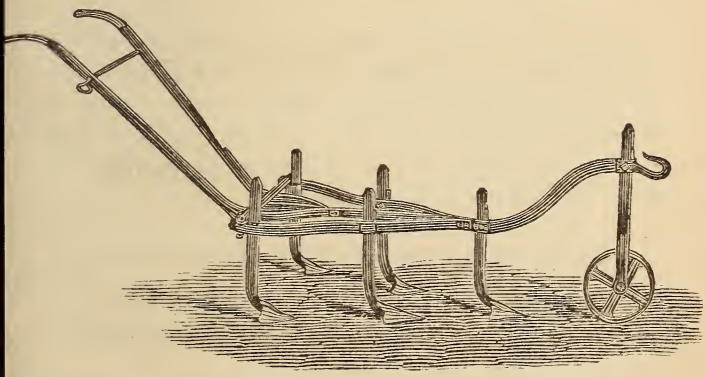

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