

* The TROPICAL AGRICULTURIST *

◇ MONTHLY. ◇

XXII.

COLOMBO, APRIL 1ST, 1903.

No. 10.

"NEW MEXICO."



It is difficult to say which is presented in more attractive colours to American capitalists and pioneers, the rich undeveloped resources of the Philippines in the Far East, or the productive wealth of what is now known as "New Mexico." The former has the advantage of being under American law, currency and Government; while the latter has the great attraction of proximity to a grand market close by for all that can be grown, whether coco palms, rubber cacao, sugar or a host of other products. "The silver dollar" is a further attraction to investors in Mexico—labour and all expenses being paid in silver, while the crops can be realised in gold. These remarks have been suggested by the receipt of a copy of a profusely illustrated New York Journal (printed in English and Spanish) entitled "Modern Mexico," from which we learn much of the silver and gold currencies, the buildings (ancient and modern) the railways, irrigation works, the electric trams, the education, the pottery, bull-fights, the legends, sheep and cattle raising; but above all the tropical agriculture in Mexico. The illustrations in the latter show in one group:— oranges, (Mexican oranges sell in New York) banana, coconut, rubber, and plum trees, We do not admire the palms in any of the pictures; but the growth of rubber for 18 months and sugar-cane for 10 months, is phenomenal. "Forest cut ready for burning on San Miguel plantation," points to a

Ceylon man being on the scene—perhaps John Darley of the Knuckles as V. A.? In writing about "Money in Coconuts," George D. Coleman of Orizaba gives the most posterous estimates—figures which show he can have no practical experience beyond a stray group of trees. He writes:—

"A coconut tree will yield from 150 to 250 nuts per year when in full bearing, as every lunar month a new branch of blossoms comes out, and only a hurricane will destroy them. As from three hundred trees to the acre is fair number (I have seen 500 trees in fine condition on an acre), the yield of nuts would be, calculated on the basis of 200 nuts and 300 trees, 60,000 nuts to the acre, which at 1 cent per nut would mean \$600. At Tlacotalpan, in the State of Vera Cruz, where there are three small groves, I have been asked *un real*, or 12 cents at retail for one single nut, and in other places I have never seen the ripe and fully developed sold for less than 6 cents each. The half-ripe nut is sold in quantities for half that sum for making the favourite refresco or drink of the hot country. But the owner of the coconut grove who is content to receive 1 cent per nut for the nut on the tree or ground is losing much money."

[One cent of a dollar or 3 of a rupee is certainly a low price, even for Ceylon.]

Mr. Coleman is supposed to be a traveller who knows something of India and the Philippines and yet what will he say when told that Ceylon, which can boast of the most regularly planted and best cultivated coconut plantations in the world, can nowhere show more than 100 trees per acre, that 70 to 75 is the rule, and that only an ignoramus would dream of planting more than 100 trees. To do justice

to each palm, 75 trees per acre should be the maximum; and where then has Mr. Coleman seen 500 coco palms "in fine condition" on one acre? Then again 200 nuts per tree or 60,000 nuts per acre instead of the 3,000 to a maximum of 6,000—which is the heaviest crop per acre in Ceylon—famous all over the world for its coconuts. Verily, if this is the information which our American cousins have to swallow, some enlightenment is required from a Ceylon authority. We do not contradict Mr. Coleman when he says "the coconut needs two things especially—lime and salt; for—

"Lacking the first it delays its growing and time of fruitage, and lacking the second, it either remains entirely barren or gives few nuts, and those small and of poor flavour and deficient in oil, the main constituent giving it commercial value. It is a prevalent opinion that the coconut will not thrive except in sandy land and on the borders of the sea. This is due to the fact that the currents of the sea float the ripe nuts for long distances, and then the waves wash them upon some beach, where they sprout and take root. As these beach sands are generally full of shells, as well as salty, these two requisites give a fine growth even in pure sand, but where lime and salt exist in the soil, the better and richer the soil the better the coconut. One of the most luxuriant coconut trees I ever saw grew 100 miles in a straight line from the sea or salt water and in a rich chocolate loam, but the soil contained lime in abundance, and the owners had supplied a sufficient amount of salt."

And we are quite prepared to agree that a "coconut grove" (say of 100 acres) in Mexico is as good as a gold mine, even though we do not believe that, when it is at its very best, more than 500,000 nuts can be plucked in the year. But if these sold at 3 cents of a dollar each (or R90 per 1,000 in our Ceylon currency) the net income should not be less than 10,000 dollars or 30,000 rupees, or £2,000 sterling from the 100 acres which would be quite phenomenal in Ceylon, where such a return would be welcomed from 400 acres of well cultivated palms. So, we can quite see that "New Mexico" under the stimulus of American capital (and if possible, Ceylon experience in tropical products) has a great future before it and we shall be glad to hear again from our New York friends who, meantime, are going to study the *Tropical Agriculturist*.

REPORT ON HEVEA BRASILIENSIS IN THE MALAY PENINSULA.

By STANLEY ADEN,

Superintendent, Experimental Plantations, Federated Malay States, 1902.

(Concluded from page 583.)

TABLE XIII.

10 trees tapped every day (6 days).

Total weight of wet rubber 123½ ounces. Averages yield per tree 12.35 ounces.

In nearly every case the yield as slightly better than that when the same tree was tapped at weekly intervals, notwithstanding that an average of 10 ounces of rubber had been extracted from each tree immediately previous to this experiment.

The comparatively large yield on the first day is very noticeable and was probably due to the fact that

the trees had recently been tapped, a point to which attention has recently been drawn. The result of this last experiment supports the argument that there is little, if any, advantage in allowing the trees to "rest" before renewing the incisions.

YIELD.

Most of the points with reference to the yield of latex, the season to tap, the yield at various stages of growth, the time that should elapse before tapping operations are repeated, the age at which tapping can profitably commence, the cost of extraction, and other matters relating to this most important question, need much further investigation, the information obtained up to the present being far from complete.

The season to tap.—The "resting" season of *Hevea* spp. is very short, the trees not being devoid of foliage for more than about 10 or 14 days generally during the early part of February. This, however, is by no means always the case, and it is a common thing to see a tree here and there in the midst of a plantation, absolutely leafless and remaining in this state for two to three weeks although surrounded by others clothed with luxuriant foliage. In the case of young trees, this short "wintering" results in the production of a large number of auxiliary branches, where hitherto a tree of three to four years old consisted of a single whiplike stem 30 to 40 feet high.

Advantage was taken of this short resting season during the early part of the present year with a view to determining whether the different stages of growth had any effect on the flow of latex, the experiments being carried out on the Evelyn estate Selangor. In the first experiment some eight to nine year old trees were selected, whose foliage having turned yellow, was just commencing to fall. After being tapped on eight occasions at intervals of two days, most of the trees began to push forth new leaves, so operations were suspended.

The following table shows the amount of dry rubber obtained per day, from 20 trees tapped on the herring-bone system; the weather at the time being unusually hot and dry.

TABLE XIV.

Twenty trees, tapped on eight occasions:—1st tapping gave 10½ ounces of dry rubber, 2nd, 21¼, 3rd, 24¼, 4th, 23, 5th 22½, 6th 23¾, 7th 25¼, 8th 22½. Total 173½ ounces of dry rubber.

In the next experiment 20 trees growing on the same estate and as near as possible of the same dimensions, were selected, which were just commencing to push forth new leaves and flowers, which in this species are produced simultaneously. The tapping was on the same principle as in the previous experiment, but was carried on over a period of 24 days, by which time the leaves had mostly attained their full size, and the seeds had begun to form.

The result was:—

TABLE XV.

Twenty trees tapped on occasions gave:—1st tapping gave 17 ounces of dry rubber, 2nd 23, 3rd 20¼, 4th 21, 5th 22½, 6th 14¾, 7th 16¾, 8th 24, 9th 19½, 10th 17¾, 11th 20, 12th 20¼. Total 236¼.

The climatical conditions had altered considerably at the time the third experiment was made, which was during the month of April, rain falling almost daily during the whole time the operations were in progress. Twenty trees were again selected and were now in full growth and the fruits about the size of marbles, the result being shown in Table XVI.

TABLE XVI.

Twenty trees tapped on 12 occasions:—1st tapping gave 8½ ounces of dry rubber, 2nd 11¼, 3rd, 14¾, 4th 16½, 5th 15½, 6th 15¾, 7th 16¾, 8th 18, 9th 14¾, 10th 17¼, 11th 16¾, 12th 16¾, total 181¾.

If the yield of those trees tapped when leafless be compared with that obtained on the first eight occasions in the second experiment, when the trees were just commencing to grow, and the third where the trees were in full growth, the result will be found to be distinctly in favour of those trees tapped during the "resting" stage.

The figures are:—

	ozs. of dry rubber
1st experiment eight tappings on 20 trees gave	73½
2nd „ „ „	59½
3rd „ „ „	116

As this is the result of a single experiment it is impossible to conclude what was the real cause of the increased yield obtained whilst the trees were resting. It possibly might have been due to the difference in the atmospheric conditions or more probably, I think, to the inclusion of one or two trees which for some unknown reason had given a much better return than their neighbours. It may be remarked in passing that the results, so far as they go are directly opposed to the theory recently promulgated, as to the effect of tension on the flow of latex; or even if it be accepted that the thickening of the *bast* tissue was nearing completion, and that the tension was therefore approximating the maximum, what is there to account for the decided decrease, only a fortnight later, at a time when the sap was rising in the stem?

The cause of the increased or decreased flow, however, does not effect the producer to any great extent and seeing that most of the experiments previously referred to were conducted during the months of June, July and August, when the trees were bearing a heavy crop of seed, it would appear that tapping operations might be prosecuted with advantage during all stages of the plant's existence. It is to be hoped that further experiments will bear this out, otherwise, if tapping is to be restricted to certain seasons, the question of labour will prove a serious problem.

A dry season nevertheless has advantages over a wet one, in-as-much as the work is greatly facilitated but the flow of latex is affected to a slight extent, owing to the fact that it dries more quickly on the wound. I have found that by simply removing the coagulated rubber from the wound an hour after the incision had been made that a further flow of latex occurred. Though only a very small flow it shews that probably a greater yield would have been obtained previously had not the coagulation of the latex on the wound prevented a further exudation. The variations in yield from day to day, of the same tree, noticeable in all the foregoing Tables, are no doubt due to some extent to the prevailing climatical conditions, it having been noticed on many occasions; that a larger yield was obtained on a dull, still day.

It is of the utmost importance to get the tapping finished as early in the morning as possible, and with this object in view all preparations should be made the previous evening, so that a commencement can be made at daylight. On estates where the cultivation is divided between rubber and other products, I would advise that no tapping should take place later than 9 a. m., but where rubber is the sole cultivation, such a course would probably be found impracticable.

The number of times a tree can be tapped and the length of time which should elapse before tapping can be repeated, depends, I consider, not so much upon the amount of latex extracted at the first tapping as it does upon the injury inflicted upon the tree during the extraction of that latex. It has been seen in the experiments dealing with the area of trunk to be tapped that an equal amount of latex was obtained immediately after the first tapping by continuing the operations on the opposite side of the trunk, and although by this means over 5 pounds of dry rubber has been taken from a single nine year old tree, the supply was by no means exhausted, but the injury inflicted must be considered as severe and cannot therefore be recommended. Moreover it is probable that an equal amount of rubber might have been obtained had the labour expended on this one tree been divided between say four trees, in which case the wounds at the finish would be reduced by three-fourths and consequently would heal up much quicker.

I would lay down as a general rule to follow, that having regard to the welfare of the tree, it is advisable to postpone further tapping until the old wounds

are completely healed up. This remark applies more especially to young growing trees, in which case there would be a considerable risk of arresting the growth of the tree, if it be tapped first on one side and then on the other, before the original wounds are completely healed up.

I have found that nine year old trees on which the incisions had been renewed on nine or ten occasions had completely recovered, i.e., the wound was quite covered over with new tissue, on the occasion of my next visit, exactly twelve months afterwards, and were therefore ready for further tapping. On the other hand, those wounds which had been renewed 14 or 15 times were far from being healed up and in some cases there was still 1½ to 2 inches of wood exposed even after a lapse of 12 months. Although these trees were again tapped and in most cases a yield equal to that of the previous year was obtained, it was I consider a risky proceeding. Far better work through the whole estate, selecting the best trees and tapping them lightly—renewing the incisions eight or nine times, by which time the trees operated upon first will probably have completely recovered and will be ready for further tapping.

Age at which tapping can profitably commence.—Experiments for the purpose of ascertaining the age at which tapping can profitably commence are necessarily very incomplete as there are hardly any trees available between the ages of four and nine years. Recently some three-and-a-half and four year old trees growing on one of the largest rubber estates in Selangor, have been tapped, but the results clearly indicate that this is too young. I append the result of tapping 50, three-and-a-half year old trees. These were planted 14' x 14' (222 to the acre), the average girth of all the originally planted trees being 17.51 inches at 3 feet from the ground, and that of the 50 trees selected 21.24 inches. The tapping was on the herring-bone principle and the incisions, which were confined to the first 2 feet of the trunk, were renewed on 12 alternate days.

TABLE XVII.

Result of tapping 3½ year old trees.

Field Number of Tree	Girth at 3 feet from Base.		Total yield of dry rubber in Ozs.	Field Number of Tree.	Girth at 3 feet from Base.		Total yield of dry rubber in Ozs.
	ft.	in.			ft.	in.	
1	1	10	2.5	87	1	7	1'
3	1	7	1.	88	2	0	2.25
6	1	7	3'	94	1	9	1.25
10	1	8	Nil.	97	1	10	.75
18	1	9	.5	102	1	9	.75
25	1	8	1'	103	1	8	.5
28	1	7	2'	105	1	8	1'
30	2	0	1.25	106	1	9	.75
31	1	11	2.25	107	1	10	3.5
34	1	10	1.75	112	1	8	.75
38	2	1	.5	114	1	8	1.25
44	2	2	1.5	123	1	10	1.25
47	1	7	1.75	125	1	7	1.25
53	1	10	1.25	130	1	10	1'
59	1	9	1.25	131	1	8	1.
65	1	9	1.5	134	1	9	.75
66	1	10	1'	137	1	10	1.25
68	1	9	1.	139	1	10	1.25
69	1	8	.5	141	1	9	.75
70	1	10	1.5	142	1	7	.5
71	1	8	1'	144	1	9	1'
75	1	7	1.5	150	2	1	1.25
76	1	9	1.25	152	1	9	2.25
78	1	9	.75	153	1	10	1'
27	1	10	1.5	161	1	8	1.75

The total yield including scrap (17 ounces) was 77 ounces being an average of 1.54 ounces of dry rubber per tree.

Four year old trees.—The four year old trees selected for tapping were all 2 feet or more at 3 feet from the base, the mean girth being 26.65 inches, and that of the whole of the originally planted trees 12.45 inches, the largest tree having a girth of 31 inches at a yard from the ground. The trees were planted 24' x 24' or 75 to the acre and 21 trees were selected from two acres, representing 14 per cent of the total. As in the former case the herring-bone system of tapping was adopted and the incisions renewed on 12 alternate days.

The total yield per diem of 21 trees was as follows:—

TABLE XVIII.

Result of tapping 4 year old trees.

June 1902.

Weight of dry rubber in Ounces.

	1	3	5	7	9	11	13	15	17	19	21	23
Total yield per Diem	2.5	2.5	3.5	3.5	3.5	3.75	2.75	3.5	3.25	3.75	3.	
Total Yield per Diem	} Scrap		} Total Yield									
	} 9.75		} 47.25									

Average yield per tree 2.25 ounces.

These trees which are growing under most favourable conditions, are a perfect picture of health and probably equal anything that can be found at this age in this part of the world; and I doubt whether, even in its native habitat, the rate of growth exceeds, or indeed equals this. It is apparent, however, that there is very little profit to be made if a tree must be tapped on twelve occasions in order to obtain a yield of 2½ ounces of rubber.

Seven year old trees.—At S'tiawan there are about 20 trees owned by the natives and, as is usually the case with native cultivation, they have been much neglected. They are growing on a dry sandy soil, which is covered with 'Lalang' (*Imperata Sp.*) a vigorous growing grass and although said to be seven years old have an average girth of 26.2 inches only, at 3 feet from the base, which is but slightly in excess of the average girth of the four year old trees, referred to above, and even a trifle less than the four year old trees selected for tapping.

These trees were also tapped with herring-bone incisions but the operation was more severe than in the two previous experiments; the vertical channel extending to a height of 4 feet, while the oblique incisions extended half way round the trunk, there being four on either side the vertical channel at distances of 1 foot. The incisions were renewed on 12 occasions at intervals of two days, the yield from ten trees being shown in the following Table.

TABLE XIX.

Result of tapping 10 trees 7 year old, 12 tapplings every 2nd day.

					Ounces.
Weight when dry	...	...	...	...	119.75
Scrap	...	...	...	...	25
				Total	142.75

Average weight of dry rubber per tree, 14.275 ounces.

The fact that these trees yielded nearly six times the amount obtained from four year old trees, of a similar girth but growing under more favourable conditions, is partly due to the more severe tapping to which they were subjected, but only partly. I think, for I am inclined to regard this as sufficient proof that age is the most important factor to be reckoned with when considering whether a tree is fit to tap or not, and that it cannot be argued that because a tree say ten years old, gives 3 pounds of rubber, that half this amount might be obtained from a tree half the age. As instancing the fact that an annual yield is procurable, it may be remarked here, that although

tapped very severely, these same trees, when tapped exactly 12 months later, gave an average return of over 9 ounces of dry rubber per tree. On this occasion the incisions were much smaller and were renewed on eight occasions only; still the yield exceeds that obtained on the first eight occasions at the previous tapping.

Eight to nine year old trees.—Only five trees were available of this age, all of which were tapped on a system previously explained, viz, three small herring-bone incisions to each tree. These trees were also native property, but were growing under somewhat better conditions than the trees just referred to having been planted among old coffee trees, whose decayed roots and foliage had provided a small amount of *humus*, a constituent in which this soil was particularly lacking. The mean girth of these trees was 39.8 inches or 13.6 inches in excess of the seven-year old trees growing close by.

The total yield dry rubber per day from five trees is shewn in Table XX.

TABLE XX.

EIGHT YEAR OLD TREES.

Trees 55, 56, 57, 58 and 59. Small herring-bone incisions (three per tree).

Tapped on eight consecutive days:—

1st day 4 ounces dry rubber including scrap. 2nd 7½, 3rd 10½, 4th 11½, 5th 10½, 6th 12½, 7th 13½, 8th 13½
Total Weight 83½. Average weight of dry rubber per tree 16.75 ounces.

Considering that the incisions were only renewed on eight occasions this may be considered a very gratifying return, being more than twice the amount obtained from the seven to eight year old trees when tapped on eight occasions, a strong argument in favour of good cultivation. It will be remembered however, that the system of tapping was different, and as this system has always given the best returns, the comparison may not appear quite a fair one.

Ten to eleven year old trees.—Tables VII and VIII which were given in the chapter relating to the area of the trunk to be tapped, shew the yield obtained from 10 to 11 year old trees growing under similar conditions. When tapped with V incisions and renewed on twelve occasions the average weight per tree of dry rubber was 28½ ounces. When tapped with small herring-bone incisions, exactly twelve months later, and the incisions renewed on eight occasions, the yield per tree was 19½ ounces of dry rubber. Here again we have a large increase of yield with age, as compared with the 4, 7 and 8 year old trees, a very noticeable point in connection with all these experiments. These trees gave about ten times the yield obtained from the four year old trees, although growing under more adverse conditions, and twice the amount obtained from the seven year old trees with considerably less labour. The yield from other 10 year old trees will be seen on reference to Tables III, IV, V and VI, the aggregate results being 721.25 ounces of wet rubber obtained from 10 trees being an average of 72.12 ounces per tree, or after allowing for a loss of 50 per cent on drying 2½ pounds per tree.

The largest amount obtained from a single 10 year old tree was 16½ ounces of wet rubber, which when thoroughly dry weighed 5 pounds 6½ ounces. This tree, which does not figure in any of the foregoing tables, was 5 feet 3 inches in circumference, and was tapped with herring-bone incisions, renewed on 14 alternate days.

The cost of extraction of the latex depends firstly on the age and dimensions of the tree operated upon, secondly, on the instrument used. Assuming that the trees tapped are eight years old and of good growth, an average of two ounces of dry rubber per day may be relied upon, and with an ordinary pruning knife a coolie can easily tap three trees an hour, or 15 trees a working day of five hours. The remainder of his time would be partly employed by shaving off the rough bark and getting the trees ready for tapping on the following day, collecting the latex and conveying it to

a central shed to be coagulated, cleaning out the tins, etc., so that at the rate of 30 cents per day, the cost of collection can be put down at 15 cents per pound, a figure liable to modification if improved methods of extraction are forthcoming. The cost however, increases perceptibly when trees of a younger age are worked and in the case of five to six year old trees, where the yield will probably not exceed one ounce of dry rubber per day the cost is just doubled and it appears to me to be very doubtful, whether it is worth while tapping a tree unless an average of at least one ounce of dry rubber per day can be relied upon. With an improved tapping instrument, many more trees could be gone over, but even then the cost of extracting the rubber from younger trees will be considerable, to say nothing of the injury inflicted upon the tree, if the tapping be continued until an appreciable amount has been obtained.

PREPARATION OF MARKETABLE RUBBER.

Coagulation of the latex should be effected immediately after it has been collected, for if allowed to stand even until the following morning, decomposition of the proteid matter will often set in, and the value of the rubber will be decreased. This is easily detected by the putrid smell which is given off by the latex, or in the case of prepared rubber, by the dark coloured blotches, both of which can be entirely avoided by coagulating the latex immediately it is brought in from the trees. The rubber will then have only a slight, unobjectionable, characteristic odour, and will be of a light amber colour, deeping slightly with age.

The composition of the latex of Hevea, as given by Seeligmann, * is as follows:—

Caoutchouc ..	32 per cent	} in solution.
Nitrogenous matter (proteid)	2·3	
Salts	9·7	
Resinous matter ..	traces.	
Water, slightly alkaline ..	55·6 per cent.	

The quality of "Para" rubber is due to some extent to the very small proportion of resinous matter contained in the latex. The latex, however, differs perceptibly in the per-centage of caoutchouc it contains sometimes being of a creamy consistency with a yellowish tinge, while that from other trees has a more watery appearance and resembles skimmed milk; but as the latex from the various trees is not coagulated separately, this difference in the quality of the latex does not necessarily result in rubber of different grades. The Brazilian method of coagulating the latex by smoking it, has been described many times and need not be repeated here. Rubber prepared by this method still commands the highest price of all native cured rubbers in the market, but whether the "Para" rubber so prepared will continue to occupy the premier position when pitted against rubber coagulated on more scientific principles is very doubtful. There will probably be a certain amount of conservatism to break down, as is generally the case when a new product makes its appearance on the market, but we may rest assured that so long as rubber continues to be used for the manifold purposes it is at present, that it will always command a remunerative figure; and when prepared free from all foreign matter, and shipped in as dry a condition as possible, the probabilities are that it will eventually oust the "Para" rubber of to-day from its present position, for purity and freedom from moisture are what the manufacturer most desires.

The preparation of the commercial article is quite a simple matter, and the cost but slight. The method I have adopted is as follows:—Before tapping, a little water, about sufficient to cover the bottom of the tin, was placed in each tin, in order to delay coagulation until the tins could be collected, which is generally about an hour after the incision has been made. As soon as the flow of latex has ceased

the tins are collected, and their contents poured into a basin and an equal amount of water added. In this dilute state the latex was strained through a fine muslin cloth and practically all dirt, bits of bark, etc., were thereby removed: the latex is now ready to be treated with some coagulating re-agent such as acetic, nitric or sulphuric acid, corrosive sublimate, alum or other salts. All these substances and many others have the effect of collecting the rubber particles, which are suspended in a watery fluid, into a solid mass, which can then be pressed and dried.

The coagulating power of the various acids differs considerably, but in all cases a very small amount is required. Parkins gives the following approximate figures. (*loc.cit.*):—

100 c. c. of pure latex	are completely coagulated by
	0·1 gram Sulphuric Acid.
100 c. o. "	0·1 " Hydrochloric Acid.
100 c. c. "	0·3 " Nitric Acid.
100 c. c. "	0·95 " Acetic Acid.

He also states that "if excess be added then coagulation ceases to be complete." This I have found to be the case with many of the acids I have employed though not so with acetic acid, even when ten times, the requisite amount has been added in which case coagulation took place instantly, so that it was impossible to pour the latex out into flat dishes. The residue, however, was quite clear showing that all rubber had been extracted. The great thing to remember is that the quantity of acid required depends upon the volume of *pure latex*, and no matter to what extent it is diluted the amount of acid required to bring about complete coagulation remains the same.

In actual practice I have found that acetic acid is by far the handiest to work with, as the range being so considerable, the quantity required to bring about complete coagulation is easily determined without going to the trouble of ascertaining the volume of pure latex to be coagulated.

When the latex had been strained as described above a small quantity—roughly about a tea-spoonful to a pint of latex—of acid (acetic) was added, and the whole stirred for a few seconds. If there were no signs of coagulation a few more drops of acid were added and stirred again, when usually it would gradually assume the consistency of thick cream, when it was immediately poured out into enamelled plates. The stirring and pouring out of the latex should be done as gently as possible, so as to avoid the creation of bubbles, which burst when the rubber is submitted to pressure, giving a roughened appearance to the surface. Enamelled plates are recommended in preference to tins, as the latter are liable to become rusty, and are also acted upon by the various acids.

After a lapse of three or four hours coagulation should be sufficiently complete to allow of the rubber now in the form of a thin solid cake and of a pure white colour, being taken out of the dishes and submitted to pressure, so as to express as much of the moisture as possible. Any kind of pressure may be employed, but something after the style of the old fashioned English wringing-machine will probably be found as effective and inexpensive as anything that can be devised.

The advantage of adulterating the latex and then coagulating by some re-agent may not at first sight seem quite apparent, but unless some such principle be adopted, it will only be found possible to prepare a small per-centage in the form of thin sheets, by far the greater amount coagulating in the tins before they are removed from the trees. Such rubber will be in the form of irregular lumps will be difficult to dry, and will contain a certain amount of impurity no matter how carefully the tapping be conducted. Moreover, unless some means of assisting coagulation be resorted to, difficulties are often experienced in wet or cloudy weather, decomposition setting in resulting in a discolouration of the rubber, an evil odour, and consequently a depreciated value.

* Seligmann, Le Caoutchouc et la Gutta Percha.

In bright weather rubber prepared by the addition of acid can be dried in about a week or ten days, if placed on a rattan bench where there is a free circulation of air—assuming the cakes are not more than one-eighth of an inch in thickness, but on no account should it be placed in the sun, or the surface will be rendered permanently sticky. The producer, however should render himself independent of atmospheric conditions, by erecting a special house for this purpose. Something in the nature of a tea-withering house would suit admirably; or on those estates where rubber is supplanting coffee, a new use for the coffee-drier may be found. Unless some such arrangement already exists on the estate there is no necessity to go to any great expense in this direction; all that is required is a high temperature easily regulated, and a strong current of air with the object of driving out all the moisture as quickly as possible, thereby enabling the producer to realise on his rubber with the least possible delay.

Moulds are very troublesome and in damp weather will sometimes appear in the course of 48 hours, but their growth would be hindered to a great extent and probably entirely prevented if the rubber was kept in a drier, with a strong current of dry air passing through, until ready for shipping.

As compared with other tropical products, it will be seen that the preparation of commercial india-rubber presents very few difficulties, while the cost is comparatively small. Samples of rubber prepared by various methods are being sent home for valuation, and the result together with other remarks touching on this question will form the subject of a further report.

COST OF OPENING AND MAINTAINING A PLANTATION UNTIL PRODUCTIVE.

The following figures represent the cost of opening 500 acres of land, and planting with rubber 20' x 20' apart being 108 trees per acre.

Premium on 500 acres at \$ 1 per acre.	..	500
Quit-rent, first year, 50 cents	..	250
Survey fees, 25 cents per acre	..	125
Felling jungle, \$ 7.50	..	3,750
Clearing up, after burning off, \$3 per acre	..	1,500
Draining, \$ 10 per acre	..	5,000
Roads, \$ 1	..	500
Lining 1.50	..	750
Holing (holes 1½' x 1½') and filling with surface soil, \$1 per acre	..	500
Planting, with stumps from nurseries, 40 cents per acre	..	200
Weeding, \$ 1 per acre, per mensem (9 months)	..	4,500
seeds, 100,000 at \$ 5 per 1000	..	500
Nurseries, sowing, weeding and watering	..	150
Tools and implements	..	500
General transport	..	100
Coolie lines, to house 200 coolies	..	750
Conductor's bungalow	..	250
Manager's	..	750
Conductor's salary, first year, \$ 50 per mensem	..	600
Manager's " " " \$300	..	3,600
Contingencies	..	500
Total cost first year	..	25,275

This represents an average of \$50.55 per acre, although these figures are subject to a slight modification, varying with the nature of the jungle to be cleared and the land to be worked. The terms on which land may be acquired are dependent to a certain extent upon the situation and locality, and would not exceed the figures quoted above but, subject to certain conditions, may be had on more reasonable terms. The proximity or otherwise to a town, and the facilities for transport would necessarily affect the estimate for transport charges.

The upkeep for the second, third, fourth and fifth years would be as follows:—

Quit-rent, 500 acres, at 50 cents per acre (4 years)	..	1,000
Weeding, second year, 500 acres, at 75 cents per acre per mensem	..	4,500
" third year 500 acres at 65 cents per acre per mensem	..	3,900
" fourth year 500 acres at 50 cents per acre per mensem	..	3,000
Upkeep of drains, 75 cents per acre per annum (4 years)	..	1,500
" of roads 75 cents per acre per annum	..	1,500
Supplying vacancies, second year, 50 cents per acre per annum	..	250
" vacancies third year 25 cents per acre per annum	..	125
Insect pests 12 per acre per annum (4 years)	..	4,000
Repairs to coolie lines, second, third and fifth years 125 per annum	..	75
" to coolie lines fourth year (re-ataping)	..	150
" bungalows (2) second, third and fifth years, \$25 per annum	..	150
bungalows (2) fourth year (re-ataping)	..	150
Tools and implement, \$25 per annum (4 years)	..	100
General transport \$100	..	40
Manager's salary 3,600	..	14,400
Conductor's " \$600	..	2,400
Contingencies, insecticides " stationary etc., \$500 per annum	..	2,000
Upkeep until end of fifth year	..	39,600
Add first year's expenditure	..	25,275
Total expenditure	..	64,875

The total expenditure for five years is therefore \$64,875, being an average of 55.5 per acre for clearing and planting, and \$19.80 per acre per annum for upkeep, including the manager's salary. Taking the rate of exchange at 1s. 10d.—the average for the last two years*—this is equivalent to £5,946 17s. 6d. sterling, or an average of £11 17s 10½d. per acre; to which must be added the interest on all money expended. Nothing has been estimated for weeding during the fifth year, as it is anticipated that the trees will give sufficient shade to prevent the growth of any rank growing grasses: the weeds which appear during the fifth and subsequent years will be of a harmless nature and will die out naturally as the shade becomes more dense. If it is considered advisable to weed beyond the fourth year, an additional estimate of 35 cents per acre per mensem should suffice to keep the estate perfectly clean.

Return.—On a good estate it will probably be found that a number of trees will be worth tapping during the sixth year, though lack of data prevents me from arriving at a definite conclusion on this subject; but I confidently anticipate a yield during the seventh year at least equal to that obtained from the seven year old trees previously referred to.

Assuming that 50 per cent of the five year old trees give an average yield of 8 ounces of rubber per tree which cannot be considered an unreasonable assumption, seeing that almost twice the amount was obtained from seven year old trees growing under very unfavourable conditions—albeit the tapping was somewhat severe—the yield per acre in the sixth year would amount to 25 pounds of rubber. Taking the selling price in London at 2s. 6d. per pound (which is 1s. 1d. per pound less than has recently been obtained for well cured samples from Ceylon) this would be worth £3 2s. 6d. sterling; but as there is always a certain per-centage of "scrap" rubber, it will be safer to estimate on an average selling basis of 2s., so that the yield per acre during the sixth year may be

* The rate of exchange for the present day is 1s 8½d

valued at £2 10s. From this must be deducted the cost of collection and preparation for market, which should not exceed 20 cents per pound—equivalent to 9s. 2d. per acre, also packing charges, freight and wharfage.

The average cost per acre per annum for upkeep being \$19.80 or £1 16s. 3½d. sterling, it appears probable that after deducting all expenses in connection with the preparation and marketing of the rubber, that the return during the sixth year will leave a small margin of profit, after allowing for upkeep, including the Manager's salary and interest on the outlay.

This, I am aware does not compare favourably with some estimates which have been published, but it must be remembered that this estimate is based on the assumption that there are only 108 trees per acre; had there been three times the number, the growth during the first four years would probably have been quite as good, and the yield trebled, but I anticipate a far better return from those trees when they attain the age of nine or ten years than from trees planted more closely. This however is a debatable point, and until there is some further opportunity of experimenting in this direction it is useless to attempt to arrive at any definite conclusion.

By the time the trees are six years old, 75 per cent should give an average yield of 12 ounces, which is equal to 56.25 pounds per acre. Valued at 2s. per pound, this gives a gross return of £5 12s 6d. per acre, so that after deducting the cost of harvesting and marketing there is every prospect of a fair return on the capital expended during the seventh year.

By this time the cost of upkeep will have reached a very low figure, while the yield will increase year by year, and should average at least 150 pounds of rubber per acre by the time the trees are nine years old, and probably 100 pounds the following year.

STANLEY ARDEN,

Superintendent, Experimental Plantations,
Federalated Malay States.

THE ALOE FIBRE INDUSTRY,

Mr. C. J. Greengrass writes to us from Puttur, North Arcot:—As the plantain fibre industry seems to be attracting considerable attention just now, perhaps a few remarks on the agave or aloe fibre will not be out of place and be of interest to those who are going seriously into the matter. The varieties of this plant grown to any extent in India, besides those grown for purely ornamental purposes, are the three varieties *A. vivipara*, *A. rigida*, and the species known as the Blue Aloe, to be seen along the Madras Railway. The last named, though producing a fair percentage of fibre, cannot compare in this respect with the other two, *A. vivipara* and *A. rigida*. The latter has the shorter leaf of the two, averaging about 2ft., and as its name implies, is stiffer and harder to manipulate than the leaf of the former. The percentages of fibre in both are about the same, of equal strength, but they differ considerably in length, one being only about half that of the other, an important feature in valuation.

From my experience, I found that the *A. vivipara* is eminently the most suitable for fibre producing. I do not see any of this species about this part of India, but towards the West of India generally it is very common, and is used as fencing by the Southern Mahratta Railway towards Poona and Belgaum. The plant resembles to a very great extent the West Indian variety, *A. sisalana*, out of which the West Indies are now making fortunes, the only difference being that the latter is somewhat shorter in leaf, and has of only the one terminal spike, and none along the edge of the leaf, as with the former. It is a very hardy plant and takes kindly to all varieties of soil and will thrive on land considered too poor for agriculture. When grown on rich soil the plant becomes somewhat longer in leaf, but the percentage of fibre is less the leaf becoming "fat." A drier soil with an admixture of *MOORUM* or sand is best suited for it

cultivation, for though the leaves produced are not quite so long, as otherwise, it produces more fibre and of a better quality. The plant requires a little looking after for the first year, but after this is well able to take care of itself, producing an annual crop of leaves after about the third year, for about 12 years, when, after it has produced its central stem and shed its bulbules, it decays and dies. The bulbules spring up around the parent stem.

From information gained of the methods of cultivation, in America and the West Indies, of the *A. sisalana* it would appear that the yield per acre is about one ton of fibre, allowing 10 ft. space between the plants. From my experience of the Indian variety I should say the same remarks apply to it. A sample consignment of fibre sent to Liverpool brought £11 per ton: the cost of manufacture freight etc., was about Rs 100 per ton. The leaves were procured from plant grown as fencing along the S.M. Railway at Poona, and the method of extracting the fibre was the usual primitive one of rotting the leaves in water and beating out with wooden mallets. This injures the fibre considerably, and I have no doubt, worked with proper decorticating machines, the price realised would be much higher, running up, I should say, to about £20 per ton.

The advantages the agave has over that of the plantain tree are many. It grows on any waste land thousands of acres of which may be seen all over the Madras Presidency, and which may be had at a nominal rental. The plant gives an annual crop of leaves for about 12 years, where the plantain tree has to be cut down *in toto* for the extraction of the fibre and, moreover, requires less looking after.

This industry has now been carried on in the West Indies and America for many years past, and large fortunes are being made out of it in exporting the fibre to England and other parts of Europe. Cannot some of this money be converted into rupees instead of dollars? I commend the question to those whose constant wail is the chronic poverty of India, and also to the Indian planters who now regularly meet at these Conferences and sadly contemplate, with hands in empty pockets, the darkening aspect of the planting horizon.—*Madras Mail*.

LIFE IN THE ANNAMALAIS.

COMPARISON WITH CEYLON.

The planting region of the Annamalais with the forest belts, Mr. Windle thinks, is about

50,000 ACRES IN EXTENT.

and of it some 15,000 to 16,000 acres are in private hands the whole of this, however, is not yet opened up. It is possible that further allotments of land would have been purchased readily enough, but Government stopped the further sale of land. The elevation is from 3,300 feet to 4,000 feet. The country is well watered and the rainfall averages about 130 in a year, most of it falling during the south-west and north east monsoons, while good "blossom" showers fall in the intervening periods. The monsoon rains, as in Ceylon are heavy, but without that characteristic feature of Ceylon rains, viz., wind. The Annamalais may truly be described as

A WINDLESS COUNTRY,

but, notwithstanding this, the weather is fine and cool with an even temperature. The soil as stated before, is exceedingly rich, and analysis have been taken by Mr. Kelway Bamber of Colombo; Dr. Van Garszel, Government Analyst, Madras; Mr. Hooper, Government chemist, Calcutta; Dr. Layman, Government chemist Mysore, and others, the result of which showed that the place was

EXCELLENT FOR CULTIVATION

of products. In this connection it is interesting to note that Mr. Windle was the first to make up but in the Annamalais. He applied for 2,300 acres by was allowed 1,000 acres, the maximum granted in Government to purchasers, and began opening in

1897 late in the season. He managed to plant about 60 acres in coffee by March 1898, but a jungle fire broke out during an exceptional dry season and destroyed all his labours. However, he planted up during the monsoon weather that year and the result showed the exceptionally good country for coffee. In the season 1900-01 he took his first crop of $1\frac{1}{2}$ tons from the young trees, 40 tons in season 1901-02, and 40 tons in the succeeding season, while the prospects for the coming crop were extremely good. Cardamoms were also doing remarkably well. In fact the place was the habitat of cardamoms, for Mr. Windle had found them growing wild in the jungle. He had opened out 130 acres in cardamoms from 1 to 3 years old and they were getting on famously. Messrs. Martin and Bannatyne, former Ceylon planters, had their cardamom plantations coming on well. Besides coffee and cardamoms, cinchona was another product that appeared to take to the Annamalais. Mr. Windle planted out *Ledgeriana* variety some 2½ years ago and the trees were quite sound and healthy. They grew extremely well, and it was hard to say which grew better coffee or cinchona. As regards rubber, which was quite a new product, and vanilla, which was given up, Mr. Windle has spoken of them before. Pepper he tried but without success. Roses grew particularly well, as also all flowers, which showed a luxuriant growth, and vegetables. Poultry thrived wonderfully which might be attributed to the absence of disease or pests; jackals, wild cats, hawks, etc., being unknown. The Annamalai hills for climate, soil etc., for growing products was wonderful and there is no doubt, if Government is only willing to sell further allotments.

LAND WOULD BE BOUGHT UP READILY.

The roads, Mr. Windle remarked, were in good condition, but not so well kept as the excellent Ceylon up-country roads. They sent their produce by cart to Podanur, a distance of 60 miles—distance by the way was no consequence to the Indiau planter—and thence by railway to Calicut. There was some talk of a railway from Dindignl to Palghat through Pollachi, which was only 15 miles from the foot of the hills. This if sanctioned will prove a great boon. As regards sport, there were elephant and bison in the Annamalai forests, and mahseer in the fine rivers. The only expensive item the Annamalai planter had was felling. It cost Mr. Windle R30 an acre; and sometimes it would cost more according to the nature of the forest. There was excellent timber in abundance, both white and red cedar, jak, toon, ironwood, and a little ebony.

LABOUR WAS PLENTIFUL

and easily obtained, and none of the difficulties that beset the Ceylon planter in this direction were experienced.—Local "Times."

ARTIFICIAL NITRATES FROM THE AIR.

The question of manures for keeping up the productive power of the soil must ever be of the first importance to planters and agriculturists. In the composition of all manures an element of the first importance is fixed nitrogen as contained in the various nitrates. But the supply of natural nitrates is limited by a variety of circumstances, and the expense of applying it in the form in which we now procure it is a very considerable item. Nature herself adopts another method of giving the indispensable nitrogen to the soil. The atmosphere consisting of four-fifths free nitrogen is a natural laboratory wherein by the effect of electric discharges nitric and nitrous acid are formed. These being dissolved and washed down by the rain form a perpetual fertilising agent quite sufficient for growth under natural conditions. Artificial culti-

vation however, is a much greater tax upon the soil and Nature's arrangement, admirable for her own purposes, does not suffice under conditions of continual cropping. The drain of material is too great to be compensated in this manner.

The balance of nature is in fact destroyed, and man who is responsible for the destruction must in his own interests set to work to reconstruct more suitable conditions and by applying an increased quantity of the vivifying agent restore the balance. Thus, in the long run, the supplying of nitrogenous fertilisers by the agriculturist becomes necessary. Hitherto he has been dependent on a comparatively limited number of mines, a fact which renders nitrates expensive; but some few years ago Lord Rayleigh showed that the artificial union of nitrogen and oxygen by means of the electric spark was so easy a thing to effect as to make the method worth trying on a commercial scale. This suggestion has now been acted on by two American inventors—Bradley and Lovejoy—and a company has been formed to work their process. Apart from commercial importance, the new process is of interest from the closeness with which it follows out Nature's method of production.

The apparatus employed consists of a fixed cylindrical metal box, inside which, but insulated from it a second cylinder rotates 500 times per minute. On the surface of each cylinder are six upright rows of metal pieces or "contacts" 23 in each row. These contacts are insulated from each other and each is connected through an inductance coil to one or other pole of a 10,000 volt dynamo, those on the outer cylinder to the positive pole, and those on the inner to the negative. As the rotation goes on the negative contacts come up to the positive, and each pair then "strikes" an electric arc; as they move away the arcs are drawn out and extinguished, only to be reformed when the next set of negatives comes up. About 40,000 acres are thus made and destroyed per minute. A steady flow of air amounting to something like 700 cubic feet per hour is maintained through the space between the cylinders. The arcs promote the chemical union of the oxygen, and nitrogen and the air leaves the apparatus having about one-fortieth of its mass converted into oxides of nitrogen. It is then conducted to absorbing towers. These are already well known in connection with other chemical industries, so we need only remind our readers that they consist of lofty "stacks" loosely packed with bricks or blocks of coke down which a stream of water is allowed to trickle. The mixed gases entering at the base of the tower meet the falling water, which dissolves out the oxides of nitrogen, forming dilute nitrous and nitric acids, which can be continuously drawn off below, and used for the preparation of the required chemicals.

Sufficient data have not yet been published to allow the efficiency of the plant to be calculated. Possibly the manufacturers desire to keep such information to themselves; but there is every reason to expect that the method will bring about a reduction of the cost of nitrates. Such a result would be of incalculable importance, not merely will the agriculturist be helped by cheap fertilisers—though this is probably the most important benefit to be expected—but many other industries will be assisted. To mention one only, the manufacture of sulphuric acid is only practicable on the large scale by the aid of the oxides of nitrogen. These are now derived from nitrate of soda, but it would be a great advantage to obtain them direct from the atmosphere. Even if it were impossible to utilise the new plant, cheaper nitrates would mean cheaper acid, which would be an assistance to nearly every chemical industry. Moreover, if the nitrates can be obtained by the new process in sufficient purity for gunpowder making, the public security will be enhanced by rendering our artillery independent of the Indian saltpetre mines.—*Indian Planting and Gardening.*

PRUNING FRUIT TREES.

By W. J. ALLEN.

Pruning is a means to an end. It is not intended in this article to enter into a discussion of the general theories of pruning, which are multitudinous: nor is it possible to give any advice for pruning until one has analysed the subject, and knows the object for which he is to work, and the underlying principle on which his practices must rest. The principles are universal, and the same might also be said of the practices which are primarily the shaping or training of the tree, and secondarily (after this object has been attained), to fruitfulness. Under natural conditions trees are being constantly pruned. Every fall nature strips the trees of their leaves. This is their regular annual pruning. In addition to this, there is a continual pruning of buds and branches. If every bud on a tree were allowed to develop, the latter would become a regular bush pile. Those buds which are most favourably situated as regards light get most nourishment, while those less favourably situated become starved and drop off. The lower limbs of trees and those within the crown become weakened, and die from lack of sunlight, then the wind, nature's pruning knife, comes along and removes the dead branch. In this manner trees are constantly ridding themselves of useless branches, and the pruning so effected is undoubtedly a benefit to the branches which remain and to the general growth and improvement of the tree.

Orchard trees, by virtue of selection, by hybridisation, and cultivation are in a highly specialised condition, and to be maintained so must receive special treatment. In a sense, the fruit tree is a machine for manufacturing fruit, and intelligent pruning is one of the means by which it can be made to manufacture the most fruit of the best quality in the shortest time, and to keep up the output for the longest possible period. A correct understanding, therefore, of this machine and all its working parts is necessary to its most successful manipulation.

Wickson, in his work on California Fruits, writes:—"One of the first things for the beginner to undertake as he approaches the practice of pruning trees and vines, is to form some conception of the purposes to be served. Imitation is not the foundation of intelligent pruning, though it yields many valuable suggestions. Satisfactory work rests upon a correct understanding of the reasons for each act, and to the attainment of this all study, observation, and experience should tend. Possessing this, one can proceed capably modifying method to meet condition, and producing desirable results. Receive all suggestions, and then go quietly to the tree and study your problem in its shade. The tree is the best revelator of its need. Some of our best pruners are men who were untrained to horticulture before they entered upon their orchard work. Reading discussion, systematic instruction, are all valuable. They save much time and many errors; but recourse to the tree affords the sovereign test of attainment. These may be counted among the practical purposes to be attained by pruning (a) Convenience of the grower; (b) health and strength of the tree; (c) regulation of heat and light; (d) attainment of strong bearing wood; (e) attainment of size in fruit; and (f) promotion of regular bearing."

"On examining the tree, it will be found to be composed aboveground of a trunk from which the main branches spring, which, in their turn, produce laterals, on which the shoots and spurs which bear the fruit are to be found. Taking these points into consideration, one can hardly fail to secure rays of light upon the subject of pruning which seems dark to so many.

"Convenience.—Trees which branch near the ground are mostly quickly and cheaply handled in all the operations of pruning, spraying fruit, thinning, and picking. Low trees with obliquely-rising branches are more easily cultivated than any form with hori-

zontal branches, unless the head is carried so high that the teams pass easily under the tree. To do this sacrifices all the other conveniences and economies which actually determine profit, and is really out of the question from a commercial point of view.

"Health and Strength.—It is imperative in most parts of this State that the sunshine be not allowed to touch the bark during the heat of the day. This protection is secured even for young trees by low branching. The low tree with properly spaced branches attains superior strength by virtue of thick, strongly knit, short growth between branches, and by its strong, stiff, obliquely-rising growth sustains weight which brings horizontal branches to the ground, and thus even high-headed trees are liable to continually increasing interference with cultivation, and the desperate grower has to raise the head of his tree higher into the air and farther above the profit line while at the same time he renders it more liable to sunburn, to bark binding, and to unthrifty by forcing the sap to flow an unnecessary distance and through wood and bark will impede its movement. Besides, a low tree escapes stress by strong winds, which a high tree invites, and at the same time is less able to withstand. Pruning for health and strength of the tree also includes the removal of unthrifty or diseased parts, which are not only an encumbrance to the tree, but many communicate to other parts the cause of their ill condition.

"Heat and Light.—The maintenance of strong bearing wood in the lower part of the tree is conditioned upon the proper pruning of the top of the tree. How far the upper levels or the shade layer of the tree can be safely opened depends upon the local climate in each fruit region. The rule must be the higher the summer heat, the denser the tree—the lower the heat the thinner the tree: but everywhere the proper condition of openness must be constantly in view in pruning. Not alone must this be done to maintain thrifty growth below, but it is also essential to the best growth and ripening of the fruit in the lower and interior parts of the tree. Fruit inferior in size, colour, and quality, results in part from lack of pruning to regulate the admission of light and heat, sometimes one, sometimes both, to the shaded portion of the tree.

"Bearing Wood.—Good fruit develops on good bearing wood, and good bearing wood is the product of proper degrees of light and heat as has just been urged; but bearing wood in the case of some fruits is new wood, and reduction of old wood for the purpose of forcing the growth of new wood must be constantly in mind. Renewal is more or less a consideration with all trees and especially the securing of strong new wood. This is a point upon which close study of the bearing tree will yield most satisfactory suggestions.

"Size of Fruit.—The size of fruit, providing the tree is healthy and vigorous, depends upon the character and amount of bearing wood which the tree is allowed to carry. Removal of part of the fruit burden is done by thinning after it is well set, this labour should always be minimised by antecedent pruning, which adjusts the retention of bearing wood according to the vigour, size and bearing habit of the tree. Thinning out of bearing shoots and spurs, when either are clearly seen to be in excess, should be the constant study of the pruner."—*The Indian Agriculturist*.

TURMERIC—GINGER.

Turmeric and ginger may be both profitably grown in Bengal, and like most other root crops are meant for, and are within easy reach of, small capitalists. Turmeric, *Curcuma Longa* requires soil of a rich and friable nature, to which has been added a good percentage of potash. High lands, not likely to be overflowed, should be selected for this crop, and should be well ploughed and cleared of weeds, etc. Manure should be freely applied and well worked into the soil. Sweepings of all kinds, pondrette, and ashes especially those from cowdung cakes are specially

valuable adjuncts towards fertilizing lands, in which turmeric is to be grown. This crop is often planted on lands, where sugarcane grew the preceding year, and it is considered an ameliorating crop. One of the special features to be noted in nearly every homestead in a Bengal village is the sight of a few clumps of ginger and turmeric plants growing, where ashes and other sweepings are thrown out. The small amount of tubers produced is generally sufficient for the frugal ryots yearly consumption. Turmeric is often grown under the shade, in orchards mango topes and such, but the crops produced cannot be compared to those grown on lands specially suited and prepared for it. The time for planting out turmeric varies a good deal but the best time for doing so is from the middle of April to the end of the following month. Before beginning planting it is advisable to wait until one or two north-westerners have passed over, giving a certain amount of moisture to the parched soil. The tubers should be put down on ridges a foot or so high and 18 or 20 broad, with intervening trenches nine or ten inches broad. The cutting or sets, *viz.*, small portions of the fresh roots are planted on top of the ridges and about 18 inches apart. Three hundred such sets will be required for a *bigah* or nine hundred for an acre of land. The after-cultivation consists mainly in keeping off weeds and loosening of the soil between the ridges. Irrigation is not generally resorted to for by the time the monsoon rains are over, the tubers are already formed and only require ripening. Turmeric crops usually take ten months to come to maturity so should be taken up towards the latter part of January, and the plants be allowed to wither and dry up before doing so. When taking up the roots the *kodali* or spade should never be used, but only the digging fork.

The output of turmeric, like most other root crops varies a good deal but 16 to 18 maunds of fresh roots to a *bigah* or 3,800 to 4,000 pounds to an acre of land should be considered a very fair average. The roots are generally sold fresh to the middlemen, but they may be prepared and dried. To do this the roots must first be sorted out into two sizes, *viz.*, the smaller and larger ones, as these latter require more hoiling. After they have been sorted out, the roots are thrown into large earthen pots filled with water to which has been added an admixture of cowdung and tamarind leaves. The roots are then boiled for two or three hours according to their size and then taken out and spread out to dry. The boiling and drying makes the tubers shrink to half their original size and the loss in weight varies from 30 to 40 per cent. As the outlay required for raising turmeric crops is small, the returns obtained are generally very satisfactory. The price of turmeric, like most other such staples, varies a good deal according to the state of the crops and the time of the year; but from R 4 to R 6 *per maund* may be taken as a fair average for the dry roots, and R 2 to R 4 for the fresh ones. The following table will, I think, show that turmeric and ginger are among some of the miscellaneous crops that the would-be domiciled Anglo-Indian or Eurasian, may safely and profitably take up.

Expenditure and returns from one *bigah* turmeric

EXPENDITURE.		R.	A.	P.
Rent for 1 year with cesses ..	..	2	3	0
8 ploughs for ploughing and preparing land at 5 annas each ..	..	2	8	0
Manuring, including price of manure ..	..	6	0	0
16 coolies for preparing land at 5 for the rupee ..	..	8	3	3
8 coolies for planting at 5 for the rupee ..	..	1	9	9
After cultivation, weeding, etc. ..	..	5	0	0
Taking up and sorting roots 10 coolies ..	..	2	0	0
		22	8	0
Profit from one <i>bigah</i> turmeric ..	..	25	8	0
		48	0	0

RETURNS.

	R.	A.	P.
16 maunds fresh turmeric at R3 per maund	48	0	0
	48	0	0

Considering the small outlay, the returns obtained should be considered very satisfactory, and a great advantage that both turmeric and ginger have over other crops, is that they have practically no enemies to contend with, for nothing will touch their pungent and aromatic roots.

Like turmeric, ginger *Zingiber officinal*, may be grown very profitably in Bengal. Soil of an alluvial or loamy nature and heavily manured is the best suited to these roots. Old and well decayed cowdung or stable litter with an admixture of ashes and leaf mould, if available should be well worked into the soil, oil cake is also one of the best manures, I know of for ginger; but should be on no account applied too freshly. Ginger, besides potash, require phosphoric acid, so all manures containing the most of such properties, should always be made use of. The land after it has been *extra carefully* ploughed and manured should be laid out in ridges to facilitate irrigation, in the same manner as preparation is made for planting sugarcane. The best time for putting out ginger is from the middle of February to April. Pieces of the fresh end of the rhizome, about an inch or so long, should be planted one foot apart. When just planted the tubers should be protected from the sun until they have sprouted, the best way to do this is to cover them with pieces of plantain leaves, cut into suitable lengths and the ground should be freely irrigated for the first ten days or so, or until the plants have come up. Subsequent culture consists mainly in irrigating, weeding and keeping the soil open an applying manure once in four months. Like all *Scitamineaceae*, ginger require a very rich soil with plenty of moisture, and should be planted near enough so as to protect each other but not so thickly as to prevent access of light. Like turmeric, ginger takes a year to come to maturity; and though the tubers left underground will rot, they will sprout up again before doing so. With a little care a ginger plantation may be kept going for three years, the bulk of the roots being taken up, and a few left for the succeeding crops, the second year's outturn is said to be as a rule the heaviest. After the tubers have been taken up the plants should be manured, earthed up and freely irrigated. The average yield per *bigah* is about 10 maunds, and the market value may be taken R 6 as a fair average. Ginger is generally sold in its natural fresh state but it is also sometimes boiled and dried, in which state it is known as *soont*, and as such is greatly valued for its pharmaceutical properties.

Ginger and turmeric are some of the products the smaller capitalist should take up with every chance of making a success of it. The following table of expenditure and returns speaks for itself:—

EXPENDITURE.

	R.	A.	P.
Rent for one year per <i>bigah</i> with cesses	2	3	0
10 ploughs at 5 annas each ..	..	3	2
Manuring, including value of manure ..	..	8	0
20 coolies for preparing land at 5 for the rupee ..	..	4	0
10 coolies for planting at 5 for the rupee	..	2	0
After-culture, weeding <i>cher</i> ..	..	8	0
Taking up and sorting tubers, 15 coolies @ 5 for the rupee ..	..	3	0
Irrigating ..	..	6	0
		36	5
Profit from one <i>bigah</i> ginger ..	..	23	11
		60	1

RETURNS.

	R.	A.	P.
Ten mannds green ginger at R. 6 per maund	60	0	0
.. .. .	60	0	0
	<hr/>		
	60	0	0

The preliminary cost on raising one *biagh* of ginger crop is far in excess to that for turmeric, but as ginger is a crop that may be made to last for three years, the average cost will be found to be lower, and the return higher at the end.—*Indian Planters' Gazette.*

RECENT EXPERIMENTS WITH SWEET POTATOES.

Sweet potatoes (the enlarged roots of *Ipomea Batatas*) are among the most important agricultural products of the West Indies. As Mr. F. Watt's *West Indian Bulletin*, Vol. I. p. 271 states: 'So far as the sugar-producing islands are concerned the sweet potato occupies the foremost place in the list of home-grown foods and is, probably, next to the sugar-cane, the most important crop grown. . . . At present the crop is grown upon the sugar estates as a snatch crop and fulfils a useful purpose; owing to the short time it takes to come to maturity it can be planted after the (ratoon) canes have been cut when the potato crop will be ready for reaping from about December to February. After the crop has been reaped the land may be quickly prepared for a crop of sugar-cane. As the potatoes usually meet with a ready sale the crop is of value to the sugar planter and acceptable to the labourer. Sweet potatoes are largely grown by the peasantry themselves, the ease with which they are propagated, the poor soil in which they will thrive, the small amount of attention which they require, and the short time in which they come to maturity, all commend them to the peasant.' In the case of such a short time crop as the sweet potato it is difficult to obtain reliable information as to the actual acreage under cultivation. For Barbados the question was very fully discussed by Mr. J. R. Bovell in the *West Indian Bulletin*, Vol. I. pp. 204-12. He estimated that there were about 2,600 acres under sweet potatoes in the island as catch and rotation crops on sugar estates, of the annual value of about \$100,600 or approximately £21,000. In the islands other than those dependent on sugar, sweet potatoes also form a staple food, being to a great extent imported from those colonies in which the conditions are favourably adapted to their profitable cultivation. The sweet potato is also extensively grown in other parts of the world, for instance, the Azores, S. Africa, and the United States. According to the census return of 1890, the United States produce about 44,000,000 bushels per year. Recently considerable attention has been given to this crop by the Imperial Department of Agriculture and, as a result, a good deal of experimental work has been carried on and more is in hand.

EXPERIMENTS WITH DIFFERENT VARIETIES.

During the last season two sets of experiments were started to test the comparative value of the various varieties of sweet potatoes. These varieties are commonly recognised by local names, often indicative of some distinctive character of the potato, or of its place of origin. They differ from one another amongst other points in the shape, size, colour, flavour, and quality as a table vegetable of the root, in the shape of the leaf, in time of maturing, and in keeping power. In connection with the Botanic Station, Antigua, fifteen different varieties—some local, others introduced—were grown in separate plots under the same conditions. The crop from each plot was weighed separately. The full results have already been published by the Department in the *Report on certain Economic Experiments in connection with the Botanic*

Station Antigua, 1900-1901. The yields of each variety were calculated in tons per acre, and varied from 6 of a ton to 4.4 tons. Amongst the varieties which occupied the foremost places were 'Eliza' and two Trinidad kinds known as 'T. 1' and 'T. 2,' respectively. The latter, although beaten by the variety 'Eliza' in actual yield, were superior in shape. The experiments will be continued. Last year the ground was comparatively new, and the variation in the yield of duplicate plots necessitates caution in estimating the relative value of the several varieties. At Barbados a some what similar series of plots were laid out, under the charge of Mr. J. R. Bovell, on Waterford Estate. Twenty-eight varieties, mostly local, were obtained and 100 holes (5½ x 5½ ft.) planted of each. It was hoped that in the present crop season they would have been dug and weighed. A careful comparison was then to have been made as to quality as a table vegetable, shape, keeping power, etc. Unfortunately, during the past season insect pests have been more than usually prevalent on sweet potatoes in Barbados. The experiment plots were ravaged by red spider and other pests and the plants seriously injured. Even under such adverse conditions some useful information was obtained, concerning the comparative powers of resistance of the different varieties.

The field was examined by Mr. Maxwell-Lefroy in the middle of November. The sharp manner in which the plots of the different varieties were marked out owing to their varying powers of resistance to insect attack was most striking. Amongst those which had suffered the most at this time were 'Red Sealy,' 'Hurley,' and 'Caroline Lee.' About a month later many of those which were fairly free from attack in November had been damaged, but to the end 'White Gilkes' (both the three and six months varieties) and all the plots of mixed kinds, maintained their vigour in a surprising manner. From the result of this single experiment, 'Gilkes' and plots of mixed varieties seem to possess more than average powers of resistance to insect attack.

STORING SWEET POTATOES.

The usually low keeping power of the sweet potato is a great drawback to its usefulness. The question is discussed somewhat fully by Mr. Watts in the paper already referred to. The practical result is that shortly after the time of reaping the supply of sweet potatoes exceeds the demand. The greater number of the varieties will not keep long after being dug and they are sold at low prices to clear the ground for the succeeding cane crop. Hence for a brief period food is abundant and cheap. At other times the reverse is often the case.

'These home grown supplies are, as a rule, employed directly as food, little attempt is made to convert them into forms which will keep and thus equalise the supplies which are otherwise irregular; it seems probable that something will have to be done in this direction before much progress will be made in the substitution of locally grown for imported foods.' (F. Watts, *loc. cit.* p. 274.) The concluding words indicate the course which is pursued in equalising the distribution of food throughout the year in those communities which can afford it, namely the importation of foodstuffs, principally from America. Mr. Bovell (*loc. cit.* p. 211) gives the value of such articles imported into Barbados (for the year 1898) as £175,011. Towards this large total, starches, grains and meals of various kinds contributed no less than about £95,000. Most of these could be raised in the Colony. In the other sugar islands the situation is very similar. American food stuffs are largely imported to supply, during certain seasons of the year, the want of local food supplies, although at other times of the year such food materials are produced in the island in excess of the demand. Unsound as this policy undoubtedly is it will probably continue to be pursued until conditions arise which compel attention to be given to the more extensive cultivation of local food stuffs and to methods for preserving them so as to allow the supply to be

regular and uniform throughout the year. The question of the storage of sweet potatoes in a fresh state is one which has attracted a considerable amount of attention in different parts of the world. In the West Indies it has been found that some varieties keep fairly well if left in the ground and dug in small quantities as required. This method has disadvantages and a better one is very desirable. The problem of storing sweet potatoes is discussed in Farmers' Bulletin No. 26 of the U. S. Department of Agriculture entitled *Sweet Potatoes: Culture and Uses*, by Professor J. F. Duggar of Alabama. He says (p. 18) 'There is need for further investigation to determine the best method of storing sweet potatoes, for the losses occurring during storage are sometimes enormous. The conditions in the States are however very different to those obtaining in the West Indies and although it might be of interest to put on record the methods there employed, the contrast in climatic conditions must not be lost sight of.'

The best results are apparently obtained by storing the potatoes in dry cellars or rooms, in which the roots are placed either with or without packing of sand, straw, hay, or other dry material. Mr. Duggar in summing up says 'Sweet potatoes during storage should be kept in a dry atmosphere with ample ventilation, and a temperature between 50° and 60° F, except during the sweating period, for which time the temperature recommended by those who use artificial heat is 80° F.' Later (p. 29) he says 'The atmosphere of the storage room should be kept dry. The condensation of moisture on the roots affords conditions favourable to decay.' The essential points for success by this method of storage, namely perfectly dry conditions and a comparatively low temperature, are almost impossible to obtain economically in the West Indies where the air usually contains a very large amount of watery vapour, and the temperature is higher than in northern latitudes.

DESSICATED SWEET POTATOES.

Setting aside the possibility of keeping the whole potatoes in a fresh condition, it remains to be seen whether any other economical method is feasible. Mr. Duggar describes two modes of preserving sweet potatoes for use as a table vegetable. He says (*op. cit.* p. 25) 'Uncooked sweet potatoes may be sliced and then dried either in the sun or in evaporators. They are prepared for the table by soaking and baking. Dried sweet potatoes were exhibited among the products of Japan at the Colombian Exposition. Their preparation is described as follows:—"Cleanly washed potatoes are placed in a suitable basket and immersed in boiling water for a short time; when taken out of the basket they are cut into thin slices and spread over mats and exposed to the sun for two or three days. In order to make a superior quality, the skin of the potato is peeled off before slicing." As an indication of more recent developments it may be mentioned that a company has been lately started in New Jersey, America, with a capital of \$1,000,000, to make flour from sweet potatoes. The early results are reported as being very successful, and it is proposed to erect mills all through the sweet potato growing region. The more important States in this region are North and South Carolina, Georgia, Texas, Alabama, Mississippi, Virginia and New Jersey.

PREPARATION OF MEAL,

The remarks above, based on the irregularity of the supply of food throughout the year, apply with especial force to Anguilla, one of the Leeward Islands, situated about mid-way between St. Kitts and the Virgin Islands. Sweet potatoes are grown in Anguilla and are usually very abundant during one short season of the year. The peasants exhaust their stock during the two or three months following crop time, and for the remainder of the year are practically reduced to living on pigeon-peas (*Cajanus indicus*) and any other chance food plant which is capable of withstanding a six

months' drought. The possibility of preserving the potato in a palatable form is of the greatest importance to the peasantry of the island. The experiments recorded below are, to a large extent, the outcome of a request for information and advice made by Dr. J. Numa Rat, Magistrate of Anguilla, to the Department. Great credit is due to Dr. Rat for the trouble taken by him in the interests of the island.

EXPERIMENTS IN ANGUILLA.

In November 1899, Dr. J. Numa Rat requested advice from the Department as to a good method of preserving sweet potatoes. He was recommended to try slicing and drying, as described above, this process having been found to give satisfactory results in various parts of the tropics. *Early Experiments.* In May 1900, Dr. Rat forwarded a box containing sweet potato meal which had been prepared in the following manner:—The potatoes were peeled and grated, the pulp squeezed in a cloth and then dried in the sunshine for two or three days. The dried pulp was sifted and the coarse parts powdered in a mortar. By this method twenty pounds of unpeeled potatoes gave one pound of meal, that is, a return of only five per cent. The potato used for the early experiments was a variety known in Anguilla as 'Hug'em fast.' The cost of preparation was about 1s. per pound. One obvious objection to this method is the great loss of material caused by squeezing the wet pulp. This point was noted by Dr. Rat, and is emphasized in the following remarks by Professor A. H. Church, F.R.S., author of *The Food Grains of India*, etc., to whom a sample of the meal was submitted. Professor Church says: 'The method of preparation involves much loss or that one constituent which one can spare least—namely, the proteid or albuminous substance. . . . The expressed juice of succulent roots and tubers usually contains much soluble vegetable albumen.' A subsequent analysis of the meal by Professor Church confirmed his anticipations. The meal was found to be deficient in flesh-forming nutrients. 'The ratio of nitrogenous matter to digestible carbohydrates being 1:24.' Previous analyses of whole sweet potato roots had yielded the more satisfactory ratio of 1:13.

The detailed figures of Professor Church's analysis of the Anguilla meal are as follows:—

	per cent.
Water ..	12.6
Albuminoids and proteids* ..	3.6
Digestible carbohydrates ...	77.6
Oil or Fat ...	0.6
Fibre ...	3.5
Ash or mineral matter ...	2.1

Professor J. P. d'Albuquerque, Island Professor of Chemistry at Barbados also analysed a sample of the meal with very similar results.

Later Experiments.—In order to avoid if possible the loss occurring in the previous method, Dr. Rat prepared some more meal by grating the sweet potatoes and sun-drying the pulp without subjecting it to pressure. This method was found to be a practicable one. The yield of meal was from fifteen to twenty per cent. of the original weight of the roots instead of only five per cent. as in the earlier method. A variety called the 'Dominique' was used instead of the 'Hug'em fast.' The labour entailed being the same as before, but the yield four times as much, the cost of production was accordingly reduced to one quarter, namely, 4d. per pound of prepared meal. The meal so prepared was analysed by Professor Church. Its composition was found to be very similar to the former sample, but strangely enough it did not contain quite so much proteid matter. 'The results' Prof. Church says 'tend to show that the variety "Dominique" is inferior to "Hug'em fast" in this respect.'

* Calculated by multiplying the nitrogen by 6.25. By the phenol method 3.5 per cent was found.

† Of this ash 0.12 was phosphorus pentoxide,

EXPERIMENTS AT ANTIGUA.

At the time when the question of converting sweet potatoes into meal came into prominence owing to the necessities of Anguilla, Mr. Francis Watts, the Government Chemist for the Leeward Islands, obtained information from Mr. Spooner of Bendals estate in Antigua, concerning some experiments which he had previously carried out in this direction. Mr. Spooner's attention was drawn to the subject in 1898, when sweet potatoes were exceptionally abundant. The main points in Mr. Spooner's method were as follows:—

The cleaned potatoes were cut into slices, about 1/16 of an inch in thickness. The cutting was at first done by hand but later an old chaff cutter, temporarily adapted to the purpose, was employed with very good results. The slices were spread out on galvanised wire netting and quickly dried in the sun, until quite brittle. This state was reached in six or eight hours, when conditions were favourable. They were then stored in old flour barrels until sufficient had accumulated to be worth grinding, for which an engine on the estate was utilized.

The yield of meal by this method was 40.63 per cent. of the original weight of the potatoes; one ton of roots yielding 910 lb. of meal. Mr. Spooner estimated the cost at £4.9.7. per ton of meal, that is to say approximately 3d. per pound. Several tons of meal were made and used with great success for feeding mules and stock. The labourers ate it readily, and Mr. Spooner says that he personally found it a palatable and satisfactory form of food. It kept well, provided the slices had been thoroughly dried before being ground, but losses were incurred when for any reason, the slices were left at all leathery instead of being perfectly brittle. The meal made from such leathery slices quickly became tainted and spoiled. It is important to note how by the use of simple machinery the cost was reduced to such a low figure as 3d. per pound. The preparation was analysed by Dr. Voelcker who reported: 'The meal is well dried containing only 12 per cent. of water and should keep perfectly well. It contains practically 10 per cent. of sugar, with 67 per cent. of starch and digestible carbohydrates, 5 per cent. of nitrogenous or protein matters with a not inconsiderable portion of mineral (bone-producing) matter. The percentage of indigestible (woody) fibre is very small.

Dr. Voelcker's complete analysis is as follows:—

		per cent.
Moisture	..	11.99
Nitrogenous matter*	...	5.12
Oil	..	1.19
Sugar	...	9.90
Starch and digestible carbohydrates		67.01
Indigestible (woody) fibre	..	1.89
Mineral matter (ashy) †	..	2.90

* Containing nitrogen 0.82.

† Including sand, 0.03.

The comparatively high percentage of nitrogenous matter in this sample is noteworthy. This is the element which is lacking in the dietary of many of the West Indian natives, and of which so large a proportion was lost by the Anguilla mode of manufacture. From the above facts it will be seen that it is possible to produce from the sweet potato a meal which is palatable, digestible and cheap. It is essential that the potato should be quickly and thoroughly dried and then reduced to meal. By this treatment the greatest amount of nutritive material is retained. For such a locality as Anguilla it is important to determine whether a meal can be made at crop time and stored for use during the period of drought. To this end it is essential to know: (1) The food value of sweet potato meal, and (2) its keeping qualities.

FOOD VALUE.

In a perfect diet the ratio of the albuminoids or nitrogenous matter to the digestible carbohydrates and sugar together should be about 1:4. This relation is spoken of as the 'nutrient ratio.' The above analyses of sweet potato meal show that its nutrient ratio is low. The first sample of Anguilla meal gave a ratio of 1:2.1, and in the later samples it was even less. In the Antigua meal the ratio was much higher, about 1:15. In an analysis of fresh sweet potatoes, recorded by Prof. Church in his book on *Food* the ratio is given as 1:13. Specimens of a Barbados variety analysed by Professor d'Albuquerque gave as low a ratio as 1:50. This deficiency of the meal in proteid matter can easily be counterbalanced by supplementing it with such a food substance as pigeon-peas, which are rich in nitrogenous constituents, in common with the seeds of many other leguminous plants. In pigeon-peas the nutrient ratio is about 1:3. As has already been stated these peas are grown in Anguilla, in sufficient amount in fact to be an article of export. They are one of the staple foods during the dry season. Taken alone however they are not beneficial, containing too large a percentage of proteids in proportion to their carbohydrate and sugary contents. In conjunction with sweet potato meal they would make a good diet, capable of sustaining the inhabitants during the season of scarcity.

KEEPING QUALITIES.

Some of the meal prepared by Dr. Rat was sent to the Head Office of the Department at Barbados, in tins, and after about twelve months' ordinary storage was perfectly sweet and good. Mr. Spooner's testimony as to its keeping powers has already been given. There appears therefore to be no doubt that the meal, carefully prepared, will keep good for several months—a sufficient time to serve the immediate purpose of the people of Anguilla.

EXPERIMENTS IN PROGRESS.

In June of the present year (1901) the Department obtained for use in Anguilla a grinding mill and a vegetable slicer. During the coming crop season these will be tried, and it is hoped that an impetus will be given to the establishment of a regular industry in sweet potato meal, the importance of which to people situated as are the inhabitants of Anguilla, it is difficult to over-estimate.

OTHER USES OF SWEET POTATOES

Another method of preservation, namely, canning sweet potatoes has been tried on an industrial scale in America. Mr. Duggar says *op. cit.*, p. 25 'With in recent years sweet potatoes have been canned in a few localities. In 1893 a factory in Mississippi canned about 1,000 bushels using three-pound cans which sold in Chicago at 95 cents per dozen delivered. A bushel of sweet potatoes was sufficient for fifteen cans. Farmers were paid 40 cents a bushel. This firm expected to can about 8,000 bushels of sweet potatoes in 1894.' Such a method whilst of interest is hardly likely to be of practical importance under present West Indian conditions. Besides furnishing an important portion of man's diet, in many warm countries, sweet potatoes are very useful as fodder for cattle and stock. Both roots and vines (foliage) may be employed to this end. Mr. Duggar, in the pamphlet already referred to, compares the relative food-values of corn and sweet potatoes. His results are expressed as follows:—

Relative Food Value of Corn and Sweet Potatoes.

	Dry Matter.	Protein.	Nitrogen free extract & fat.
	lb.	lb.	lb.
100 lb. Corn contain ..	89.1	10.5	75
300 lb. Sweet potatoes contain	86.7	4.5	75.3

'Thus three pounds of sweet potatoes afford almost as much dry matter, quite as much carbonaceous material, but less than half as much protein, as is contained in one pound of corn. By using one-half pound of cotton-seed meal or one pound of cow-peas (seed) for every ten pounds of sweet potatoes this deficiency is fully supplied.' In the West Indies at present sweet potatoes are not usually regarded as a regular food for horses and cattle but rather as a special diet in cases of illness, etc. Mr. Spooner's testimony to the value of the meal as a food for stock has already been given. In the want of more exact data it would appear not improbable that it might be possible to utilise locally grown potatoes, peas, etc., as fodder for horses and stock in place of much imported corn. In England there is a certain demand for sweet potato meal for the manufacture of glucose. One firm has intimated its readiness to take as much as 1,000 tons per month, provided the price does not exceed about £6 per ton, delivered in London. This price it will be noted is very little more than 3½d. per pound including freight, etc. Even if the meal could be produced as cheaply as by Mr. Spooner in Antigua at 3d. per pound, it seems probable that it would be more useful and remunerative to the people in West Indies to prepare it for their own use rather than for export at such rates.

It is interesting also to note that, owing to the failure of the orange industry in St. Michael, the famous St. Michael orange is no longer to be found in the English market. Many of the former orange growers have turned their attention to the cultivation of sweet potatoes. A large portion of the crop is utilised in making spirit, which is shipped to Portugal and employed in fortifying wines, etc.

SHIPMENT TO EUROPE.

Another possible method of disposing of the surplus supply of sweet potatoes has been suggested. This is shipment to Europe. In May last the initial steps were taken to secure the introduction and establishment in favour of the vegetable in the home markets. To this end a circular letter was sent to several important firms, whom it was thought might be able to co-operate. The Department offered to supply them for a certain period, with fortnightly barrels of sweet potatoes entirely free of cost. The firms were requested on their side to give the potatoes away in small lots, or to sell them at nominal prices with the understanding that after say eight or ten weeks they should undertake to receive and sell a few barrels per month and sustain a regular trade in the article. The matter was actively taken up by two firms, and since October regular shipments of sweet potatoes have been made.

One great difficulty to be encountered in attempting to introduce a new vegetable is lack of knowledge as how best to cook it. To obviate this the Department prepared, with the kind assistance of Mrs. J. R. Bovell, a pamphlet entitled *Recipes for cooking Sweet Potatoes from the West Indies* which was issued as No. 6 of the Department's Pamphlet Series in July 1901. It contains fifteen different ways of preparing the vegetable for table use. Copies have been widely distributed with the potatoes. The Department has been fortunate in securing the hearty co-operation of several of the planters of Barbados in this matter, as also of the Royal Mail Steam Packet Company, who have agreed to carry the barrels of potatoes free of cost during the early stage of the experiment.

It remains to be seen how much demand there is for them in England. Supposing the trade to grow, many points as to the best modes of packing, the best varieties for transporting, etc., will require to be solved. The Army and Navy Auxiliary Co-operative Supply, Limited of London have regularly contributed valuable information concerning the condition in which the potatoes have reached England.

Preference has been already expressed in England in favour of small, red potatoes. One important point to remember is the comparative ease, with which the sweet potato can be bruised. It therefore demands careful handling.

The experiment has been commented upon in several of the English papers, and the following notice appeared in the West Indian Committee's Circular for Nov. 12, 1901:—

'With a view to popularising this vegetable in the United Kingdom Dr. Morris, the Imperial Commissioner of Agriculture for the West Indies, has arranged to send over by each mail for the present a few barrels of sweet potatoes. Samples of these potatoes with full culinary recipes may be obtained from Messrs. James Phillips & Co., 4, Fenchurch Street Buildings, E.C. Members of the Committee will greatly assist in the encouragement of what may become an important minor industry by bringing the sweet potatoes before the notice of their friends who have not had the advantage of sampling them in a 'tropical country.'—*Journal of the Imperial Department of Agriculture for the West Indies.*

MEXICO'S VEGETABLE PRODUCTS.

MOST OF THE KNOWN PLANTS AND TREES OF THE WORLD FOUND IN THE REPUBLIC.

Owing to the great range of latitude included within the borders of Mexico, as well as the extensive variations in altitude, the vegetation of all zones, from the frigid to the torrid, is to be found. More than 10,000 plants have been analysed and classified, and many yet remain awaiting the work of the scientist. In Mexico trees grow at an altitude of 13,054 feet and herbs at 13,715 feet.

Mexico is the land of striking contrasts, which is especially demonstrated in its vegetation—voluptuous growth varies with bare deserts, often within a short distance. There are luxuriant virgin forests, where the ground is overshadowed with creeping plants and brushwood and the branches are perfectly covered with parasites; near the coasts these forests are often as swampy and impenetrable as the jungles of India. There are immense prairies, thickly covered with grasses and fragrant blossoms; there are white alkali deserts, rocky and sandy plains, where nothing but the curious cacti and agaves grow. The traveller who enters Mexico from the North during the winter, over the Central plateau, is at first disappointed, and thinks it the country of sand-whirls and cacti, but even a few hours' ride to the east or west would change this idea. In a couple of hours you can be transferred from pine forests to palm groves. Most luxurious is nature in the hot and temperate zone of Mexico, especially in sheltered valleys, in the ravines and on the banks of the rivers. In the cool zone the gigantic Mexican cypresses, covered with Spanish moss or orchids demonstrate the productive power of the soil, competing with the giant chestnut trees of Sicily and the redwood or mammoth trees of California. Stately trees are the shuacates, mangoes, amates, ashes, eucalyptus, palms, etc., curious trees are the "weeping tree," the "phosphoric tree," the "caustic tree," the "claw tree" and the "sensitive plants." The principal agricultural products are according to quantity: Indian corn, wheat, barley and Mexican beans, further straw, sugar, sisal, hemp and ixtle; cotton; garden beans, rice, vetch, chick-peas and potatoes. Indian corn and Mexican beans are the principal food, red pepper the principal condiment of the people.

The productivity of certain plants is wonderful; Indian corn, for instance, yields in certain cases up to 800 times, wheat as much as 110 times. Corn and wheat of Mexico are of the finest quality. In some parts of the country two and three crops can be harvested in one year. The most productive plant is probably the banana, one acre of these plants being able to sustain

about forty persons; the most productive, however, is the century plant, which furnishes the drink (pulque) fiber, food, fuel, etc. This enormous productive power of certain plants is the reason why the Indians cultivate but a small space of land.

In the following table Emil Riedel gives an index of some of the most useful and interesting plants arranged alphabetically, according to their Mexican names, with English equivalent, scientific name, classification and some curious items:

Aoelga, beet, *Betta vulgaris cyclo*, Salsolaceas.

Ahnacate, *Persea gratissima*, Laurineas: In four varieties in warm and temperate zones; nutritious fruit; principal harvest, April-June; wood for timber.

Ahnehnete or Sabino, Mexican cypress, *Taxodium distichum*, Coniferas: Grows to gigantic size, as in Chapultepec, Popotla, Texcoco, Atlixco and Oaxaca (Santa Maria del Tule). The latter, admired and described by Humboldt, has a circumference of 170 feet and a height of 124 feet. These trees are very often covered with Spanish moss or with orchids.

Ajonjoli, benesed, *Sesamum orientale*, Sesameas Oil plant, introduced from Africa.

Alacle or hulnar, *Malva scoparia*, Malvaceas: Textile and medicinal plant.

Algeria, oily grain (*Sesameas*): Seeds used by the Indians for candy and oil.

Alfalfa, *Medicago sativa*, Leguminosas.

Algodon, cotton, *Gossypium herbaceum* and *arborescens*, Malvaceas: A native plant, cultivated in herbs and trees in many varieties, especially in the northern states of Coahuila, Durango, Chihuahua, but also in Vera Cruz, Colima, Yucatan, etc.; generally sowed from March to June, harvested from September to December.

Alpiste, canary seed, *Phalaris canariensis*, Gramineas.

Amate, shady tree of the hot zone, whose green fruit is eaten by the Indians.

Anil (the Aztec "Xihquilitzahuac"), indigo, *Indigofera tinctoria*, etc., Leguminosas: A native dye plant of hot zone for blue color, especially in Chiapas, Oaxaca, Colima; sowed from December to May; article of export declining in importance.

Anis, anise, *Pimpinella anisum*, Umbelliferas; introduced from Egypt, article of export.

Anacahuite, *Cordia Boissieri*, Borragineas; Native medicinal plant.

Anona, onstard apple, *Anona reticulata* and *glabra*, Anonaceas.

Arbol de fierro, iron wood, *Robinia*: Cabinet wood. Arbol de hule, caoutchouc tree, *Castilloa elastica*: Native tree of hot zone.

Arbol de las manitas or Macpalxochitl, claw tree, *Cheirastemon platanoides*, Bombaceas; Venerated tree of the Aztecs, grows in Valley of Toluca and Oaxaca; is medicinal.

Arbol del Peru, pepper tree, *Schinus molle*, Terbinaceas: Introduced from Peru; furnishes gum, medicine, etc.

Arrayan, myrtle, *Myrtus arrayan*, Mirtaceas: Furnishes fruit and medicine.

Arroz, rice, *Oryza sativa*, Gramineas: Introduced by conquerors, cultivated in warm zone, best in Morelos; sown in March and April; harvested in September and October.

Arvejon or Alverjon, vetch, *Pisum sativum*, Leguminosas.

Biznaga, *Mammillaria manimama* and *parvimama*, etc.: Cactus used for preserves.

Cacahuate or Mani, peanut, *Arachis hypogae*, Leguminosas: Native plant, planted in March and April, harvested in October and November; beans eaten roasted.

Cacaloxochitl, "raven flower," *Plumiera alba* and *rubra*, Apocinaceas: Beautiful Mexican flower of the hot zone; used for medicine and preserves.

Cacao (from the Aztec "cacahuatl") cocoa, *Theobroma cacao*, Butneriaceas: Native tree in hot zone of seven varieties, in Tabasco, Chiapas and Colima;

bears fruit after five year for twenty to thirty-five years; harvested from November to January; important article of export. The Aztecs used the beans as money.

Cacomite or Oceloxochitl, *Tigridia pavonia*, Irideas: Nutritious root, food for the Indians, toasted tastes somewhat like the chestnut.

Cafe, coffee, *Coffea arabica*, Rubiaceas: Introduced from Africa at the end of the eighteenth century; grows in elevated places of hot zone, in Vera Cruz (famous Codoba,) Michoacan (famous Uruapam) Colima, Chiapas, Guerrero, Oaxaca, etc., generally cultivated under the shade. Tree begins to bear fruit after the second year for fifteen to over twenty years. The "Mocha" is select fruit of the same trees. Two harvests yearly, first and best in June and July, second in December and January.

Calabaza, pumpkins or gourds, *Cucurbita melopeo*, Cucurbitaceas: In many varieties, flowers and fruit very popular food; the calabaza trompeta, guaje or acocote, *Lageneria vulgaris*, is used as instrument for the extraction of pulque.

Camote, sweet potato, *Batatas edulis*, Convolvulaceas: A native plant growing in many varieties in temperate zone, with white, yellow or red roots; planted from March to May, harvested from August to October; finest and largest are the yellowish roots of Queretaro; in Puebla and Morelia the white root is used to prepare a very fine preserve.

Caoba, mahogany, *Swietenia mahogoni*, Cedrelaceas Cabinet wood, exported.

Cana de azucar, *Saccarum officinarum*, Gramineas: Cultivated in three varieties since middle of sixteenth century in hot and temperate zones. The molasses furnishes alcohol (refino) and brandy (aguardiente).

Canafistula, purging cassia, *Cassia fistuloides*, Leguminosas: Medicinal.

Capulin, American cherry, *Cerasus capollia*, Rosaceas: Native fruit tree in temperate and cold zones, cabinet wood.

Cardo, garden artichoke, *Dipsacus fullonum*, Dipsaceas.

Cardo santo, holy thistle, *Cirsium mexicanum*, Sinanterias: Medicinal.

Carrizo (cana veral), reed grass, *Aruudo donnas*, Gramineas.

Cascalote, *Coesalpima coriaria*, Leguminosas: Medicinal.

Cassahuate, *Ipomea arborescens*, etc., Convolvulaceas. Cedro, cedar, *Cedrela odorata*, Meliaceas: Medicinal gum and timber.

Cedro blanco, white cedar, *Cupressus Lindley*—Cedro de la Sierra, mountain cedar, *Chamocyparons thurifera*: Timber.

Ceiba or Pochote, silk cotton, *Eriodendron afractinosum*, Bombaceas; Native tree of the hot zone, medicinal.

Cevada, barley, *Hordeum vulgare*, Gramineas: Introduced by the conquerors, next to Indian corn and wheat, the most important grain, cultivated in temperate and cool zones, generally sowed November to January; harvest in spring; produces as much as twenty-four times.

Chavacano, apricot, *Armeniaca vulgaris*, Rosaceas. Chayote, *Seschium edule*, Cucurbitaceas: Several varieties, a vine which produces a green or white vegetable, the green kind is thorny and boiled tastes like calabash.

Chia, lime-leaved sage, *Salvia chian*, Labiadas Mexican condiment for drinks, etc.

Chicozapote or zipotillo, *Zipota archas*, Sapoteas: Fruit tree of hot zone.

Chile, Cayenne or red pepper, *Capsicum autumnum*, Solanaceas: Principal condiment of the Mexicans, in many varieties, used fresh and dried.

Chirimoyo, *Anona chirimolia*, Anonaceas: Fruit tree of hot zone.

Cidra, citron, *Citrus medica cedra*, Auranciaceas: Introduced from Asia.

Cirnelo del pafs or atoyacocotl, Mexican plum, Spondias myrobolanus, etc., Terebintaceae; in many varieties, in temperate and hot zones.

Comino, cumin seed, Cumminum, Umbelliferae; Production in 1880, \$23,500.

Copaibo, copaiba, Terebinthina copaiferæ, Leguminosae; Furnishes medical balsam.

Copalillo, Elaphrium copaliferum, etc., Rutaceae; Mexican gum-tree; the gum of this tree was the incense of the ancient Mexicans.

Coquito de aceite, oil-palm, Elaeis melanococca; Palm of the hot zone; produces oil, article of export.

Ebano, ebony, Diospyros ebenum, Ebenaceae; Cabinet wood.—*Modern Mexico.*

(To be concluded.)

NUTMEGS AND CLOVES.

CROP PROSPECTS IN THE EAST INDIES.

Through the kindness of Dr. H. A. Nicholls, C.M.G., of Dominica, we are enabled to publish the following important communication received by him from his London agents Messrs. Boddington & Co.

"We have received through the London Correspondent of an Amsterdam house the following:—"In our last Dutch auctions high prices were paid for all kinds of nutmegs and mace and everything was sold with a good demand. The advance has already partly discounted the bad outlook of nutmegs during the next few years but certainly to a small extent only. The low prices ruling during the last few years have been the cause of a decrease in the production which has fallen off more and more on Banda Island since 1901 and feel sure that the effect of it will be more acutely felt in 1903 and during the next few years, as not only is a small and late crop expected on the Banda Island in 1903 (November instead of May to June) but it is anticipated that the crop will not yield more than one third of the average quantity on account of the drought from which the East Indies have suffered throughout this year. Beside this, the quality of nutmegs and mace will be poor. Considering that values ruling at present are only one third of what they were in 1872 in which year nutmeg prices in Holland reached 215c. for 110's to 115's, and taking into account that the consumption is increasing steadily and will continue to do so independently of the price, it seems that present values are ripe for a further advance."

"The Amboyna clove crop is also reported to be affected by drought and it is a total failure and will not yield this year more than 200 piculs † against 6,000 last year."—*Agricultural News*, Feb. 14.

GOVERNMENT QUININE FACTORY, NEDIVATAM.

(To the Editor, "Madras Mail.")

Sir,—The following case may interest cinchona growers who have supplied this factory with cinchona bark and those who may contemplate doing so. For twenty years the bark from a well known estate near Ootacamund has been analysed in England and found to contain 2½ per cent and 3½ per cent respectively of sulphate of quinine in its natural and renewed barks. For the first time in the history of this estate it sent a consignment of about 30,000 lb. in three lots to the Nedivatam factory. The owner of the estate accepted the departmental rules. Shortly after the bark had been delivered Mr Standen informed the supplier that his bark only contained, natural 1.48 per cent and renewed 2.55 per cent sulphate of quinine. On hearing this astonishing result the supplier sent a sample of

natural bark, which had been obtained from the Nedivatam factory sample bag, to Dr. Schulten of Calcutta, for analysis. Dr. Schulten certifies that it contains 2.25 per cent sulphate of quinine, and upon this basis the renewed bark would contain 3.25 per cent which practically confirms the English analysis of 20 years. This was represented to Mr Standen, who replied that he had submitted another sample to Mr. Hooper for analysis from the same sample bag, and that the second analysis worked out nearly 0.25 per cent, worse than the first. Your readers may not be aware that the samples sent to Mr Hooper by Mr Standen are not cinchona bark in its original quill or chip state but merely so much disintegrated powder, which it is impossible for any public analyst to say was a genuine or manipulated sample of bark. In this case the loss to the supplier is about 1 per cent. of sulphate of quinine on 30,000 lb. supplied at 1½d. per unit, which represents about £2,000. Now, Sir, this is a very serious matter. If this was an isolated case it might be capable of explanation, but it is no exaggeration to say that the whole District is seething with discontent, and it is difficult to meet the supplier who does not feel that he has been made the victim of an *appalling mistake* of the factory. It may be remembered that when Government opened the Nedivatam factory it was with the avowed intention of assisting growers to obtain the rates ruling in the London market without incurring the formidable expenses of sending the bark Home. The previous crop from the same estate has just been sold in England as follows:—

Natural bark, 4½d. per pound; renewed bark, 5 3-8d. to 6½d. per lb. It was analysed by T. R. Vizey and certified to contain, natural 2.48 per cent and renewed 3.42 per cent. sulphate of quinine, and the brokers' account sales show that the bark was all round richer than the analysed samples.

There is no question that it pays better to send bark (even the poorest) to London than to sell it to the Government quinine factory at Nedivatam! The only alternative cinchona growers have is to open a small quinine factory of their own. For some years past the Government factory has been practically run with supplies from private growers, yet large profits have been made. The actual process of manufacture is mere child's play. What cinchona growers want is a quinine factory of their own on the co-operative supply system where they can go and see their barks worked up, and what is more to the point, get the full value of what their barks contain. The following table compares the results of bark from the above estate when sold in England and when sold at Nedivatam:—

Sold in England.		Sold at Nedivatam.	
Analysis	Price obtained	Analysis	Price obtained
Natural 2.48	4½d per lb	Natural 1.48	2d
Renewed 3.42	5¾d to 6½d per lb	Renewed 2.55	3d

ANOTHER VICTIM.

—*M. Mail*, March 30.

EGGS.—Over five millions pounds worth of eggs are now annually imported into England, but not one half of these are used for culinary purposes. The calico Print works use over 40,000,000 eggs a year, photographic establishments use millions of dozens, and wine clarifiers 10,000,000 dozens in the year; bookbinders, kid glove makers, and leather finishers use them in abundance, as well as other trades. The general public appear to have but little knowledge of the magnitude of the numbers wanted for practical commercial uses, apart from those of food, though in the latter respect not a few of the figures are absolutely startling; as an instance one of the London clubs alone contracts for more than 100,000 eggs a year.—*Agricultural Gazette of New South Wales*, March.

* Presumably reference is made to the Dutch coinage. 100 Dutch cents=1 guilder=1s 8d.—[*Ed. A. N.*]
† 1 picul or picul=136 lb. avoird., nearly.—[*Ed. A. N.*]

H E KNAVESMIRE ESTATES CO., LTD.

The Directors have the pleasure to submit the Balance Sheet and Profit and Loss Accounts duly audited for the year ended 31st December, 1902.

The surplus on Revenue and Expenditure account is R23,546.80, to which has to be added the balance R2,979.96 carried forward from season 1901.

The Profit and Loss Account after providing for Depreciation, Irrecoverable Coast Advances and Superintendent's Commission and other charges shows an available balance of R18,560.29, out of which the Directors propose to pay a Dividend of 4 per cent. That will absorb R16,600 and leave, subject to the payment of Directors' fees, a sum of R1,960.29, which it is proposed to carry into the current season's accounts.

The Profit earned represents a return of R48.45 per acre on the area of Tea in bearing as against R56.72 per acre in 1901.

The Crop secured from Estate Leaf was 279,661 lb. or 20,339 lb. under the estimate. The Plucking area was 486 acres, and the yield per acre 575 lb. of made Tea. Had the last four months of the year been up to the average with regard to weather, the full estimate should have been secured, but total want of sun stopped the bushes flushing freely. The total quantity of Tea dealt with amounted to 316,435 lb., which included 36,774 lb. made from bought leaf.

The Tea sold to end of December was 292,200 lb., the net proceeds of which equalled 27.62 cents per lb., leaving unsold 24,205 lb., which has been estimated to produce 31.75 cents per lb.

Including the cost of Tea made from bought leaf, the twelve months' crop was put on the market for 20.48 cents per lb.

The Company's property on 31st December, 1902, consisted of:—

Tea in bearing	..	486	acres
Tea not in bearing	..	30	do
Jungle	...	73	do
Buildings & Waste land	...	5	do
Total	...	594	acres

The question of Green Tea manufacture has been under consideration, and the Board is making arrangements to have the necessary plant installed as soon as possible.

The Crop expected in 1903 is 300,000 lb. of made Tea, and the Estimate cost is 20.66 cents per lb. The Expenditure Estimate provides for the upkeep of 30 acres of unproductive land as also for the purchase of Green Tea making machinery, and allowance has been made for starting manuring on a small scale.

The Royalty payable to the Company by the Syndicate which leased the right to work Plumbago on the Estate has not yet been recovered, but all the mineral has now been realised and the small amount coming to the Company will shortly be available. There has been no mining in progress during 1902.

In terms of the Articles of Association Mr Payne Gallwey retires from the office of Director, and is eligible for re-election.

The appointment of an Auditor for 1903 rests with the meeting. By order of the Directors.

GEORGE STEUART & CO., Agents & Secretaries. Colombo, Jan. 13, 1903.

THE KELANI TEA GARDEN CO., LTD.

Following is the report submitted at the annual meeting at noon today, the minutes of which are held over for Monday:—

REPORT OF THE DIRECTORS.

ACREAGE:

398	acres	Tea in full bearing	
10	"	"	1899
14	"	"	1900

422	"	"	"
313	"	reserve	
11	"	Ravines, Waste, and Grass.	

Total 746 acres

The Directors beg to submit to the Shareholders of the Company the Accounts for the year ending 31st December, 1902, duly audited.

The Crop for the year amounted to 151,145 lbs. of made Tea as against the estimate of 200,000 lbs realising R43,325.15, or an average nett price of 28.66 cents per pound, and in addition to the above 112,420 lbs. of made Tea was manufactured for others, making a total of 263,565 lbs. made tea dealt with in the Factory.

The expenditure, exclusive of items under Capital Account, amounted to R44,662.79, equal to 25.98 cents per pound of made Tea, and included R2,901.99 spent on manuring representing 1.92 cents per pound made Tea.

The balance at credit of Profit and Loss Account after providing for depreciation on Building and Machinery, interest and other charges, and including the amount R6,807.30 brought forward from the previous year is R8,178.36, which amount the Directors recommend should be carried forward to next account.

The result of the year's working has been most disappointing, the crop falling short of the original estimate by 48,855 lbs. This shortage may be attributed to an unusually severe attack of Helopeltis affecting some 203 acres of the Tea in bearing, and also to an exceptionally wet and sunless North-East monsoon.

During the year arrangements were made with the proprietor of Kiriporuwa Estate for the manufacture of his Teas under a contract extending over two years, and to enable the Superintendent to cope with the additional leaf in the Factory, two Davidson's Sirocco Fans were erected in the withering lofts. This expenditure has already been more than recouped by the profit on outside leaf manufactured during the past season.

The estimate for the current season is 200,000 lbs. made Tea to be delivered in Colombo at a cost of cents 22.72, which includes R3,358, or the equivalent of cents 1.68 per pound to be spent on manuring.

In the terms of the Memorandum of the Articles of Association, Mr. Shakspeare retires from the Board, and as he is leaving the island does not seek re-election. It is proposed that Mr. E R Waldock be elected in his place. Mr. Hoseason also wishes to retire from the Board, and it is proposed that Mr. C L Davis be elected in his place.

The appointment of an Auditor rests with the Meeting.—By Order of the Board of Directors, CARSON & Co., Agents and Secretaries.

THE TEMPLESTOWE ESTATE CO. OF CEYLON, LIMITED.

REPORT OF THE DIRECTORS.

DIRECTORS:—Messrs H G Bois and F W Bois.

The Directors have the pleasure to submit their report and accounts for the year ending 31st December, 1902.

The Tea Crop amounted to 193,250 lb., which was short of the Estimate by 26,750 lb., and 957 lb. of Cinchona bark were also harvested. The heavy shortage in the tea crop is much to be regretted, but is in accordance with the experience of a large number of estates during 1902. The Tea cost 28.08 cents per lb. and netted 38.57 cents as against 27.57 cents and 38.11 cents for 1901. The increased cost can be mainly attributed to the shortness of crop and the price realised for the tea may be considered very satisfactory in view of the state of the tea market during the season.

The acreage of the Estate now consists of:—

479½	acres	Tea	5 years old and upwards.
28½	do	4	do
56½	do	3	do
6	do	2	do
110	do		Forest.
342½	do		Chena and Patna.

1,023 acres.

The profit on the year's working after paying interest on the mortgage for £4,500 and other loans, is R15,963.38 which includes the balance brought forward from last year of R1,591.30. The Directors recommend that this should be disposed of as follows:—By the payment of the Dividend on the Preference shares absorbing R6,516.00. By the payment of a Dividend of 3 per cent on the Ordinary Shares absorbing R4,926.00. By transferring to Depreciation account R4,000.00. By carrying forward a balance of R521.38. Total R15,963.38.

The estimate for season 1903 provides for a crop of 210,000 lb. at a cost of 26.36 cents per lb. exclusive of capital expenditure.

Mr F W Bois who was appointed a Director in the place of Mr G F Walker, retires in accordance with the Articles of Association, but being eligible offers himself for re-election. Mr Guthrie who was appointed Auditor for season 1902, died before undertaking the audit, and the Directors appointed Mr F M Simpson in his place. It will be necessary to appoint an Auditor for season 1903.

THE COLOMBO BRICK AND TILE CO., LIMITED.

REPORT OF THE DIRECTORS.

DIRECTORS:—Messrs. G W Suhren, W Shakspeare, and E M Shattock.

The Directors now beg to place before the Shareholders the Statement of Accounts of the Company's working for the year ended 31st December, 1902. The Works were taken over on January 3rd, 1902 and the first few months were occupied in repairing and overhauling the Plant &c, and in getting everything in readiness for the New Brick Machinery which had been ordered from England. This machinery arrived at Works in August but the Works were ready for a steady start at end of July. From that time forward until the end of the year, however, the weather was so abnormally and consistently wet that it was found quite impossible to obtain an adequate supply of clay from the pits to keep the works going. Consequently the monthly output of Bricks from August to Decem-

ber was extremely small and the Works were therefore carried on at a loss. It will be seen from the Accounts that the amount at debit of Profit and Loss Account is R10,473.17. Great efforts were made to maintain the brick output but it was found that the incessant rains prevented any possibility of profitable working. Other difficulties which had to be contended with were the irregular supply of labour and firewood, but it is hoped that these have now been overcome, and as, since the beginning of the year, fine weather has prevailed a start has been made with regular work. No fees to Directors have been included in the accounts and it remains for the meeting to decide whether the Directors are to receive any remuneration. In accordance with the Articles of Association the Directors retire and it will be necessary for the Meeting to elect a new Board. It will also be necessary for the shareholders to arrange as to the further carrying on of the Secretarial work.

THE CEYLON GAME PROTECTION SOCIETY.

REPORT FOR 1902-3.

I once more place before the members of the Ceylon Game Protection Society my annual Report and its chief feature will I think be its brevity. Not that the Society has been idle or that interest in its work and responsibilities has flagged, but thanks to the steady and consistent co-operation of Government—the work before us except the matter of appointing watchers diminishes each year. I do not say that it need or should diminish, for importation and acclimatisation of deer, antelope and wild guinea fowl might easily and beneficially occupy our attention, but with the limited funds at our disposal our scope is confined to the protection of the animals we already possess around us. Nor do I say that protection is in any way adequate. In spite of restrictions imposed by Government by the prohibition for the last nine years of the export of hides of sambur and spotted deer and the recent prohibition of the export of horns, the slaughter of those animals continues and exists far beyond the limits of expediency. The difficulty of dealing with this evil in a sparsely populated country presents a problem to this Society and to Government far more difficult of solution than landowners in the British Isles have to face, and I would ask, has poaching come anywhere near being abolished?—in Ireland for instance where a Game Protection Society exists—our Bete Noir is the itinerant moorish trader, the game butcher. It is he who subsidises the villager, it is he who takes his carts into the low country forests, it is he who supplies the hide and horn markets, and it is he who carts back to us of dried meat into the populous villages of the more civilised villages. He does not do much shooting himself, but he is the robber who by means of a few handfuls of rupees which probably do not reach the hands of those who have earned them, takes away the meat out of the mouths of the villagers and, in the form of stud horns of deer, part of their legitimate means of subsistence. During the year under review the export of cut horns of sambur and spotted deer was prohibited by proclamation for a period of two years dating from September 1902, and it will be for the Society to watch whether any marked diminution in this export takes place. The period appears to me to be too short to effect its object, and horns being imperishable will be stored against the possible withdrawal of the prohibition. In addition to this many hundred of deer horns having all the appearance of stud horns with the occasional exception of a fragment of bone being attached are undoubtedly the horns of shot animals or "cut" horns. As the horn reaches perfect maturity and the season for its annual studding approaches it may be wrenched or knocked off its base of bone and so pre-

vent the appearance of being naturally stud. In the course of a hunting run stags have known to knock their horns off against trees. This proclamation, therefore, welcome as it is to the Game Protection Society, will hardly act as a serious deterrent to slaughter for trade purposes, for there is always the meat of the carcass as well. I am indebted to the Hon. the Collector of Customs for the following return of export of sambur and spotted deer horns during 1901 and 1902:—Taking the average weight of a pair of antlers of the two species to be two pounds (2 lb), the export of 1,233 cwt during these two years represents the product of 69,328 stags. I will not attempt to calculate the number of hinds killed in the same period. Statement showing the exports of Deer and Sambur horns for the Island of Ceylon (Colombo) for the two years 1901 and 1902.

Continues to which ex-ported	Horns 1901			Deer 1902			Horns 1901			Sambur 1902		
	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	
	cwt.	qr.	lb.	cwt.	qr.	lb.	cwt.	qr.	lb.	cwt.	qr.	lb.
United Kingdom	540	3	24	450	0	9	844	3	6	787	2	27
British India	0	1	20	0	1	16	0	0	0	0	0	0
Germany	0	0	0	0	3	0	0	0	0	0	0	0
Total	541	1	16	451	0	25	844	3	6	787	2	27

H M CUSTOMS, (Signed) H L CRAWFORD, Colombo, 6, Jan. 1903. for Principal Collector. No. 9. H M Customs, Colombo Jan. 6th, 1903.

SIR,—With reference to your letter of the 28th ultimo, I have the honour to forward a return of the export of horns during the years 1901-1902, and to state that no horns have been shipped from our ports since 1899.—I am Sir, your obedient servant (Signed) H L CRAWFORD, Principal Collector. To Thomas Farr Esq., Honorary Secretary. Ceylon Game Protection Society.

The GAME SANCTUARIES—are doing good and when the Food Supply in these runs short, the game will overflow into adjacent forests and here the Society should exert itself to afford protection by means of watchers. I dealt with this subject fully in my last report and since then no further developments are to be recorded beyond an improved Water Supply by means of drains in the proposed Puttalam Sanctuary and a considerable restriction in its area (112,000 acres to 75,000 acres) (37,000 for villages.) In the Hill Districts the amount of good that has been accomplished by the refusal of shooting licenses to Tamil coolies and squatters about Nuwara Eliya together with an organised system of watchers is very marked, and where a year or two ago sambur had practically ceased to exist the old Game Paths again show signs of use. We have been fortunate in having the sympathy of his Excellency the Governor as well as that of the Government Agents of the adjacent Provinces and as a Society for the Protection of Game we have reason to congratulate ourselves upon the results of our efforts.

The New Ordinance No. 11 of 1901, to amend Ordinance No. 10, of 1891, has now become law and if applied in prosecutions with common sense and discretion; it should be of very material assistance in bringing to justice those persons who although in search of game, are not caught red-handed in killing for by its terms, pursuing or attempting to pursue, capturing or attempting to capture game are made punishable offences. It will, however, be necessary to prove that these persons are in pursuit of game and not of monkeys and pigs.

BRANCH SOCIETIES—appear to be in a fairly flourishing condition, judging by the reports of the two energetic Honorary Secretaries of the Nawalapitiya and Haputale Branches. Mr. P R Shand informs me that he has some 40 members on the list, and Mr. Ormiston some

26 members. Considering how favourably Uva residents are situated with regard to sport it is a matter for surprise and regret that the number of members is not far greater. During the year I have received from the Honorary Secretary of the Nawalapitiya Branch a sum of R26'25 being 25 percent of subscriptions collected by them in 1901, whilst from the Honorary Secretary of the Haputale Branch I have received nothing, but have on the other hand disbursed R20 collected by myself in the form of subscriptions, as well as R15 to pay a game watcher in Uva. There is one more subject of a general nature which I must briefly allude to in this report, and that is the inadequacy in my opinion of the fines and penalties imposed in Ceylon in cases of breaches of our Game Ordinance. Through the courtesy of Mr. JOHN FRGUSON of the *Ceylon Observer* I have received a copy of the Perak Government Gazette in which I notice an enactment in the Federated Malay States to provide for the protection of wild animals and birds. The penalties range from five dollars in respect to birds up to 500 dollars in respect to big game. During the year 1902, two meetings were held, one a general meeting on April 2nd, and the other a general committee meeting on the 20th September, at the former the following Committees were elected.

GENERAL COMMITTEE: SUB-COMMITTEE.—A Resolution giving Honorary Secretaries of Branch Societies control over the subscriptions collected by them to the extent of three-fourths thereof with the proviso that annual accounts be rendered to the Honorary Secretary of the Parent Society was carried. Mr. P R Shand, the Honorary Secretary of the Nawalapitiya Branch, has kindly complied with this proviso and sends me the following very satisfactory balance sheet E together with a cheque for R45, and a list of members numbering 46. The Balance Sheet E referred to.

BALANCE SHEET FOR 1902.		DR.
To balance brought forward	..	R43 83
„ Subscriptions 1902	R180	
25 per cent to Parent Society	..	R45
		<u>135 00</u>
		R178 83
BALANCE SHEET FOR 1902.		CR.
By paid watchers	..	R58 75
„ Legal fee in prosecuting case	..	21 00
„ Stamps	..	4 65
„ Balance	..	94 43
		<u>R178 83.</u>

Whilst upon this subject I would point out that the establishment of these branch societies tends to impair the strength of the Parent Association financially. Subscriptions are necessarily diverted from it, but at the same time the principle is very sound and fair in most respects. There is, however, another side to the question and it is my duty to draw attention to it. Sportsmen in search of big game in Uva and other areas protected by funds from the Parent Society do not hesitate to seek for their sport in those localities, although they may have contributed but an infinitesimal sum towards protecting them. I would, therefore, appeal to the Hon. Secretaries of these branches not to adhere too closely to the rule giving them the right to three-fourths of their collections, but to err if possible on the side of liberality. I anticipate a falling off in revenue this year owing to the above cause and I trust too much will not be expected of the Parent Society financially.

PROXIES.—It was decided that proxies were not desirable at Game Protection Society meetings owing partly to the fact that the non-attendance of members were bad enough as things were, and partly to the fear that by their means resolutions might be carried which might affect the prestige of the Society in the eyes of Government. By this it was intended to be understood that certain members who seldom or never attended meetings might in

ignorance of the previous history of any question at issue, upset any annual measures that had been decided upon after mature consideration by those active members whose attendance was regular and continuous; and as the status and usefulness of the Society depends much on its consistency in its relations with Government there would be the fear of loss of influence in that quarter. The rule prohibiting shooting sambar and spotted deer in the Hill Reserves was again brought up and the following resolution was carried:—"That the present rule prohibiting all shooting of game above 4,000 feet should be altered in accordance with the resolution passed at last meeting, viz.—"That when registered packs are hunted, the killing of sambar be confined to stalking with the rifle at any elevation and to killing with the knife and hand." At the General Committee meeting held on the 20th September which was but poorly attended, Messrs C O Wilson and M J Kenaway were added to the Committee. At the same time correspondence with the Hon the Colonial Secretary on the subject of shooting in the Hill reserves and conditions to be attached to game licenses was submitted with a copy of conditions proposed by the Hon. Secretary. They were as follows.—1. Shooting at night and netting are prohibited. 2. This license is not transferable. 3. Hunting by men in gangs carrying sticks or guns, with or without dogs, is prohibited. 4. Shooting elk and spotted deer within the Hill reserves above 4,000 feet is prohibited, except with the permission of Government in writing. The only modes of hunting elk and spotted deer within such reserves, is hunting with dogs, to the knife and killing with the rifle. I greatly regret that through inadvertence on my part the words "above 4,000" instead of at any elevation were inserted in condition No. 4. This was most unfortunately not noticed at the meeting. I say unfortunately because it has given rise to some discontent as well as charges of want of *bona fides* on the part of the committee. It certainly on the face of it appeared that the committee had acted in an arbitrary and unwarrantable manner, in upsetting a resolution passed at two general meetings, and I took upon myself the whole onus of this inadvertence and trust that the explanation will be accepted in the same spirit in which it is made. However, the following letter from the Hon. the Colonial Secretary will show that the conditions proposed by all were not acceptable to Government in their entirety and it will now be competent for me to propose that the words at any elevation be substituted for above 4,000 feet:—

No. 017338—Colonial Secretary's Office, Colombo, 28th October, 1902.

Sir,—With reference to your letter dated 27th ultimo, submitting for approval conditions proposed to be noted on the back of licenses to kill game, I am directed to state that there is no objection to conditions 1 and 2 being endorsed on the license the sections of the ordinance 12 or 10 of 1891 and 11 of ordinance 10 of 1891 under which these rules are framed being inserted in brackets. I am to point out that condition "3" cannot be adopted, as there would be legal difficulty in exactly defining the term gang and in distinguishing a gang from a legitimate shooting. In condition "4," it will be necessary to insert "sambar" for "elk," and it is suggested that the condition may read thus:—"This license does not authorise the holder to shoot or attempt to shoot sambar or spotted deer at any place above the elevation of 4,000 feet, otherwise than stalking with the rifle when the holder has obtained permission in writing from the Government Agent for the purpose.—I am to invite you to be good enough to reconsider the rules and to state that on your furnishing me with revised rules to obviate the difficulties pointed out, they will be considered by Government.—I am, Sir, your obedient servant.

E. R. CUMBERLAND, for Colonial Secretary.

Thomas Farr, Esq., Hon. Secretary, Ceylon Game Protection Society, North Cove, Bogavantalawa.

The meeting requested the Honorary Secretary to endeavour to ascertain from the Government Agent, Sabragamuwa how the two watchers of the Meda and Kadawatte Korles were being employed and to obtain a return of cases instituted. The following letter in reply to the Government Agent, Sabragamuwa and the annexed return of cases were received by me in due course:—

No. 141.

Nov. 10, 1902.

In reply to letter from Government Agent, Sabragamuwa.—The two watchers are employed in the Kadawatte and Meda Korale under my own supervision. They are for the most part engaged in going about the country lying between the Walaway on the North and East Balangoda and Welgepola on the West and Atskalan Korale on the South where game is plentiful and where years before elk and spotted deer used to be killed by the hundred. This being dense jungle with small villages situated here and there watching is rather difficult. But it is a fact admitted that killing game is certainly reduced by nine-tenths from what it was five years back. I do not as a rule prosecute at the instance of the watchers alone when I do get information I hold an enquiry and get the chance to work up the cases. The watchers presence in the District act as a prevention to a great degree. (Signed,) S. D. MAHAWALATENNE.

Return of cases instituted under the game protection Ordinance.

No. 20,747 6th June, 1901, killing game without license S. D. Mahawalatenne, R. M., M Dingirihamy fined Rs.—No. 20,884 5th July, 1901, killing game without license S D Mahawalatenne, R.M. Mudalihamy and 2 others acquitted and discharged.—No. 22,362 12th October, 1901, having meet of game during close season S D Mahawalatenne, R.M., M Mothahamy accused under concealment.—No. 22,580 8th November, 1901, killing an elk without license S. D. Mahawalatenne, R. M., V K A Kiri Menika accused discharged.—No. 22,579 8th November, 1901, killing an elk without license S. D. Mahawalatenne, R. M., accused discharged.—1902 nil.

Taking into consideration the circumstances revealed by the letter I considered myself justified in discontinuing the services of those two watchers forthwith. It will be noted that no cases have been instituted since November 1901, and the presumption is that the villagers in those two Korales, are such reformed characters that to watch them further would be to insult their respectability. Owing to the close season for game in the Eastern Province having been attended without reference to this Society. I was requested to approach Government upon the subject, and received the following reply from the Hon. the Colonial Secretary:—

No. 017337. Colonial Secretary's Office, Colombo, October 6th.

Sir,—In reply to your letter of the 27th September, 1902, I am directed by His Excellency the Lieutenant-Governor to inform you that the Game Protection Society will be informed before any alteration is made of the proclaimed close season in any Province.—I am Sir, yours obedient servant (Signed) A CLAYTON, for Colonial Secretary.

Thomas Farr Esq., Honorary Secretary, Game Protection Society.

The Government Agent of the Eastern Province has since kindly furnished me with the following particulars:—

No. 336. Batticaloa Kachcheri, Sept. 13th, 1902. Sir.—Referring to your letter dated 6th instant I have the honour to inform you that the close season for deer in this Province is from 1st June to 31st August for the current year. Please see my notice dated the 11th March last in Government Gazette No. 5838 of 22nd idem. It is the same as that for the Southern Province and was declared by one under Section 13 (1) of Ordinance 10, of 1891, No close season is provided for the shooting of Elephants or Buffaloes under the Game Ordinance of 1891. Govern-

ment notification dated 15th November, 1900, in Government Gazette No. 5735 of 16 idem regulates the rotation of districts for the issue of licenses for the Capture of Elephants.—I am, Sir, your obedient servant (Signed) S HAUGHTON, Government Agent, Eastern Province.

The Society at this meeting through their Committee expressed its appreciation of the Government Proclamation prohibiting the export of sambar and spotted deer horns, and duly recorded its thanks. It will be noted that no mention is made in this report of elephants or buffaloes, but from all I can learn the destruction of these animals is upon a very limited scale and previous reports have dealt thoroughly with the subject. I annex my balance sheet which I think explains itself. It brings the accounts up to the date of this meeting with the exception of those subscriptions for 1903 viz. R15 and Mr Stand's cheque for R45 from the Nawalapitiya branch. There is a credit balance in the Mercantile Bank of India of R1,839.26—irrespective of the two items just mentioned viz. R60—which after two years expenditure is in excess of the balance taken over by one or two years ago, by R44.77 plus R60 subsequently received.

BALANCE SHEET 1902—1903.

Balance from last year R2,026; Donations R130 Fines R375; Government Subsidies R405; Subscriptions R620; Interest R37.70. Total R3,222.45.

By paid Game Watchers R879; Forest Peons Game Watchers R158; Uva for Hon. Secretary Haputale Branch R115; 4 Subscriptions from Uva Residents R20; Stationery Stamps and Commissions R69.89; Advertisements R76.40; Legal Fees &c. R27.50; 100 Copies Report for 1901-1902 R35.40; Balance R1,839.26. Total 3,222.45.

MATURATA PLANTERS' ASSOCIATION.

FIRST ANNUAL REPORT: 1902,

REGISTER.—The number of estates on the register is now 16 against 17 last year (1902). Wellakelle and Ellamulle estates have been made into one.

MEETINGS.—Three general meetings were held during 1902, at which most members were present.

FINANCES.—There is a balance of R13.10 to the credit of the Association.

ACREAGE AND TEA ESTIMATES.—4,810 acres in tea; 4,758 acres in bearing; estimate 1,700,000 lb. Black Tea for 1903: equal 357 lb. tea per acre. The manufacture of Green Teas has not been tried in the district.

CROP AND PRICES.—Generally this district has not had a bad year, as regards crop; the shortage was less than in most districts. Prices have been scarcely so well maintained, as in former years.

ROADS.—The district minor roads in Maturata have never been famed for their excellence. The natural configuration of the district and original bad traces are chiefly responsible for this. The best has been done with the money available. Four new bridges have been built and two have been renewed. Another bridge is urgently required on the Mandara Nuwara-Ellamulle Road. The road from Alacolawewa to Padiapallela is a constant source of expense and trouble; land-slips and subsidences are of frequent occurrence, but as this road is by far the most important in the district, it must always be kept in good order. It is hoped that Government will construct a first-class metalled cart road from Brookside to High Forest, at an early date. The erection of Sign-posts is a matter of urgent necessity, and your Committee are desirous of obtaining a special grant from the D R C for this purpose.

HOSPITAL.—The new Maturata Hospital was opened on March 1st, 1902, and from that date to December 31st, 261 in-door patients and 2,975 out-door patients were treated, which figures show how necessary this Hospital was.

POSTAL.—The work of the Post-master at Maturata has given satisfaction throughout the year.

POLICE.—Your Committee consider that the establishment of a branch station in the neighbourhood of High Forest, worked from Ragala, with a guard-room and a regular system of Police patrol, will meet the requirements of the district.

LABOUR.—This can scarcely be said to be in a satisfactory state. A general restlessness is apparent, and advances appear to be rising.

TIN TICKETS.—This scheme works satisfactorily, but very few coolies came in from the Coast to this district during 1902. Your Committee would recommend special efforts being made, during 1903, to recruit labour from the Coast, with the aid of Tin-tickets. New districts must be tapped, and a special Recruiting Agent established.

C.P.R.C.—The local section consists of 12 members. A Rifle-range has been completed on the Government Patanas adjoining Gonakelle estate.

GENERAL.—Your Committee regret the apathy of certain Superintendents in the district, who have not supported or joined the Association, and consider that such show a great lack of public-spiritedness.

F. G. HARVEY, Hon. Secretary.

HEWAHETA PLANTERS' ASSOCIATION.

ANNUAL REPORT

as follows, which was adopted.

MEMBERSHIP.—The number of estates on the register is 9 as compared with 7 in 1902.

FINANCE.—The balance to credit of the Association at the end of the year is R309.70 as compared with 263.33 at the end of last year.

CROP ESTIMATE FOR 1903.—The official returns received show 9,142 acres in tea and 8,852 acres in bearings. The estimated crop is 3,909,800 lb, including 16,000 lb. of green tea, giving an average yield of 427 lb. per acre. The foregoing figures do not include 535,500 lb. of green leaf from various native gardens, the acreage of which it is difficult to estimate.

SEASON.—The tea crop was short owing to the unfavourable weather during the latter part of the year, but in several instances estimates were obtained. The prices generally have been fair.

MAIN ROADS.—The main road from Peradeniya to Deltotta, especially from the 17th mile post downwards as also the main road from Kandy to Hangurankette leave much room for improvement, and your Committee trust these roads will have more attention in the near future. Your Committee would once more urge upon Government the desirability of joining Upper and Lower Hewabeta districts by joining the cart roads ending at Loolecodera and Rahatnugoda.

TELEGRAPH.—Your Committee have much pleasure in recording the opening of the Deltotta Telegraph office, which has proved a great boon to the district, and they trust that Government will shortly extend the service to Upper Hewahetta.

HOSPITAL.—The working of the hospital has generally been very satisfactory, but your Committee would specially urge on Government the necessity of a waiting-room for outdoor patients being built at once, as during the S.-W. monsoon the only accommodation at present is an open verandah, which is open to the full force of the wind and rain.

LABOUR.—Continued scarcity of labour causes much anxiety and your Committee would like to see Mr Westland's scheme given a fair trial.

POLICE.—Your Committee regrets to have to report that illicit sales of arrack and toddy are still carried on with impunity in the district, and the Police seem to be quite incapable of coping with the evil.

C.P.R.C.—The C.P.R.C has been well supported during the year, and it is hoped that more will join in the new year. The keenness of members in Rifle shooting has been well maintained.

THE HORREKELLY ESTATES CO., LTD.

REPORT OF THE DIRECTORS.

Managing Director:—Mr C E H Symons. Directors:—Mr F J de Saram, Hon Stanley Bois, Mr F W Bois, Hon F O Loos and Mr Fred Dornhorst. Secretaries: Lewis Brown & Co.

The Directors have pleasure in submitting the accounts of the Company for the year ending 31st December, 1902, which they trust will be considered satisfactory. The sum of R5,997.28 has been written off as depreciation on buildings, plant and machinery, and the 1903 manure account has been reduced to R5,000 by transfer of R3,884.68 to "1902" Estate expenditure. It has been decided to place R15,000 to a Reserve Fund Account, and the Shareholders will be asked to approve of the Directors' investing the sum so reserved upon the security of immovable property. The balance available for distribution (including R899.51 brought forward from 1901) is R44,002.45, from which the Directors recommend payment of a dividend at the rate of 10 per cent which will absorb R400,000, and leave R4,002.45 to be carried forward. The working of the estate for the years 1900, 1901 and 1902 compares as follows:—

Expenditure on Est. and 1900.	1901.	1902.	
in Colombo office	R35,761.59	R39,756.93	R43,098.52
Number of Coconuts produced	1,502,298	1,439,218	2,146,825
Quantity of Coir Fibre made	Ballots 22,592	24,876	21,209

Two Directors—The Hon Stanley Bois and Mr F W Bois retire by rotation, and are eligible for re-election. The Shareholders have to appoint an Auditor for 1903. The current year's prospects are favourable.—By order of the Directors, LEWIS BROWN & Co., Secretaries. Colombo, 31st January, 1903.

THE UDABAGE COMPANY, LIMITED.

REPORT OF THE DIRECTORS

335 acres in full bearing
164 „ 4½ years old

499 acres cultivated
641 „ reserve suitable for Tea and Rubber

1,140 acres more or less.

The Directors beg to submit to the Shareholders a statement of the accounts duly audited for the year ending 31st December, 1902. The crop secured amounted to 218,763 lb. made Tea as against an estimate of 240,000 lb, and realised an average of cents 34.65 per pound nett including the Bonus on Green Teas as against an expenditure of R52,936.66 or cents 24.08 per pound. Of the total crop 215,180 lb was manufactured into Green Tea and 3,715 lb into Black. The crop results for the year were somewhat disappointing, owing in common with other estates in this district to the abnormally wet season experienced, and yield was in consequence affected. The estimate for the current year is 250,000 lb of made Tea to cost cents 23.18 per pound, and it is proposed to spend a sum of R1,022 on manure during the season. The increase in crop necessitates an extension to the Factory, and the provision of a Down-Draft Sirocco involving an expenditure estimated at R6,000. In terms of the Memorandum and Articles of Association of the Company the Hon. Mr J N Campbell retires from the Directorate, but is eligible for re-election. The appointment of an Auditor for the current year rests with the Meeting.

BATTICALOA PLANTERS' ASSOCIATION.

ANNUAL REPORT.

The third annual report was as follows:—

Your Committee has pleasure in submitting the third annual report and in so doing congratulates you upon the satisfactory position of this Association.

The number of estates and voters on the register has increased during the year. As regards finances there is an appreciable balance to the credit of the Association.

During the year three meetings have been held.

OBITUARY.—It is with deep regret that your Committee records the death of Mr J J O'Dowd, who joined this Association from its commencement and was one of its most valued supporters. A donation has been made from the Association funds towards the proposed memorial brass to be placed in the R C Cathedral.

COCONUTS.—The crops for the year have been up to the average, and the weather throughout the latter end of the season has been such as to justify hopes of a fair crop during 1903.

The price fetched by copra during the year has been far above the average, and in July a highwater mark in prices was reached—one hardly hoped for by the most sanguine of us.

PESTS.—It is satisfactory to be able to report a decided check in the spread of the caterpillar pest. As much trouble as ever has been experienced in dealing with both black and red beetles, and until the native garden owners are either persuaded or compelled to attend to the proper beetling of their trees, the pest is not likely to decrease.

PADDY.—The *minnari* crops were good owing to the timely rains; the knlum velami crops were up to the average and good prices were realised.

WARD FOR PAYING PATIENTS.—Though in January, 1901, we were informed that H. E. the Governor had instructed the Director of Public Works to submit a plan and estimates for this work, and though provision was made in the annual estimates for 1902 for construction of same, January 1903 sees us with no signs of a ward. We are informed by Government that the money voted "had to be utilised for other more urgent works." That a sum of money voted for an urgent want of such vital importance as this is to the residents of the district, should be used for another work (we believe in the Western Province) is most unjust.

ROADS.—On the South Road the Periya Motuwanne and Mohidee Tandu causeways have at last been finished. The causeway at mani has been commenced and is likely to be completed during 1903. This Association ventures to hope that the most important bridge over the Randany Odai at the 32nd mile post, which when in flood cuts off all communication from the south, and which bridge was washed away as far back as December, 1901, will have the earnest attention of the P W D, and that instructions will be given that every effort be made to ensure its completion as soon as possible. Special attention might be called to the Batticaloa-Kalkndah road, which, owing to the very heavy traffic, is generally in an unsatisfactory condition.

MAIL SERVICE.—This Association regret that the motor-car service has met with such misfortune. Our thanks are due to the Postmaster-General for having so promptly substituted a through horse-coach service.

C. P. R. C.—During the latter end of the year a section of this corps was formed, and, considering the short time of enrolment, is in a high state of efficiency.

BADULLA PLANTERS' ASSOCIATION.

ANNUAL REPORT.

Your Committee has pleasure in submitting their report for the year 1902—the 19th since the formation of the Association,

MEETINGS.—During the year three General meetings and three meetings of Committee have been held. There have also been two meetings of the sub-Committee on minor roads.

MEMBERSHIP.—There are 46 estates registered on the roll of membership against 48 in 1901. There are also two private members against the same number in the previous year.

FINANCE.—The books and accounts of the Association are laid on the table for the inspection of members. The balance at credit of the Association at 31st December, 1902 amounts to R36'61 cents.

TEA.—Crops generally in the district have been well up to estimate. The weather throughout the year was favourable, and the rainfall good and well distributed.

The SOUTH-WEST MONSOON was late in setting in, and tea in consequence flushed very finely in June and July. However, though leaf was abundant, much of the fine flavour and quality characteristic of the tea from these districts during the dry months from June to October was absent, and there was less fine tea sent from the districts this year than usual.

The TEA CROP for 1903 is estimated at 7,080,975 lb. and 91,000 lb. from native gardens. The acreage under tea is 17,458 acres, of which 15,829 acres are in bearing; the yield per acre on tea in bearing is estimated at 447 lb.

LABOUR.—Labour has not been quite so plentiful in the districts generally, and advances have been rising considerably. More coolies from the coast are required, and your Committee would be glad to see immigration encouraged to the fullest extent.

TIN TICKETS.—This system has worked well and will, your Committee believe, be of great service to the planting community as well as to the cooly.

MAIN ROADS.—The principal roads have been kept in good order, but on some roads, notably the Madulsima Road up to the 11th mile, the quantity of metal laid down is scarcely sufficient to maintain the road in good order for a year. The traffic on this portion of the road has increased considerably of late years.

MINOR ROADS.—These have been kept in a fairly good state of repairs, but more liberal votes are in some cases required for the improvement of these important roads, the bridging of stream and other works. A new road has been cut to connect the minor road at Kudnoya with the bridge at Badulla. This will be of some service to the Badulla district, but your Committee regret that Government was unable to grant the bridge across the Baddullu-oya at the ford on this road.

Your Committee are urging upon the Provincial Roads Committee the necessity of constructing bridges across the streams at Pilpola and Nahavilla, and they hope that these will be made before the close of 1903.

NEW TELEGRAPH OFFICE.—Your Committee are pleased to report that a sum of R20,000 has been included in the estimates for 1903 for the opening of a telegraph office at Madulsima. This will be a great boon to the district interested.

RAILWAY EXTENSION.—In December last a resolution was passed by your Association asking Government to survey a light line of railway from Bandarawela to Badulla and Passara. Your Committee feel that these important districts should no longer be left without the benefit of a railway through them. Many of the estates are from 40 to 50 miles from the nearest station, and the heavy cost and uncertainty of transport form a severe handicap upon the tea enterprise of Badulla, Passara, and Madulsima. Your Committee sincerely hope that Government will be pleased to carry out this survey, and that the railway will be constructed at no distant date.

OBITUARY.—Your Committee records with much regret the death during the year of Mr Norman Rettie and Mr F G Hoste, both esteemed members of the Association.

In conclusion your Committee are pleased to think that better times are in view for the tea industry of

Uva, and that with a continuance of the same careful system of plucking, which has always been characteristic of these districts, a bright future is before the planting enterprise of Badulla and Madulsima.

COCONUT PEARLS.

The following extract is taken from *Chemical Studies of the Coconut with some notes on the changes during germination*. By J A Kirkwood and William J Gies, reprinted from the Bulletin of the Torrey Botanical Club, 1902, pp. 321-359, and issued as No. 26 of the Contributions from the New York Botanical Garden for June 1902:—

Within the nut there is occasionally found a small stony substance of a bluish white colour, a kind of vegetable bezoar, called in India *calappa*, which is eagerly purchased by the Chinese, who ascribe great virtues to it as a sort of amulet to preserve them from diseases. The cause of its formation in the nut is unknown.

According to Harley and Harley these pearls, like those of molluscan origin, appear to consist almost entirely of calcium carbonate, with water and organic matter in smaller proportion. Riedel, quoted by Harley and Harley, states that in 1886, while in North Celebes he found a pearl in the endosperm of the coconut. One such pearl was pearl-shaped in form and 28mm. long.

We are greatly indebted to Dr. D Morris, C M G, Imperial Commissioner of Agriculture for the West Indies, for the following very interesting quotation from a letter to Dr. MacDougal:—

“More than two hundred years ago Rumph, an eminent botanist in the East, sent as a present to the Grand Duke of Tuscany a ring in which a coconut pearl had been set. Further, Rumph himself described coconut pearls in his great work with considerable minuteness and gave illustrations of two of them. One was perfectly round, the other was oval or egg-shaped. Travellers in the Philippine Islands have heard of coconut pearls, but seldom or ever have seen them. The natives, it is said, keep ‘coconut stones’ as charms against disease and evil spirits. The Rajahs, we were told, highly prized them and wore them as precious stones. It was only a few years ago that real coconut pearls were at last brought to England. One is now at the Museum at the Royal Gardens at Kew, brought by Dr. Hickson. It is almost egg-shaped, perfectly white, and composed almost entirely of carbonate of lime. It has, in fact, a somewhat similar composition to the pearl of the oyster, and yet there is little doubt it is a purely vegetable product” (See Harley and Harley: *Proceedings of the Royal Society of London*, 43, 464, 1887-11.—*Agricultural News*, Barbados, Jan. 3.

TOBACCO IN JAFFNA.

The planting of tobacco has been completed in all parts of the District. The area under cultivation is annually on the increase and the cost of labour and manure is almost double of what it was about half a dozen years ago. But the demand for this tobacco in the Travancore market which is the only one outside Ceylon is not so great as it was some years back.—“Hindu Organ,” Feb. 8.

PRODUCE AND PLANTING.

A correspondent who has had an opportunity of observing the development of this slight

MOVEMENT IN FAVOUR OF CHINA TEA, which has extended from the Westend to the suburbs, and is almost accepted as a domestic creed by a few of the second-hand devotees of fashion, mentions an incident which recently came under his notice. One of these champions of China tea recently offered her cook some choice tea from the Flowery Land as an especial treat. It was the real thing, and too exquisite for ordinary consumption, but as it was the cook's birthday the occasion was considered a suitable one for astonishing the kitchen by a display of taste, and some of the "real tea" from China was presented amidst a flutter of excitement. Never doubting that a sensation had been created, the donor in due time asked her servant how she liked the delicacy, expecting a reply indicative of the enthusiasm she had sought to arouse. But in the kitchen the taste runs on something with a fuller flavour. The humble recipient of the gift, instead of becoming ecstatic over it, had to confess that in the kitchen they could not drink the delicacy because its flavour suggested "smoked hay." This was both ungracious and unappreciative, for doubtless the tea was of a delicate and subtle flavour, but it serves to show some of the difficulties attending the regaining of a lost trade, and it is also evidence that the present generation of tea drinkers are oblivious of the past fame of China teas, and are content with the teas which the gods in the form of the blenders send them. It may be very dreadful from the point of view of the self-styled epicure, but it is clear that before China tea again finds favour with the masses the consumer will have to acquire a taste for it, and so long as the blenders continue to exercise their skill and succeed in pleasing the majority there is not likely to be any feverish desire on the part of the consumer to take his China tea neat except at a few ladies' clubs or gatherings where they possess profound knowledge and taste, or imagine that they do.

We take the following from "Tea, Coffee, and Sugar" of New York: "The position of

TEA IN THE UNITED STATES

is so strong and the consequent activity so intense that there is probably no other line of business endeavour in the land in a condition so satisfactory to itself. Certainly, no one hears of anyone going out of the tea business, as in coffee, for instance, according to rumour, and the envy of the coffee men is often heard. A 'slump' by this time has often been prognosticated, but with 8-10ths of the stock sold, leaving only 2-10ths to do a half year's business in, this seems improbable. The tea men have disposed in the main of their stock, and it is up to the consumer to pay the bill. Here he should not grumble very much, if at all, for on effecting the purchase of his favourite leaf he will find it cheaper, even though only a little. Thus he will not feel he should stint himself in tea drinking, and the largely increased stock of tea in the land should find its way into the teapot, making room for the 1903 crops. An oddity and at the same time a somewhat portentous sign is the presence of England in our own market as purchaser of tea. The Englishmen even outbid us in our fancy bidding, and the fear is that they will leave us no tea of the kind so much liked here—the greens. The market is certainly being complicated and into unusual strength, and that too from a source that has been a fretful complainant of a plethora of tea of Colonial growth. Surely this world is one of strange and unexpected compensations, and if the consumer does not object too hard, why, as they say, 'let her go Gallagher.'—With reference to

THE DEATH OF MR NORMAN LAYTON

should be noted that on the assembling of the members of the tea trade at the opening of the auction last week, Mr W T Wilson (of Messrs Gow, Willson, and

Stanton) said: "Since we last met in this room death has claimed one of the most respected men in our trade. I refer to Mr James Norman Layton, who died on Thursday, January 22. I am sorry that fate has so decreed that I should be the first to occupy this chair today, as I feel sure that there are many gentlemen who will be following me who are far more eloquent, and therefore better able to extol the many virtues of this most estimable gentleman. I understand that Mr. Norman Layton has had a career in the tea trade extending between fifty and sixty years, and, speaking for the latter half of that time, I know, from personal experience, that he has made none but friends. Gentlemen, when I say that he was a just and honourable man, a friend to his fellow-workers when in trouble or distress, and a perfect gentleman in the highest sense of the term, I feel that I have but inadequately expressed the views and sentiments we all hold of our dear friend Norman Layton." It was the wish of all present that a letter should be sent to the widow and family of the deceased gentleman, expressing the deep sympathy felt for them by the entire trade in their sad bereavement. This was accordingly done.—*H and C Mail*, Feb. 6.

COFFEE GROWING IN NEW SOUTH WALES.

A new industry is now started in New South Wales, and one that should prove very profitable—coffee growing. It is an industry that might be well gone in for in the northern portion of this state, where it might do well, as there is a good summer rainfall. The coffee plantation in New South Wales is at Walbin Island, on the Clarence river. This year the harvest is about 40,000lb. of berries. The trees are now about ten years old, and yield about 50lb. of berries per tree, or about 15 lb. of the prepared article. The trees begin to give a return at about four years old.—*Western Mail*, Feb 14.

TEA COMPANY MEETINGS.—Several Tea Companies held their annual meetings on the 21st Feb., and in some cases at any rate the results for the past year were not up to expectations. The Kelani Valley Tea Garden has had a very disappointing year and was no less than 48,855 lb. short of the original estimate of crop. This was due to a very severe attack of *Helopeltis* affecting some 203 acres of the tea in bearing and also to the unfavourable character of the N. E. Monsoon. No dividend was declared but R8,178'36 was carried forward. The Knavesmire Company Ltd. had three bad months but were able to declare the same dividend as last year, namely four per cent. Green tea is to be started here and with the prospects of rubber the future of the company looks encouraging. The Templestowe Company Ltd. also, in common with many other companies, experienced a shortage in crop but were nevertheless found at the end of the year with R15,963'38 for disposal. Of this R651,6'00 went in the payment of a dividend on the Preference shares, R4,926'00 in the payment of a 3 per cent dividend to the ordinary shareholders. R4,000 was transferred to Depreciation account and a balance of R521'38 has been carried forward. The dividends of these companies, with those of last year, for the purpose of comparison, are:—

	1901.	1902.
Kelani Tea Garden Coy.	0	0
Templestowe Coy.	3	3
Knavesmire Coy.	4	4

THE DONNYBROOK TEA COMPANY, LIMITED.

REPORT OF THE DIRECTORS.

The Directors beg to submit a Statement of Accounts for the year ending 31st December 1902, duly audited.

	ACREAGE.	
	Donnybrook	Mitford
Tea in full bearing	112 acres	37 acres
Tea in partial bearing	40 acres	108 acres
Tea not in bearing	—	7 acres
	152 acres	152 acres
304 acres cultivated in Tea		
4 acres forest		
67 acres Chena, Patua and Waste land		
Total... 375 acres		

The Crop secured amounted to 146,199 lb of Green Leaf as against an estimate of 200,000 lb. Of this 126,244 lb was sold as Green Leaf realising R8,205.75 while the balance was manufactured in the Norton Factory and sold in the local market, viz. 4,989 lb made Tea, at an average price of 38 cts. per lb. nett. The balance at Debit of Working account after providing for Legal expenses, Visiting Agent's fees, and all other charges, amounts to R3,531.60, which amount has been transferred to Property Immoveable. The estimate for Crop season 1903 is 50,000 lb of made tea to be produced at a cost of 37.02 cts. per pound, and the result of the year's working, estimating the Crop to nett 32 cents per pound is likely to show a loss of R2,510, for which provision will have to be made. In terms of the Memorandum of the Articles of Association of the Company Mr G P Fuller retires from the Directorate but is eligible for re-election. Mr Shakspeare who is leaving the Island also retires and does not seek re-election. The appointment of an Auditor for the current year rests with the Meeting.

KIRKLEES ESTATE COMPANY, LTD.

THE REPORT OF THE DIRECTORS.

DIRECTORS:—Messrs, G H Alston, John Gordon and Hon. Mr. W H Figg.

ESTATE SUPERINTENDENT:—Mr. J Armitage Ogden.

ACREAGE: 31st December, 1902.

Tea in bearing ..	435 acres.
Do partial bearing ..	13 "
Tea clearings ..	10 "
Timber and Cardamoms ..	129 "
Grass and uncultivated land ..	140 "
Total ..	727 acres.

The Directors now have to present to the Shareholders the accounts of the Company for the past year. The Crops secured amounted to 175,591 lb. Tea, including 6,996 lb. manufactured from purchased leaf, and 2,887 lb. Cardamoms. The nett price realised for the Tea was 36.34 cents per lb., as against 34.18 cents in 1901, and the Cardamoms sold realised 83.10 cents per lb. nett. After providing for depreciation of buildings and machinery and paying the 7 per cent dividend on the preference shares, the profit on the year's working amounted to R13,024.48, equal to 12.02 per cent on the paid up Capital of the Company, to which has to be added the balance of R976.47 brought forward from 1901, less R140.79 over-estimated for produce unsold at the end of that year. There is therefore available a sum of R12,860.16, out of which the Directors have decided to set aside a further sum of R500 to the coast advance reserve account as a provision for doubtful debts, and out of the available balance of R12,360.16, they now recommend the payment of a final dividend of 7 per cent, making with the interim dividend of 3 per cent paid, on 5th August last, a total of 10 per cent for the year, leaving a sum of R2,360.16 to be carried forward to the current sum of R2,360.16 to be carried forward to the current season's accounts. The only expenditure on capital

account during the past year was R292.50 for the purchase of ac. 9: 3: 38: land. The estimated crop, this year are 165,000 lb tea and 3,000 lb cardamoms on an expenditure of R46,300. In terms of the articles of Association, Mr G H Alston now retires from the Board, but is eligible for re-election. The appointment of an Auditor for the current year rests with the meeting.

THE VOGAN TEA COMPANY OF CEYLON, LTD.

DIRECTORS:—Messrs R W Harrison, V A Julius and E M Shattock.

The Directors now beg to submit to the Shareholders their Report and Accounts for the year ended December 31st, 1902. The Estimate of crop on Vogan and Iddagodde was 400,000 lb. of Tea, while the actual quantity secured was 362,355 lb., the shortfall being due to the abnormal absence of sunshine experienced during the last four months of the year. From bought leaf 15,231 lb. were also manufactured, making a total of 377,586 lb. which cost to place in Colombo 23.43 cents, and realized a nett average price of 32.92. Included in the Expenditure is a sum of R1,700.99, which has been spent in the upkeep of the Rubber clearings, and in laying down Albizzia nurseries. On Stamford Hill and Barkindale the crop for the year was 100,752 lb against an Estimate of 100,000 lb., the Tea costing, after deduction of profit on manufacture of outside leaf, 22.83 cents in Colombo, and realizing a nett average price of 33.13 cents. The following table, shewing the crop, cost and average price realized for the past five years, is appended, and will no doubt be found of interest.

	Crop.	Cost.	Price realized.
1893			
Vogan and Iddagodde ...	353,837	20.22	34.00
Bought leaf ...	30,929		
Stamford Hill and Barkindale ...	100,712	25.53	43.90
1899			
Vogan and Iddagodde ..	386,609	20.15	36.81
Bought leaf ...	2,523		
Stamford Hill and Barkindale ..	95,286	22.17	45.30
1900			
Vogan and Iddagodde ..	462,899	21.40	30.34
Bought leaf ...	20,268		
Stamford Hill and Barkindale ..	107,474	23.42	39.94
1901			
Vogan and Iddagodde ..	334,448	23.62	32.23
Bought leaf ...	15,383		
Stamford Hill & Barkindale ..	82,640	20.90	42.20
1902			
Vogan and Iddagodde ...	362,353	23.48	32.92
Bought leaf ...	15,231		
Stamford Hill & Barkindale ..	100,752	22.88	38.13

After payment of Interest on Debentures and all other charges, the amount of profit earned is R11,834.55 to which must be added the balance of R120.10 brought forward from the previous year, making a total of R11,954.65 available for distribution. This amount the Directors recommend should be apportioned as follows:—

By the redemption and cancelment of R. c.	
20 Mortgage Debentures of R500.00 each absorbing ..	10,000 00
By the payment of a Dividend of 4 per cent for the year ..	23,000 00
By the payment of a bonus to the Vogan Superintendent of ..	500 00
By the payment of a bonus to the Stamford Hill Superintendent of ..	500 00
By placing to Depreciation Account ..	2,500 00
By carrying forward to next Account ..	451 65
	41,954 65

Rubber continues to make satisfactory growth, and it is proposed to plant up a further 15 acres in this product during 1903. The acreage of the Company's properties is as follows:—

	A.	R.	P.
VOGAN AND IDDAGODDE.			
Tea in full bearing over 4 years ..	658	3	33
Tea in partial bearing under 4 years	119	0	10
Tea under 2 years old ..	25	0	0
Rubber ..	10	0	0
Reserve ..	515	1	38

1,328 2 1

STAMFORD HILL AND BARKINDALE.			
Tea in full bearing ..	220	0	0

Total Acreage..1,548 2 1

In terms of the Articles of Association Mr. R. W. Harrison retires from the Board of Directors, but being eligible, offers himself for re-election. It will also be necessary to elect an Auditor for 1903.

UNION ESTATES COMPANY, LIMITED.

REPORT OF THE DIRECTORS.

DIRECTORS:—Messrs W D Gibbon, F L Clements, G H Alston. ESTATE INSPECTOR.—Mr W D Gibbon. ESTATE SUPERINTENDENTS.—HAYES GROUP: Mr R J Trimen. DEE ELLA: Mr W L Vanderslott.

ACREAGE.

	Tea in full bearing.	Tea in partial bearing.	Cocoa.	Cardamoms.	Total Cultivated.	Grass Jungle and Waste Land.	Total.
Hayes Group	509	3	...	30	542	1,669	2,211
Dee Ella	243	..	81	..	324	162	486
	752	3	81	30	866	1,831	2,697

The Directors submit herewith to the Shareholders of the Company the Report and Accounts for the past year. The Crops secured on Dee Ella were 65,606 lb Tea, 162 : 3 : 17 : cwt Cocoa, 21,173 Coconuts and small quantities of Vanilla and Pepper; the Tea realized 30.81 cents per lb and the Cocoa sold R31.04 per cwt nett as against 30.69 cents and R33.15 respectively in 1901. The crops from Hayes Group amounted to 253,787 lb. Tea and 1,741 lb Cardamoms realizing nett 27.45 per lb Tea and 81.20 cents per lb Cardamoms sold, as against 30.71 cents and R1.14 respectively in 1901. The shortfall in tea crop was due to the very unfavourable weather experienced on both Estates during the last four months of the year and to attacks of Helopeltis on some of the lower fields on Hayes Estate, which seriously affected the crop there. Every step is being taken to deal with this pest. The amount at debit of Profit and Loss Account at the end of 1901, R830.55 was reduced by R450.08 realized in excess of the estimated value of balances of crops then unsold, leaving R380.47 to be brought forward to debit of 1902 accounts. To this must be added the balance of R1,638.74 loss on 1902 working account. The only Capital expenditure during the past year has been the instalments due for the construction of the Hayes Road amounting to R6,776.07. There is now only one further instalment of R3,291.24 due on 30th June, which will complete all expenditure on this Account. The Estimate for 1903 is 323,820 lb Tea, 180 cwt Cocoa, 30,000 Coconuts and 2,000 lb Cardamoms, on an expenditure on Working Account of R91,509.99. During the past year the Hon Mr W B Figg resigned his seat on the Board of Directors and the vacancy has been filled by the appointment of Mr F L Clements. In terms of the Articles of Association, Mr W D Gibbon retires from the Office of Director, but is eligible for re-election. The appointment of an Auditor for the current year will rest with the Meeting.

THE COLOMBO TEA TRADERS' ASSOCIATION.

INCREASED SAMPLING ALLOWANCES; THE WEIGHT OF PACKAGES, AND FALSE PACKING.

The Annual General Meeting of the Colombo Tea Traders' Association was held at the Chamber of Commerce Rooms on Feb. 27th. The Hon. Mr. Stanley Bois, Chairman of the Association, presided, and there were also present:—Hon Mr J N Campbell, Messrs G H Alston, J G Wardrop, A Thomson, A H Ayden, H J Scott, J H Adams, S Brown, A Pridaux, W Shakspeare, E R Waldock, G Croll, A W Willis, S O Jones, A F West, O M Aste, F M Maekwood, W Somerville, H M Waldock, W E Keell, W P Ampenoff, A O'dell Figg, W E Mitchell, A R A Heath, H B Phillips, Gordon Frazer, A H Barber, H E Day, Seymour P Jeffery, Dyer, A O Rannin, D Edwards, H Walthew, C W Booty, Alexander Fairlie, A E Lubbock, L O Leefe, C M Wright, G A Ginn, E Webb, E B Walker, W E Drury, J Lochore, R Davidson, W R Sands and W Bartlett.

The minutes of the previous meeting were read.

THE ANNUAL REPORT.

Your Committee have now pleasure in presenting to you their Report and Accounts for the past year.

MEETINGS.—Three General Meetings have been held during the period under review, the first being the usual Annual General Meeting, a report of which appeared in the local press, on the 28th February last; the second being an Emergency Meeting on 30th May to discuss the operation of the increase in the Cess, which was to become law on the 1st June; and the third also an Emergency Meeting on the 9th December, to decide the dates of the two last Sales of the year. Your Committee have, in addition, met frequently to consider several matters of interest which have been brought to their notice.

PROSECUTION OF MELBOURNE TEA IMPORTERS.—This incident, which has been ventilated in the local press, was directly dealt with by the Chamber of Commerce, with whom, however, your Committee have kept closely in touch. From correspondence which the Chamber has had both with the Ceylon Government and the Melbourne Chamber of Commerce, it would appear that the prosecutions referred to were the immediate effect of a Custom's Ordinance which is open to criticism, rather than of an arbitrary interpretation of such Ordinance by the Melbourne Minister of Customs. The Australian and Colombo Tea Trades are in sympathy on this question, and it is to be hoped that further efforts to secure an amelioration of so stringent an Ordinance will meet with success.

PATENT PACKAGES.—The Agents of Australian Mail Steamers have been approached with the object of securing an alteration in the Bill of Lading. Instead of the weight of a package being limited to 100 lb. nett, it is suggested that it should be 130 lb. gross, thereby removing a disability from patent packages, which are constructed to contain over 100 lb. nett. The proposal was referred to your Committee, but did not meet with its support.

SAMPLING ALLOWANCE.—Owing to the increase in the number of buyers and the larger demand for samples for foreign countries, there is a feeling that the small samples now being distributed in the Port are insufficient, and a suggestion has been put forward that the sampling allowance should be increased from 3 to 5 lb. A resolution to that effect forms part of the business to be brought forward at the annual general meeting.

FALSE PACKING.—A flagrant case of false packing, which was fortunately discovered before shipment, was brought to the notice of your Committee lately, who decided upon legal action if such could be pursued with any hope of success. The lawyers were, however, not encouraging, with the result that two further measures will be introduced at the general meeting, intended to protect the Trade against a recurrence of false packing or cognate malpractices.

GREEN TEAS.—A noteworthy feature of the past year has been the increasing demand for Ceylon Green Tea which has been greatly stimulated by the high prices ruling in America for China and Japan Teas. While 2,796,844 lb. were exported during 1902, it is estimated that over 10 millions will be shipped this year; and there is every probability that, in future, Green Teas will become an important factor in the Tea Trade of Ceylon.

The total exports for the year were, as per Chamber of Commerce Returns:—

	1901.	1902.
United Kingdom ..	103,543,932 ..	105,734,570
Australia ..	13,718,794 ..	20,641,134
Russia ..	11,727,068 ..	9,653,896
America ..	7,016,593 ..	4,502,131
Other Countries ..	7,984,854 ..	5,767,237
Total ..	148,991,241	146,299,018

Totals for 1900 and 1899:—

1900 ..	118,431,639
1899 ..	129,894,156

The following figures show the quantity offered locally in public sale for the last four years, with the average prices obtained for complete invoices sold:—

1899	33,377,318 lb	Average 38 cents
1900	47,681,826 do	do 34 do
1901	51,044,000 do	do 33 do
1902	55,835,478 do	

The following formed the Committee for 1902—The Chairman of the Chamber of Commerce (*ex-officio*). **BUYERS.**—Messrs Tarrant, Henderson & Co., Messrs Rodewald & Heath, The Trading Co. (Successor to A G A K & Co.), F F Street, Esq. **SELLERS.**—Messrs J M Robertson & Co., Messrs Whittall & Co., Messrs Bosanquet & Co., Messrs George Steuart & Co. The number of members belonging to the Association is 45, same number as in the previous year. The accounts for the past year made up to 31st December, 1902 and submitted to you duly audited, shew a credit balance in hand of R1,564 34. Mr J A McGillivray deserves the thanks of the Association for his voluntary audit.

THE CHAIRMAN'S SPEECH.

The CHAIRMAN said:—In rising to move the adoption of the report and accounts for the past year I do not need to detain you long, fortunately, because there is a considerable amount of business before us today. A retrospect of the past is always interesting, but it is the future towards which our eyes continually turn and it is with great satisfaction I am able to congratulate the Trade generally and producers, and sellers in particular, on the improved prospects of the tea trade, though I am sorry Reuter has not enabled me to announce the eightpenny average. We should soon be getting it as it is now in the immediate vicinity and, perhaps, before long we may be able to top that figure even. The report before you first treats of the question of the

PROSECUTION OF MELBOURNE TEA IMPORTERS, which was a matter which the Chamber of Commerce and also this Association has had before them, and it has been thoroughly ventilated

in the local press. From a perusal of the voluminous documents sent us in connection with the case, it seems evident that in the wording of one of the local Acts, tea was pronounced as unfit for human consumption if it contained anything over 8 per cent ash. The tea in question was alleged to have contained 8½ per cent ash and consequently there was no course but to put it out and that was done. I think we can depend on the tea dealers of Melbourne taking all the necessary steps. The Chamber of Commerce and this Association have not, however, lost sight of the matter and will act as they see best. It is a delicate question to interfere with the fiscal arrangements of any Colony, or appear to interfere with them. As regards the

PATENT PACKAGES

notice of a special resolution has been given for discussion at this meeting and I will not anticipate discussion on the matter. I would only say with regard to the resolution that there are various difficulties in the way when we bear in mind that the object of the steamship Companies is strictly to limit the amount in a tea chest to 100 lb net, and this resolution does not adequately provide for that difficulty. That will no doubt be fully discussed. A similar remark might also be applied to the question of

SAMPLING ALLOWANCES

in regard to which a special resolution will be brought forward. I think, however, there can be no doubt this resolution is brought forward in conformity with the growing requirements of the trade. There seems to be no doubt that the quantity sent to each buyer is inadequate to enable him to arrive at a fair valuation of the tea and in these circumstances, speaking as a seller, I would be prepared to agree to an increase in the quantity, but whether that increase should be from 3 lb to 5 lb remains to be seen. As regards the paragraph in the report

"FALSE PACKING"

there is also a special resolution to be brought forward to deal with the matter, and I do not need to anticipate discussion on the matter.

GREEN TEAS.

The growth in the trade has been most marked and most satisfactory. It is regrettable—I think this is a matter I referred to at last annual general meeting of the Association—that we do not seem to get the figures from the Cus toms to tally with the amount on which cess is paid by the Planters' Association, and I can only suppose that it is due to the carelessness of Firms, exporting clerks, or some other reason. The difference between green and black tea is not mentioned in the Bills of Lading, and I would ask you to assist us in getting accurate figures in by seeing that your subordinates discriminate in the Bills of Lading between Green and Black Tea.—Proceeding next to deal with the

TEA EXPORTS FOR THE YEAR

the Chairman said:—We exported 2 million less to the United Kingdom and 2 million less to Australia, but against this we sent 2 million more to Russia, 2½ million more to America and 2 million more to other countries. Taken in conjunction with the considerable increase over last year in the local sales is very gratifying. The local sales in Ceylon were during 1902, 6½ million lbs. above that of 1901 which was in turn 3½ millions in excess of 1900. It is evident we

have to congratulate ourselves on the very healthy state as regards the local market and I trust its extension will continue as, I think, it doubtless will if justified by the results obtained by those offering tea locally. As regards

YOUR COMMITTEE

the voting papers have just been opened by the Committee in virtue of rule 8, and have resulted in the election of the following:—Buyers: Messrs Rodewald and Heath, the Russian Trading Company (Mr Ampenoff); Cro-field, Lunpard & Co; Mr F F Street. Sellers: Messrs J M Robertson & Co.; Messrs George Stenart & Co.; Messrs Whittall & Co.; Messrs Bosanquet Bros. which, I think, is substantially the same Committee you had last year.

THE ACCOUNTS

are of the simplest description and leave no comment for me except to point out their satisfactory condition. The last matter—or practically the last matter dealt with is the

NUMBER OF MEMBERS BELONGING TO THE ASSOCIATION,

which is 45 and, I am glad to say, there are six further firms which have been elected at last meeting of the Committee making in all 51 members. On looking into the constitution of the membership of this Association—I took the trouble to analyse the constitution this morning—I find there are 5 brokers, members; 16 firms, who are solely and simply buyers; 9 firms solely sellers and 15 firms, who are both. Now I have no hesitation in saying the bulk of these firms are interested, both buyers and sellers are interested, in every stage of the tea planting industry of Ceylon. It nevertheless occurs to me that we might with great advantage to ourselves

BROADEN THE BASE OF OPINION

on which this Association rests and on which it formulates the requirements of the trade; and I would suggest as the best means to this end that we should invite the Chairman of the Planters' Association and the Planting Member of Council to become in future as *ex officio* members of this Association. I am sorry this did not occur to me in time to put it forward as a resolution today at this meeting, but I throw out the suggestion now as I feel it would strengthen our hands materially and keep us better in touch with opinion upcountry. On the other hand it would enable our upcountry friends to keep in touch with the conditions of the trade in Colombo and prevent many misunderstandings arising—which, although, I am glad to say, we have successfully avoided them in the past, we wish to give every facility for avoiding in the future. I need hardly point out, gentlemen, that we owe our

PRESENT POSITION IN THE MARKETS OF THE WORLD

to the unity, combination and to the heartiness with which every one—from the producer and seller to the buyer and distributor—has worked together in the past to put the Ceylon tea trade at the head and front of the tea trade of the world and I feel sure everything we can do to assist this policy will be of the greatest service to the trade in the future. With these few remarks, I beg to move the adoption of the report and accounts for the year ended December 31st, 1902. (Applause.)

Mr S P JEFFERY—(of Messrs Lipton, Limited)—I have much pleasure in seconding the adoption of the report and at the same time congratulating the Chairman and Committee on the satisfactory year that has just passed. (Applause.)

THE GENERAL COMMITTEE.

The General Committee was formally appointed, the names of which were given by the Chairman in his opening speech.

TEA TRADERS' HOLIDAYS.

The CHAIRMAN:—The next item on the agenda is the question of the Tea Traders' Holidays for the present year. It is proposed in accordance with our usual practice for the past year or two, to omit the sales on 15th April and 30th September. On December 16th the sale will be held as usual and a supplementary sale on December 18th, closing the catalogue on the 14th and making the first sale of the new year on 5th January, the catalogue to close on 30th December at 4 p.m. If you recollect some little time ago we decided that these dates should be settled at the general meeting, and I trust that if you have any objection to these proposals of the Committee—they are merely proposals—you will take this opportunity of putting them forward.

Mr DRURY—(Messrs Forbes and Walker)—Mr Chairman, in connection with these holidays, I would like to suggest that we revert to the system of the holidays being settled by the Committee—with the exception of one point—the December holiday. At X'mas last year a great deal of trouble arose which is still fresh in the minds of us all. I think, the Committee arrange the holidays, it will be much more satisfactory.

The CHAIRMAN—said that these dates were fixed now in order that they might be advertised well in advance. There was some trouble last year in the December holiday, but that was due more to a mistake in regard to the closing of the catalogue. There was also the question of writing home, because if there was no sale their home houses would require to be informed and it might save telegraphing and other expense. The Committee would have no objection to undertaking the responsibility but at the same time it was discussed in a general meeting and considered these holidays should be fixed at the general meeting.

Mr ALSTON—(Messrs Whittall & Co.)—seconded the suggestion of the Committee as put forward by the Chairman.

The CHAIRMAN:—I take it you are seconding the original proposal. Mr. Drury, previous to that being seconded, made a suggestion which I believe is to be an amendment—that the matter should be left to the Committee. If nobody seconds that, it falls to the ground and we deal only with the original motion.

No seconder to Mr. Drury's amendment being forthcoming the original motion was put to the meeting and carried.

INCREASED SAMPLES.

The CHAIRMAN:—Before calling on Mr. F. F. Street to propose the resolution standing in his firm's name I would like to read the following letter received from the Planters' Association:—

The Secretary, Colombo Tea Traders' Association Colombo.

DEAR SIR,—Your letter of the 16th instant having been duly read and considered at a recent meeting of the Committee of the Planters' Association of Ceylon, I now write to ask you to bring under the notice of your Association the annexed copy of resolutions passed on the subject of the resolutions to be brought forward at the annual general meeting of the Colombo Tea Traders' Association.—I am, dear Sir, yours faithfully,
A. PHILIP, Secretary to the Planters' Association of Ceylon.

Kandy, Feb. 23rd, 1903.

(Resolution referred to.)

"That as regards Resolution 4 in the advertisement notice of the meeting of the Colombo Tea Traders' Association the Committee of the Planters' Association considers that the value to be deducted from the sale proceeds should not exceed the present charge. (11). That as regards Resolutions 4, 5 and 6 the Committee of the Planters' Association considers that in their present form they appear to be detrimental to the interests of the Producers."

Mr J. H. ADAMS—(Messrs F. F. Street and Co.)—with your permission I should like before moving the motion to alter the increase to read from 3 lbs. to 4 lbs.

The CHAIRMAN:—I suppose the Association will have no objection to permitting the mover to substitute 4 lbs. instead of 5 lbs?

Mr. J. H. ADAMS—then moved the motion standing in the name of Mr. F. F. Street, which amended read as follows:—

"That in view of the increased number of buyers and the demand for extra samples for foreign markets, it is desirable that the sampling allowance for big breaks be increased from 3 lbs., as at present, to 4 lbs."

In doing so he said that since the resolution had been published there had been a lot of discussion on the matter and he thought sellers generally had come to the opinion that 4 lb. would be quite enough for the trade but at the same time they allowed that 3 lb. was hardly a sufficient quantity to give adequate samples. In Calcutta the sample was $\frac{1}{2}$ lb. and he believed buying brokers got 1 lb. each. In London they got larger samples and in China they used to get 1 lb. At the present moment in Ceylon there was never a sample left after the sale for the buyer or for other firms who wanted to send a sample away.

Mr. S P JEFFERY—(Messrs. Lipton, Ltd.)—in seconding the motion, said that he thought from the resolution passed at the Committee Meeting of the Planters' Association that they were inclined to overlook the fact that all the tea sold on the local market contained absolutely net weight. He had some experience in re-packing and his experience was that if there was a gain it was on the wrong side. With regard to tea packed for London he thought it was the custom to pack a little for what weight may be lost. His chief reason for supporting the resolution was, however, that the sample they got as buyers was in his opinion too small and he thought that was the opinion of many others. A large sample looks much more attractive, and he thought if they had larger samples to value the teas on, it would be in the producers' favour. On looking at a large sample they were inclined to see the tea in a better light. It is very difficult to get a sample of tea after the sale. He had often tried to get a sample to offer where he thought he could get orders and

he had to leave it because he could not get samples big enough to offer to customers. That was his chief reason and he strongly supported the resolution. He hoped both sellers and buyers would see it was to their interests to support it.

Mr. DRURY—at some length, explained the system of distributing samples and showed the sizes of the tins and the sizes of the packets in which the samples were contained. The brokers drew 3 lb. of tea and they distributed in large breaks 37 samples and in small breaks 39 samples in the trade. They were distributed in this way. 20 of the buyers sent round tins of this sort (showing one) some larger and some smaller. These buyers expected these tins to be filled and for 18 buyers who have no tins they sent samples in paper. The complaint was that if only these 3 lb were to be used they could not fill these tins. In fact some of them are only half filled, and that was where the complaint arose. If filled, 3 lb. would not even go round. That meeting could fix on a standard size of sample or fix a limit. He would suggest a size of box—that used by Messrs Crossfield, Lampard & Co. They could have 38 samples out of the quantity allowed if that box was adopted. A large sample looked better than a small one and it was most certainly to the interests of the seller and also to the interests of the buyer that larger samples be allowed. He would strongly support this motion that 4 lb be drawn and they could get a sample that would please everybody. After they bought, they could get a sample to send to their constituents and a sample which could be used for pushing tea in the various parts of the world, which was a very necessary thing indeed.

THE VIEWS OF THE P. A. REPRESENTATIVES.

The Hon. Mr J N CAMPBELL—said he was not altogether satisfied with the demonstration made by Mr Drury. Of course, he did not put his opinion against Mr Drury's or any of theirs; but he thought the trade hitherto had been supplied by the brokers in Colombo with a sample such as was sufficient and if all the brokers had supplied similar samples he did not think that agitation would have ever been brought before the Association. He perfectly agreed that a good sample ought to be given to the trade and if it was actually necessary that more than 3 lb should be taken he personally had no objection; but the question was "Who is to provide this sample?" Hitherto the seller had borne the whole of the cost of the sample supplied to the trade. Some years ago there was no such deduction made from the invoice as was made now, and that in a way without consulting the producer. When he said "without consulting" the producer he meant that apart from consulting him in that Association the producer was not invited to express his opinion and the result was that buyers received a sample of 3 lb which was paid for by the seller. A further allowance of 1 lb was asked from them, but he wanted to know what became of the 3 lb they already supplied. At present they gave about 100,000 lb to the trade per annum in sampling allowances and now 33,000 lb were asked for the same purpose. He thought it would be only fair that the buyer would be willing to take his share of that responsibility and in future that they (the producers) should be limited to the 3 lb and if further sampling allowance was necessary, the 1 lb or $\frac{1}{2}$ lb—as he was told by some was sufficient—should not be

deducted from the invoice. The buyer, he proceeded, invariably got more than the nominal amount of the invoice. Beside that he got his proportion of the samples drawn amounting on an average to a fortieth part of 100,000 lb. a year, so that it was perfectly reasonable the buyer should allow them 1 lb. against the 3 lb. they were willing to allow. He would ask them to allow him, to add the following words as a rider to the motion:—

“And that the value to be deducted from the sale proceeds shall not exceed the present charge.”

That was the view taken by the Planters' Association and as one of their representatives there he was bound to bring it forward. But it was also his own opinion. With these few words he begged to move that rider which he had just read and he asked them in all fairness to the producer and seller, who was not so largely represented there as the buyer to give that their earnest consideration.

Mr E WEBB—supported Mr Campbell's rider. With regard to extra sampling allowance he thought there was no doubt that more was required by the trade. He had been a couple of years in Mining Lanc himself and knew what was required for a sampling allowance. He thought the brokers should have something to hold over for show. He did not see why the buyer should not bear some of the charge of the sample. As a rule the buyer did not get more than the actual amount of the invoice. He thought that everyone, in order to prevent loss in weight, put in a little more than the actual amount and counting what the buyer annually drew from other samples, he did not think, it would be any unreasonable charge on buyers to let them be responsible for the extra samples.

Mr A R A HEATH—(Messrs Rodewald & Heath)—said he would like to point out the fact that in London they had a pound draft given to them on all teas sold whereas in Colombo they got nothing whatever, but the sample given by the broker and the small sample they got after buying tea. Planters were very anxious to encourage that market, and, therefore, he did not think it was at all an unreasonable suggestion that they should get this sample given them to judge by and also to send samples away to customers. At present in London the buyers got a pound, but here there was nothing at all, and he had many claims for short weights from Australia &c. He was sure there were many buyers there who could bear him out in that. He did not think the present resolution was at all an unreasonable one.

Mr JEFFERY:—I should like very strongly to endorse the point about the draft on teas given in London.

The CHAIRMAN:—I am afraid you cannot speak a second time on the same subject except by way of explanation.

Mr JEFFERY:—I was not going to speak except to endorse Mr Heath's remarks.

Mr G H ALSTON—said that it appeared to him as in the way of every other business, the sellers gave samples of his produce to the buyer. For the trade it was the same. Of course, it was brought forward as regards the London trade that they had to put back a return, but that was not really a return for, in addition to that, 1 lb. was allowed. After the lucid explanation given by Mr Drury of the amount required to give a

fair sample by which buyers could judge tea he did not think sellers should grudge them that sample.

The CHAIRMAN—said with regard to the weight of teas offered in the local sale he had there a letter before him which arrived at the last Committee Meeting, but not in time for any resolution to be brought forward in connection with it. The letter was from Messrs. Tarrant Henderson & Company who stated:—

The Chairman, Tea Traders' Association, Colombo.
Dear Sir,—For some time past we have noticed that the packages of tea offered for local sale, particularly under initial marks, are very often of very inferior wood and the tea on examination proves to be badly fired and is frequently short in weight.

We shall be glad if you will circulate this letter with the object of eliciting from other buyers if their experience is the same as our own, and if this is so would ask the Association to endeavour to take such steps by making this known publicly, as will improve matters.—Yours faithfully,

TARRANT, HENDERSON & CO.

Colombo, 13th February, 1903.

Proceeding the Chairman said it was an advantage to have that before them, so that if such a state of things existed they might do something hereafter to remedy it. He would also like to state—though it might not be absolutely in order it appeared in an interesting manner on that subject that a letter had been received from Mr Edgar Turner, who was a member of that Association. He says with regard to this particular question:—

In your rules and regulations corrected to March 1896, I find 39 members, corrected to April, 1902, 43 members (including 3 up-country members who do not draw samples), so that we do not see the necessity of increasing the sample allowance. You may remember that the sampling allowance when initiated was not liked by the sellers, on the ground that in a few years the trade would be asking for more and more.

Our fears were justified, and unless the movers of resolution No. 4 can show strong reasons for the increase it will cause dissatisfaction.

Should, however, it be the general wish of the trade, and they show the necessity of the increase in the seller's interest I trust it will be on a sliding scale. Say all breaks of 300lb. and under 1lb. samples be drawn, and samples seen at selling broker's office.

2 lb. allowance up to	...	800 lb.
3 " " "	...	1,200 lb.
5 " " " over	..	1,200 lb.

This sampling allowance he thought—he was subject to correction by the mover of the resolution—was intended only to apply to breaks of 1,000lb and over.

Mr. ADAMS—signified that that was so.

The CHAIRMAN proceeding said the amendment suggested by Mr CAMPBELL and seconded by Mr WEBB would read:—

“That in view of the increased number of buyers and the demand for extra samples for foreign markets, it is desirable that the sampling allowance for big breaks be increased from 3lb. as at present, to 5 lb. and that the value to be deducted from the sale proceeds shall not exceed the present charge.”

The amendment was first put to the meeting when there voted for it only the mover and seconder.

The original motion was then put and declared carried.

A MEMBER—asked if the style of sample suggested by Mr Drury was to be agreed upon. He thought it would simplify matters for the Brokers if it were adopted now. The tin, Mr Drury had shown them, was he thought generally considered a good one.

The CHAIRMAN—replied, he thought that was a matter that might safely be left to the Committee. It was a matter that could not very well be determined at a general meeting.

FALSE PACKING.

Mr. GORDON FRAZER—(MESSRS. GORDON FRAZER & Co)—moved the following resolution standing in his firm's name :—

“That no teas may be put up for sale at the Chamber of Commerce Sale-rooms except through members of the Colombo Tea Traders' Association. Other teas may, however, be offered on sale provided that they are guaranteed by the selling Broker as first hand teas on Garden Account, or provided that they be first bulked and repacked in the store of a *bona fide* member of the Association and there remain pending delivery.”

He said that his experience in regard to a lot of tea purchased by him at the sale on 21st January made him consider the steps of which that resolution was the effect and he thought when they heard what these experiences were they would agree with him that some such thing as was provided by that resolution was absolutely essential for the credit of shippers, the good name of Ceylon generally and the tea estates of the Island particularly. Briefly the circumstances were these. At the sale on 21st January he purchased 18 chests of tea, containing 1,780 lbs. The sample on which this purchase was made was a tippy, well made broken pekoe. Some of the packages were opened in his stores and the tea appeared perfectly up to sample, but by what he might term a dispensation of Providence that tea was required for blending and it became necessary to turn up the whole of it. This turning up displayed a most flagrant example of false packing. For the first 4 inches from the top of the chest the tea was perfectly the same as the sample, but underneath was the mixture of cheap souchong and dust. A deliberate fraud was attempted. The packages were treated in the same way at the bottom so that in the event of the chest having been opened the wrong way up the fraud would not have been detected. Now he asked them what would be the effect on the kind of an American or colonial buyer, if that tea had been opened by him in that condition. His credit in that quarter would receive a severe shock and also the credit and good name of Ceylon through him would similarly suffer. They could not tell how many cases like this had actually gone through and he thought that to think that was a singular case would be assuming too much. He might also tell them that instead of 1,870 lbs. the actual contents of these chests was only 1,820 lbs. That showed the disease, now for the remedy. The Committee of that Association obtained legal advice on the matter and the advice so obtained was such that no action was taken. It was considered difficult to secure legal proof. It, therefore, behoved them to take some steps for the protection of individual shippers and Ceylon tea estates and the reputation of the trade in the Island generally and he thought that resolution the best way of meeting the difficulty. They would observe that tea sold on garden

account was, in no way, affected by that resolution. If they adopted that resolution they did so as much on behalf of the estate proprietors as the merchants whose interests in that matter he considered, were identical. (Applause). Personally he did not think they should do much to encourage mixed lots of tea, once they had passed the hammer, to make their appearance on the catalogues again. He did think buyers should have some guarantee as to where the lots they purchased were packed. In the case of estate teas they knew they were packed in the estate factories and with that guarantee they were perfectly satisfied, but in the case of other teas they had no such guarantee. That was the reason for the resolution, and he did not think its terms were too strong. Another advantage it would have was that it would make the disposal of stolen tea more difficult to those exploiters of this particular branch of the tea trade in Ceylon. (Laughter). He remembered one fine day a cart-load of tea going a missing between the Colombo godowns and his stores. Unfortunately they knew that was not an unique case. From all points that resolution was calculated to benefit both producer and seller and both in their own individual interest and for the credit of Ceylon which they all prized so highly, he moved that resolution which he strongly recommended to their support. (Applause).

Mr. HERCULES SCOTT—(MESSRS. BOSANQUET & Co)—said he had much pleasure in seconding the resolution. He was extremely sorry to hear from the letter read by the Chairman that the Planters' Association Committee had passed a resolution that resolutions 4, 5 and 6 were opposed to their interests. He could assure the representatives of the Planters' Association present that in seconding that motion, he had done so he considered more in the interests of the producer and the sellers than he had in the interests of the buyers. He could not see anything opposed to the producers or the sellers or anything that put the slightest resolution upon them. (Hear, hear.) He spoke approvingly of the terms of the resolution and the advantages it offered and concluded by stating that they had not brought forward that resolution except with the idea that it was in the best interests of producers. (Hear, hear.)

Mr. E WEBB—said he did not see any objection why that motion should be opposed by the producer. It seemed in their interests.

Hon. Mr. J N CAMPBELL—said that as the name of the Planters' Association had been mentioned he might explain that when their resolution was passed the second part of the motion before the meeting had not been published. Very naturally they objected to the first part of the resolution by itself because that would confine the sale to the Tea Traders' Association, but with the addendum they had now added, he did not think the Planters' Association would object. He would like to ask what was a *bona fide* member? He did not see the difference between a *bona fide* member and an ordinary member of the Association. (Laughter.)

The CHAIRMAN:—I don't think the mover of the resolution will have any objection to those words being deleted.

Mr. GORDON FRAZER:—Not at all, Sir.

The CHAIRMAN—said that before he put the resolution to the meeting he thought it was only

fair he should read to them a few remarks from a letter which had been sent to them by Messrs. J T de Saram and D B Seneviratne who were native buyers, in that market. Proceeding the Chairman quoted largely from the following letter:—

A PROTEST BY NATIVE BUYERS.

63, Maliban-street, Pettah, Colombo. 16th Feb. 1903.
F W Waldoek, E-q, Secretary,

Colombo Tea Traders' Association, Colombo,
Sir,—On behalf of the native sellers and buyers who patronise the Weekly Tea Sales held at the Chamber of Commerce, allow us to take objection to the suggested introduction of certain new rules forming the subject of the 5th and 6th Resolutions to be proposed at the Annual General Meeting of the Colombo Tea Traders' Association to be held on the 27th inst. We humbly beg to submit that if the proposed rules be passed and adopted by your Association they will involve great hardships on native sellers and buyers of Tea, and such rules will not in any way improve the Tea market, nor will they on the other hand be conducive to the benefit of the European Tea grower or planter.

As far as we could see, the adoption of these rules will only benefit the Broker, who will have to be paid an extra commission for buying Tea at the Chamber of Commerce Tea Sales for native dealers. The other alternative allowed for the native seller is that their Tea should be bulked and re-packed in the stores of a *bona fide* Member of the Colombo Tea Traders' Association, which would be an expensive process as far as the native seller is concerned, and ultimately the benefit accruing from this will also result only in the advantage of the European Storekeeper. The native dealer has to sell his Teas cheaper than his European brother, and that he should be mulcted in extra brokerage or commission as a result of these rules coming into force would be very unfair and would absorb altogether the little profit he makes. These rules would therefore be an infliction principally on the Colombo Tea Traders' Association, on the native sellers and buyers, and they appear to be framed with the object of restricting natives dealing in Ceylon's staple without any justification whatever for so doing. A good proportion of the Teas purchased by the natives at the auction sales are used for local consumption. The local retail dealers get their supplies of Tea from those who purchased at the Tea sale of the Chamber of Commerce. And under the new rules, Tea for these dealers could only be obtained at an extra expense. This would be an unnecessary additional tax on the local consumer. Finally, we beg to submit that there is no necessity for the innovations contemplated. It has been the custom for many years for natives to offer and buy Teas at these Sales. The conditions of sale which now obtain at these Sales have not been found wanting—wanting in the sense as to make any invidious improvements affecting the native dealer only. If these rules have been suggested by any other motive, such as the prevention of fraud and deception in the packing and bulking of Tea by the *native seller only*, we beg to state that the 7th clause of the existing conditions of sale is quite ample to meet the case, and that under this clause any Tea not properly offered could be rejected. (We beg to inform you that a copy of this letter has been sent to the Chairman of the Ceylon Chamber of Commerce and for the reasons already urged, and for other reasons, we trust that the proposed rules will not be passed by your Association towards which end we solicit your co-operation by duly presenting this letter before the meeting on the 27th instant.—We beg to remain, Sir, Yours faithfully,

(Signed.) J. T. DE SARAM.

{ " } D. B. SENEVIRATNE.

Proceeding the Chairman said he felt perfectly certain that no native trader, who was carrying on a legitimate trade, would be hampered in any way by that Association. He could only further

say that he welcomed with pleasure the remarks of Mr. Webb and Mr. Campbell on the subject of the position of the Planters' Association for he felt sure any opposition they could possibly have could only be due to their not thoroughly understanding the object of the resolution. (Applause.)

The resolution was put and carried *nem con.*

The CHAIRMAN:—Before going further I might ask when this new regulation is to come into force.

Mr. DRURY:—I would suggest first sale in April.

Hon. Mr. CAMPBELL:—Is that the first of April? (Laughter.)

The CHAIRMAN:—These regulations will be printed as conditions of sale, I suppose.

Mr. DRURY:—Yes.

A RESOLUTION WITHDRAWN.

The CHAIRMAN—who was to have moved on behalf of Messrs. Bois Bros—"That admission to the Tea Sales at the Ceylon Chamber of Commerce Rooms shall be strictly confined to Members of the Association, their accredited representatives, and visitors introduced by them" said that in view of the previous resolution he did not think it was necessary to put that before them and with the permission of the meeting he begged leave to withdraw the same.

**WEIGHT OF PACKAGES TO AUSTRALIA;
FREE TRADE IN TEA BOXES WANTED.**

Mr. J G WARDROP—(COLOMBO COMMERCIAL COMPANY, LTD.)—moved the following resolution standing in his firm's name:—That the Steamship Companies be asked to substitute for the existing clause inserted on all Bills of Lading for Tea shipped to Australia, which is as follows:—

"No package to contain more than 100 lb tea; otherwise the steamer is not responsible nor liable for damage."

The following, viz:—

"No package of tea to weigh more than 129 lb gross; otherwise the steamer is not responsible nor liable for damage."

The original clause referred to in that resolution was inserted 7 years ago with the object of minimising the claims of the shipping Companies with respect to that tea. He thought they must admit it as a fact that the producer in the past had not been as careful of packages to send Colombo for sale as to the sale in London and hence the necessity for that clause in the Bills of Lading. At the time that clause was brought into operation patent packages were used to a very small extent. Now a patent package can be legitimately said to contain 110 lbs. of tea against 100 in the wooden packages and the consequent effect of that stipulation of the Bills of Lading is to penalise the users of the patent boxes. If they adopted that resolution he was now moving it would inflict no hardship on the wooden packages and it would put the patent packages in a more fair position. There was no restriction in the amount packed from Colombo to London or to any country except Australia with regard to the value of the patent packets, he could only mention the case of a Company doing business in Ceylon with Russia. Their Russian friends found the patent boxes useful and well adapted to their trade, strong, light and capable of standing long and varied transport. He thought they were sufficiently used to warrant their taking this action.

Mr. A R A HEATH—seconded the resolution. He thought if the shipping Companies could be induced to make the alteration in the present clause and allow 129 lb gross instead of as previously 100 lb net it would be a distinct advantage from a buyers point of view and he could not see that looking at it from the planters point of view there could be any objection to it. He understood that the shipping Companies might consider the matter favourably if brought before them by that Association, and, therefore, he seconded the resolution.

Mr. HERCULES SCOTT—said they had heard a great deal on that matter lately which all went to attempt to popularise the Venesta Chest. Some of them were, perhaps, not aware that the matter was very fully discussed last September at a Committee meeting of that Association, and in January last it was brought up in a Committee meeting of the Chamber of Commerce and a resolution was unanimously passed at both meetings, condemning the principle of this resolution. If he had their permission, he might read the resolution passed by the Committee. Proceeding Mr. Scott read the minute of the Committee meeting with regard to this matter and went on to say that at the Chamber of Commerce meeting in January over a month ago that resolution came before them and was unanimously condemned. He hardly thought that the annual general meeting of that Association should upset the decision of both their own Committee and that of the Chamber of Commerce. The Colombo Commercial Company were, as they were well aware, agents for the Venesta Tea Packages and he thought Mr. Wardrop would agree with him that the primary object of the resolution was to push the sale of Venesta tea packages. That, from the Colombo Commercial Company's point of view was quite right, but he thought it was different for the Tea Traders' Association to come forward and give a gratuitous advertisement to a package which is protected by patent. After alluding to the difficulties that would arise in repacking, &c., were the resolution adopted, Mr. Scott went on to say that he was told several present were to vote for the resolution just to give free trade in patent boxes. If they admitted the Venesta chest into general use, what was to prevent the makers of them doubling the price? They were protected by patent. If the Venesta chest became universal, they put the whole situation in the maker's hands.

Mr. W E MITCHELL:—I think the Venesta Company have the remedy in their own hands if they make a package that will hold 100lb. (Hear, hear.)

Hon. Mr J N CAMPBELL—said he had great pleasure in supporting the motion put forward by the Colombo Commercial Company. He had to say he was very much surprised and astonished when he heard the Committees of the two Associations had agreed to have nothing to do with the proposal that that alteration should be made on the Bills of Lading. Mr Hercules Scott's remarks had been entirely a diatribe against the Venesta package and in favour of the Momi chest. He (Mr Campbell) was not in any way interested in the Venesta packages. He had nothing to do with the Venesta Company and he was not a shareholder in it, but he did use for the London market a large number of Venesta packages and

he was always very well satisfied with them. There was no free trade in packages in Colombo. They were not allowed to ship more than 100lb. in one package to Australia. Why should they not be allowed to use any package they liked? He did not know why there should be any difference in what was packed for London and for Australia. Why should there be a limit in the quantity packed to Australia? There was no limit in the quantity packed to London. It had always been said by the shipping Companies when they were approached "Let the trade approach us and then we may consider the matter. As long as the Traders' Association is against the change we will take no action." He asked that the Traders' Association should now give them an opportunity to put all boxes on an equal footing. (Hear, hear.)

Mr SCOTT—repudiated the suggestion made by Mr Campbell that his remarks were a diatribe against the Venesta packages in favour of the Momi. The great proportion of their teas were packed in country wood. He had no interest in the Momi chest and held no brief for them.

Mr AMPENOFF—said that the Company he represented had been trading with Ceylon for the past four or five years. Their experience was that tea packed in the ordinary boxes arrived broken and half the tea lost and his Company had given him instructions that the tea he bought now was to be packed in Venesta packages which they found strong and serviceable. He could not see why objections had been raised to the Venesta Chests. Russian buyers—

Mr SCOTT:—May I rise to a point of order? This is not a question of shipments to Russia; it is a question of shipments to Australia.

Mr AMPENOFF—resumed his seat.

Mr WARDROP—in reply—said he had nothing to add further than that he was equally interested in Momi boxes as in Venestas and all he wanted to see was free trade in tea boxes. What they were aiming at there that day was to forward the interest of the Tea Traders.

The CHAIRMAN—said he would only say one word, in regard to what fell from Mr Scott, and that was that although the Committee of the Chamber of Commerce or that Association had decided against this, it was not *prima facie* evidence that it had been settled for all time; and if any new facts were brought forward, it was quite competent for the Association to reverse that decision at any time. He just mentioned this unless any member might think that it would be a slight on the Committee to reverse their decision.

THE MOTION LOST.

THE CHAIRMAN—then put the motion to the meeting and it was lost by 14 to 12 votes.

This was all the business.

SANITARY INSTRUCTIONS FOR THE TROPICS.
—We invite the attention of our readers to the list of Sanitary Instructions for the use of people in the Tropics which have just been issued by the Liverpool School of Tropical Medicine. These simple rules are of the greatest importance to all residents in Ceylon and should be perused carefully, in view of the latest discoveries in medical science affecting tropical countries.

A NEW USE FOR SUGAR.

VULCANISING WOOD.

As the result of experiments, a method of so treating timber as to secure even from soft wood a largely increased toughness and hardness is reported to have been invented by Mr Powell, a Liverpool merchant. The treatment to which the timber is subjected is that of saturation at boiling point with a solution of sugar, the water being afterwards evaporated at a high temperature. The result is to leave the pores and interstices of the wood filled in with solid matter, and the timber "vulcanised," preserved, and seasoned. The nature of moderately soft wood, it is claimed, is in this way changed to a tough and hard substance, without brittleness, and also without any tendency to split or crack. It is also rendered remarkably impervious to water. Hard woods, similarly treated, derive similar benefits. Moreover, it is claimed that the process may be completed and timber turned out ready for use in a few days. The invention, which has been patented, is to be brought before the attention of the timber trade by a series of practical demonstrations and lectures.—*H. and C. Mail*, Feb. 20.

RUBBER FORESTS IN PORTUGUESE AFRICA.

The Portuguese investigator, Dr. Pereira, on a journey through Africa, telegraphs from Mosamedes that he has found large forests of rubber trees in the regions of Pungo-Andongo, Bardo and Quanza. The natives there have no idea of the way how to get the rubber.—"*Gummi Zeitung*,"—*India-Rubber Journal*, Feb. 16.

PRIMEVAL CAMPHOR AND OAK FOREST DISCOVERED IN FORMOSA.

An interesting and unusual discovery is that of a primeval forest which has been found in Southern Formosa. The forest is of vast extent, covers, it is said, 50,000 acres, and contains 120,000 camphor trees, each measuring from 7 to 18 feet in girth. These are roughly estimated to yield ten million cattles of camphor, which, purchased by the monopoly office at 18 yen per 100 cattles, will be worth 1,720,000 yen approximately. Besides, the forest abounds in "red-grained" oak, excellently suited for making Japanese oars, and also in *tenge*, valuable for cabinet work and other purposes. On the whole, therefore, the trees in this newly-discovered but ancient forest may be valued at some tens of millions of yen. There is one big obstacle, however, in the way of their being utilised, and that is the excessive cost of transportation. Mr. Ishibashi, chief of the Aborigines district office, is the lucky discoverer of this forest. He has also discovered in the same remote district a peak standing 12,081 feet above sea-level, the next highest peak therefore in the island, the highest being Mount Nitaka.—*Hongkong Weekly Press*, Feb. 23.

RED COCONUT BEETLES IN SINGAPORE.

With regard to the inspection of coconut trees, Mr Ridley, in the Gardens Report for 1902, says that, during the year, notices to

cut down infested trees were served on 238 persons and 1,039 dead trees and 35 piles of rubbish were destroyed. There were no prosecutions. The number of red beetles, especially, has greatly diminished in Singapore, so that it was some time before Mr Ridley could get a couple for a correspondent in Madagascar who wished to see it.—*Straits Times*, Feb. 28.

NETHERLANDS INDIA.

The *Batavia Nieuwsblad* tells of the steady march of improvement in Pulo Way, at the harbour of Sabang. Jetties and storehouses are being rapidly built for the Dutch mail steamers calling there. It is expected that the N D L steamers will follow the example.

THE NUTMEG PLANTERS

at Banda in the Moluccas are now in the hands of a shipping ring which deals with them on ruinous terms. The planters look now for better times from Australian ships beginning to call at Banda, and readily buying up local products. The supercargoes of these vessels have promised to call again.—*Straits Times*, Feb. 28.

EAST AFRICAN PEARL-SHELL.

Dr. Aurel Schulz, F R G S, the well-known South African explorer, has secured two concessions over the whole of the German East African Coast—one for mother-of-pearl and pearl fishing, and the other for the exploration of trepang, also called *Beche-de-mer*, both of which in other countries have developed into great industries and given large returns. The discovery of genuine mother-of-pearl shell on the German East Coast of Africa is expected to result in the development of a solid industry. Dr. Schulz states that the islands lying off the coast from coral banks of enormous extent, which fulfil all the natural conditions requisite for the maturing of mother-of-pearl shell in large quantities, while the conditions for diving are very favourable, as the water lies shallow over great areas. Red mussel, out of which he extracted some good white pearl, is plentiful over a distance at least 400 miles in length. South of the island Mafia, off Ras Kisimans, and in other places, he found beds of the large pinna shell (of extraordinary size) which yielded black seed pearls. Trepang is present in considerable quantities.—*African Review*.

ESTIMATE OF COST AND REVENUES OF A CACAO PLANTATION.

[Estimates of expenses in establishing a cacao farm in the Visayas, Philippines, and profits after the fifth year.]

The size selected is 16 hectares, the amount of land prescribed by Congress of a single public land entry. The cost of producing such a tract of land is as yet undetermined and cannot be reckoned in the following tables. The prices of the crop are estimated at 48 cents per kilo, which is the current price for the best grades of cacao in the world's markets. The yield per tree is given as 2 cattles, or 1.25 kilos, a fair and conservative estimate for a good tree, with little or no cultivation. The prices

for unskilled labor are 25 per cent in advance of the farm hand in the Visayan islands. No provision is made for management or supervision, as the owner will, it is assumed, act as manager.

Charges to capital account are given for the second, third and fourth year, but no current expenses are given, for other crops are to defray operating expenses until the cacao trees begin to bear. No estimate of residence is given. All accounts are in United States currency.

EXPENDABLE THE FIRST YEAR.

Capital account :—

Clearing of <i>average</i> brush and timber land at \$15 per hectare	... \$340.00
Four carabaos, plows, harrows, cultivators, carts, etc.	.. 550.00
Breaking and preparing land, at \$5 per hectare	... 80.00
Opening main drainage canals, at \$6 per hectare	... 96.00
Tool house and storeroom	... 200.00
Purchase and planting 10,000 abaca stools, at 2 cents each	... 200.00
Seed purchase, rearing and planting 12,000 cacao, at 3 cents each	... 360.00
Contingent and incidental	... 174.00

Total	... 2,000.00

SECOND YEAR.

Interest on investment	... 200.00
Depreciation on tools, buildings and animals (20 per cent of cost)	... 150.00

	350.00

THIRD YEAR.

Interest on investment	... 200.00
Depreciation as above	... 150.00

	350.00

FOURTH YEAR.

Interest on investment	... 200.00
Depreciation as above	... 150.00
Building of drying house and sweat boxes, capacity 20,000 kilos	... 450.00

	800.00

Total capital investment ... 3,500.00

FIFTH YEAR.

Income account :—

From 11,680 cacao trees, 300 grams cacao each, equals 3,500 kilos, at 48 cents...	1,680.00
Expense account :—	
Fixed interest and depreciation charges on investment of \$3,500	... 350.00
Taxes $1\frac{1}{2}$ per cent on a one-third valuation basis of \$250 per hectare	... 60.00
Cultivating, pruning, etc., at \$5.50 per hectare	... 88.00
Fertilising, at \$8 per hectare	... 96.00
Harvesting, curing, packing 3,500 kilos cacao, at 10 cents per kilo	... 350.00
Contingent	... 86.00

	1,030.00
Credit balance	... 650.00

SIXTH YEAR.

Income account :—

From 11,680 cacao trees, at 500 grams cacao each, equals 5,840 kilos, at 48 cents	... 2,803.20
Expense account :—	
Fixed interest and depreciation charges as above	... 350.00
Taxes as above	... 60.00
Cultivating, etc. as above	... 88.00
Fertilising, at \$8 per hectare	... 128.00
Harvesting, etc., 5,840 kilos cacao, at 10 cents per kilo	... 584.00
Contingent	... 93.20

	1,303.20
Credit balance	... 1,500.00

SEVENTH YEAR.

Income account :—

From 11,680 cacao trees, at 750 grams cacao each, equals 8,760 kilos, at 48 cents	... 4,204.80
Expense account :—	
Fixed interest charges as above	... 350.00
Taxes as above	... 60.00
Cultivating, etc., as above	... 88.00
Fertilising, at \$10 per hectare	... 160.00
Harvest, etc., of 8,760 kilos of cacao, at 10 cents per kilo	... 876.00
Contingent	... 170.80

	1,704.80
Credit balance	... 2,500.00

EIGHTH YEAR.

Income account :—

From 11,680 cacao trees, at 1 kilo cacao each, equals 11,680 kilos, at 48 cents...	5,606.40
Expense account :—	
Fixed interest charges as above	... 350.00
Taxes as above	... 60.00
Cultivating, etc., as above	... 88.00
Fertilising, at \$15 per hectare	... 200.00
Harvest, etc., 11,680 kilos of cacao, at 10 cents per kilo	... 1,168.00
Contingent	... 240.40

	2,106.40
Credit balance	... 3,500.00

NINTH YEAR.

Income account :—

From 11,680 trees, at 2 'catties' or 1.25 kilos cacao each, equals 14,600 kilos at 48 cents	... 7,008.00
Expense account :—	
Fixed interest charges as above	... 350.00
Taxes at $1\frac{1}{2}$ per cent on one-third valuation of \$500 per hectare	... 120.00
Cultivating, etc., as above	... 88.00
Fertilising, at \$15 per hectare	... 240.00
Harvesting, etc., of 14,600 kilos of cacao at 10 cents per kilo	... 1,460.00
Contingent	... 250.00

	2,508.00
Credit balance	... 4,500.00

In the tenth year there should be no increase in taxes or fertilisers, and a slight increase in yield, sufficient to bring the net profits of the estate to the approximate amount of \$5,000. This would amount to a dividend of rather more than \$312 per hectare, or its equivalent of about \$126 per acre.

These tables further show original capitalisation cost of nearly \$90 per acre, and from the ninth year annual operating expenses of rather more than \$60 per acre.

It should be stated, however, that the operating expenses are based upon a systematic and scientific management of the estate; while the returns or income are based upon revenue from trees that are at the disadvantage of being without culture of any kind, and, while I am of the opinion that the original cost per acre of the plantation, nor its current operating expenses may be much reduced below the figures given, I feel that there is a reasonable certainty that the crop product may be materially increased beyond the limit of two 'catties.'

In Camerouns, Dr. Preuss, a close and well-trained observer, gives the mean annual yield of trees of full-bearing age at 4.4 pounds.

Mr. Rousselot places the yield on the French Congo at the same figure. In the Caroline Islands it reaches 5 pounds and in Surinam, according to M. Nichols, the average at maturity is 6½ pounds. In Mindanao, I have been told, but do not vouch for the report, of more than ten 'catties' taken in one year from a single tree; and, as there are well-authenticated instances of record, of single trees having yielded as much as 30 pounds, I am not prepared to altogether discredit the Mindanao story.

The difference, however, between good returns and enormous profits arising from cacao growing in the Philippines will be determined by the amount of knowledge, experience, and energy that the planter is capable of bringing to bear upon the culture in question.—*Philippine Bureau of Agriculture, Farmers' Bulletin, No. 2, 1902.*

"SWEET POTATO" SUGAR IN FORMOSA.

[WHY NOT IN N. AND E. CEYLON?]

The Island of Formosa will soon become, under the wise economic administration of Baron Kodama and Dr Goto, one of the great sugar producing regions of the world. Sugar is made there from the sweet potato. There is an almost unlimited market throughout the Eastern world for sugar, and the Japanese administration in Formosa is wisely availing itself of the splendid opportunity for developing and supplying this market. It is estimated that at least one-half of the island is adapted to the growing of the sweet potato for sugar manufacture. The climate is moist and favourable, and the soil is as fertile as that of the Hawaiian Islands or of Java. The range of temperature is from 75 to 100 degrees Fahrenheit. The sugar section extends from the middle to the southern end of the island, and in this section rain occurs every day from May until the latter part of September, which is the growing season, and then there is no rainfall whatever until the following May, affording a perfect season for harvesting. The first sugar company was established about two years ago. In 1901 the product of sweet potato sugar was 20,000 bales, and last year it was estimated that it would reach 60,000 bales. The profits of the industry are encouraging, as one acre of land will produce 40,000 pounds of potatoes—worth about 80 yen, or \$40 (gold)—and manufacturing expenses is only 75 cents for 1,000 pounds of sugar. Wages are low, a labourer receiving only about 12 to 16 cents a day. In such circumstances there is no reason for astonishment at the rapid development of the industry.—*Straits Times, Jan. 24.*

THE ACTION OF BASIC SLAG ON POOR PASTURES.

It will only be after many years of continuous research that we shall know fully the real action of this cheap and comparatively new source of phosphate (Basic Slag) and the actual limitations to its use. At present we know that on many poor pastures its application has an almost immediate beneficial effect, and that in such cases its influence is very lasting. The Bath and West of England experiments would almost lead us to regard the application of this manure as a permanent improvement to such pastures as benefit from it at all. The six years' experiments at Gockle Park indicate limits which are more in accordance with what we know to be sound and practical agricultural maxims. According to these North Country results, basic slag only indirectly benefit the grasses in a pasture. The slag is found to improve the white clover; the flourishing clover improves the soil by increasing the supplies of nitrogen; while, as a result, the better grasses are strengthened and the worthless bent is displaced. Basic slag, in point of fact, seems to be of benefit only so long as it maintains or increases the white clover; and during the whole of this time both the soil and the better grasses are being indirectly improved. But when the white clover ceases to be the predominant crop—usually from three to four years after the first application of slag—the use of this manure in any quantity should cease, and its use followed up by the application of a mixed manure. Farmyard manure can then be applied with good effect. If artificials are preferred; these experiments show that the best results are obtained by their application in two dressings. In November, 1½ cwt of slag and ½ cwt of bone meal, should be used. This should be followed in February or March by a dressing consisting of 1 cwt. of superphosphate, ¾ cwt of fish meal, and 1½ cwt of kainit. These two dressings will cost about 15s and is enough to apply to one or two acres over such portions as need it—i.e., where the white clover is giving place to a more mixed herbage. Such dressings as these, especially if followed by cake feeding, will greatly assist the better grasses of the pasture, and complete the work of improvement commenced by the basic slag.—LAND AGENTS' RECORD.

COCONUTS: COSTA RICA'S POSSIBILITIES.

Every fool with his scheme, and we with ours. It been brought forcibly home to us that as very little is known as to utilising many of the riches in which our fertile soil abounds, and for the present we bring to the front Coconuts, which—if we were poets—we would compare to weeping willows who are mourning their misfortunes and abandonment. By order of the Governor of Limon a recount has been made of the coconut trees existing in the Comarea, and although not effected with any minuteness, it has been shown that there exist between 40,000 and 50,000 trees of this class. Each one of these produces a minimum of 50 nuts yearly, so that without exaggeration of any kind it can be assumed that two million coconuts represents the annual production. Each 40 coconuts produce on an average one gallon of oil, and therefore the two million nuts would produce 50,000 gallons of oil yearly which is less than half the quantity of grease imported into this country for soap alone as will be seen from the figures: In 1901, 373,352 kilogrammes of grease for soap were imported with an invoice value of \$18,431.19. The 50,000 gallons of oil that we have calculated as the product of the Limon coconuts would scarcely give 3703 quintals, or, say 170,338

kilogrammes, which are not, as we before said, even half of the 373,352 kilogrammes of fat imported, among which, we do not include 28,055 kilogrammes of machine oil that are also imported, which we could manufacture here—taking for the raw material the coconut or wild fig, for the oils of both plants are very good lubricants and only need a little mixing with petroleum for thinning it. In the calculations that we have made, we have taken into account only the Comarca of Limon, without considering the other extensive territories of the republic in which coconuts can be extensively produced. What is being done, today with all these products? Only a few hundred coconuts are exported that scarcely pay the cost of picking and transportation. What can be done? Much—by arousing the existing apathy before necessity, which is the supreme law, compels us by a more painful process. We know that there exists in this country the necessary machinery for the manufacture of coconut oil, machinery that cannot be utilised because the owner lacks capital for exploiting the business. Perhaps someone may be found with aptitude, having capital and lacking the material elements. Is it so difficult to realise this result? We think not; and in whatever form it is effected it may be the base for a productive and regenerative industry, a germ of the future commercial emancipation of Costa Rica. —*Limon Weekly News*, Dec. 1902.

MARKET VALUE OF VANILLA.

Messrs Brookes & Green, the well-known firm of Brokers in London, writes:—

Concerning Vanilla market and artificial substitutes, we beg to inform you that owing to a very large crop of vanillas from Seychelles, the price dropped very considerably from September 1901 to March 1902.

At the time of writing this letter prices are rising, and we think will keep firm through the summer. You may contradict authoritatively, that either 'Vanillin' or any other artificial competitor was the cause of the decline.

Referring to our letter of July 21st 1902, giving values of the sample vanillas you sent over, these valuations we repeat today, viz: from 3s to 7s-per lb, the mention of 6d per lb as a rumour, is altogether wrong.—*Barbados Agricultural News* Jan. 3.

JAVA PRODUCTS IN 1902.

At the opening of the first meeting of the Commercial Chamber of Amsterdam in the New Year, the President delivered the customary review of the trade in the preceding year. In general the results were not brilliant, the course of prices being mostly downward. Java coffee, which opened at c.33, declined to c.34 for good ordinary and Santos from c.23½ to c.18½. Java tea followed a downward tendency until July, and then improved for the greater part. The Amsterdam market maintained its excellent position, and in the last ten years arrivals and deliveries are about 150 per cent. more. As regards Cinchona bark, the large supplies caused a fall in value from c.7½ to c.6 per unit. The imports of rice were respectively c.10 and c.25 per cent, more compared with 1901 and 1900, but prices were maintained. The prices of Java tobacco were on the average c.5 per half kilo. lower, which means a loss of fl.2,500,000 on the crop.—*London and China Express* Jan. 16,

"DEANE-JUDGE" SAMPLES OF GREEN TEA.

We received a few days ago (and regret we did not notice them sooner) a few samples of green tea, from Mr. Drummond Deane, handed to us by Mr. Grieve of Messrs. Brown & Co. These samples, we may mention, have been seen by several testers in Colombo and were said to be very good and very like in appearance to China teas. The teas are an original ordinary green tea sample and a polished sample made in the New Polisher called the Deane-Judge Polishing Machine. They are, at present, at our office and can be seen by any callers interested.

CACAO CULTIVATION IN THE PHILIPPINES.

There can be no doubt of the rapid development of the Philippine islands under good Government, so soon as the Americans establish "the Roman peace." A "Philippine Bureau of Agriculture" has already been established and we have just received its "No. 2 Bulletin," which deals with "Cacao Culture in the Philippines," by Wm. S. Lyon in charge of Seed and Plant Introduction." Mr. Lyon mentions that cultivated cacao already exists in nearly every province of the Archipelago; but without much commercial success so far, while manuring is quite unknown. Very practical advice is given to intending planters, and an accomplished Entomologist is already at work as to insect enemies; while the following paragraphs are of interest in themselves, and a showing of the good sense of the compiler:—

The Philippine Islands appear to be so far singularly exempt from the very many cryptogamic or fungous diseases, blights, mildews, rusts, and cankers that have played havoc with cacao-growing in many countries. That we should enjoy continued immunity will depend greatly upon securing seeds or young plants only from non-infected districts or from reputable dealers, who will carefully disinfect any shipments, and supplement this by a close microscopical examination upon arrival and the immediate burning of any suspected shipments.

Another general precaution that will be taken by every planter who aims to maintain the best condition in his orchard is the gathering and burning of all prunings or trimmings from the orchard, whether they are diseased or not. Decaying wood of any kind is a field for special activity for insect life and fungous growth, and the sooner it is destroyed the better. On this account it is customary in some countries to remove the fruit pods from the field. But unless diseased, or unless they are to be returned after the harvest, they should be buried upon the land for their manurial value.

The climate of the Philippines, where cacao can be grown, is specially praised, and the following contrast offered:—

Malarial fevers are relatively few, predacious animals unknown, and insects and reptiles prejudicial to human life or health extraordinarily few in number. In contrast with this we need only call attention to the entire Caribbean coast of South America, where the climate and soil conditions are such that the cacao comes to a superlative degree

of perfection, and yet the limits of its further extension have probably been reached by the insuperable barrier of a climate so insalubrious that the Caucasian's life is one endless conflict with disease and when not engaged in active combat with some form of malarial poisoning his energies are concentrated upon battle with the various insect or animal pests that make life a burden in such regions.

Finally we have estimates given, which will be closely scrutinised by Ceylon planters, who can readily compare the figures with their experience by remembering that the American dollar is equal to about three of our rupees in value—the hectare being 2½ acres, the "cacao farm" estimated for, is one of 40 acres. The outlay, therefore, to the end of the 4th year is R262 per acre, but the cost of land is not counted and other expenses are expected to be defrayed by "catch crops." We make no further comments, save that so early as the fifth year, an "income," or rather gross return from the cacao crop of over R5,000 (or R125 per acre) is expected, which rises by the 9th year to R21,000 or over R500 per acre, resulting in a net profit of R337 per acre. Very rich must be the soil and flourishing the cacao trees that can give such results.

INDIA-RUBBER.

THE CHEMISTRY OF INDIA-RUBBER.—By Carl Otto Weber, Ph.D. Pp. x + 314. (London: Chas. Griffin and Co., Ltd.). Price 16s net. In the volume before us, the author has applied himself specifically to the chemistry of India-rubber, and incidentally to that of its various substitutes. It may be said at once that the result is an eminently useful contribution to the literature of India-rubber and its congeners. The book contains nine chapters and an appendix. In the first chapter, which forms more than a third of the work and gives its title to the whole, Dr. Weber deals with the constituents of India-rubber, discusses their physical and chemical properties, and propounds in outline a theory of vulcanisation. The carbohydrates present in crude "unwashed" rubber are first referred to, and then follows a useful little table showing the proportions of resinous extract obtained from the various commercial brands of technically-pure rubber by treatment with acetone. It may be explained that the importance of these "resins" lies in the fact that they allow the chemist to discriminate between a high-quality rubber, such as Pará, and an inferior product like some of the African kinds. Passing on to india-rubber proper, the author summarises the evidence which goes to prove that the pure rubber substance is a hydrocarbon of the terpene type. Oxygen, it is true, is always present in commercial specimens, but it is partly accounted for by atmospheric oxidation and partly by the presence of an "insoluble" compound having the empirical formula of a hydrated terpene. This last, the author suggests, may be an intermediate product between india-rubber itself and the carbohydrates from which, perhaps, the various terpenes are manufactured in the cells of the rubber plant. Organic chemists have apparently found the chemistry of india-rubber somewhat unattractive.

No doubt this is largely due to the intractable nature of the compound; for india-rubber, from this point of view, certainly possesses the defects of its qualities. It has few points of attack; there are none of the carbonyl-, carboxyl-, amido-, imido-, hydroxy- or methoxy-groups in which the organic manipulator delights; it cannot be readily dissolved; and *a fortiori*, being a colloid, it cannot be crystallised. Nevertheless, it has one vulnerable spot, and the Achilles' heel in this case is found in the existence of the 'ethylene bonds' pointed out by Gladstone and Hibbert. Much stress is laid upon the colloidal properties of rubber as being the clue to a proper understanding of its behaviour during manufacture—a disquisition on the colloidal state, leading up, however, to an interesting study of the phenomena of vulcanisation. In the author's view the vulcanisation of india rubber by means of sulphur consists essentially in the direct addition of sulphur to the india-rubber hydrocarbon (poly-prene), with the formation of various polyprene sulphides. Combating the theory that the action of the sulphur is one of substitution instead of addition, the author rightly points out that if the former were the case the vulcanisation of a ton of rubber would mean the production of about 18,000 litres of hydrogen sulphide—a daily amount which would make the vulcanising rooms fairly reek with the gas. In reality, only insignificant traces are found there. The cold process of vulcanising by means of sulphur chloride is also discussed in detail. In the succeeding chapter the technical examination and valuation of india-rubber and gutta-percha are dealt with. But in this industry, as in so many others, our manufacturers cling hard to rule-of-thumb methods; stocks are bought on the strength of a cursory empirical examination; and we read that, in consequence, different lots, supposed to be of identical quality, "often show the most absurd variations" when properly appraised by analysis. The following quotation speaks for itself:—

"Pig iron, caustic soda, wood pulp, and scores of similar articles, costing comparatively speaking, a few shillings per ton, are brought and sold on the basis of strict analytical standards; but india-rubber, costing from £150 to £500 per ton, changes hands without either buyer or seller having more than a vague knowledge of its intrinsic value."

A full description is given of the various india-rubber substitutes now so frequently used, and which consist either of recovered rubber from cast-off articles or of the products obtained by the action of oxygen, sulphur or sulphur chloride upon such substances as linseed or colza oils. Inorganic compounding materials, vulcanising agents, solvents, colouring matters and textile fabrics each claim a chapter. Analysts and technical chemists who are called upon to examine india-rubber will be grateful for the chapter on the analysis of rubber articles, with which the volume proper closes. Chemists should note that nitro-naphthalene is recommended as a "solvent" for india-rubber in preference to the nitro-benzene hitherto generally employed. The author is to be congratulated upon a very useful contribution to a somewhat obscure and difficult branch of technical science.

C. SIMMONDS.

—*Nature*, Feb. 5.

ZANZIBAR NEWS.

MR. D. G. FAIRCHILD, RECENTLY IN CEYLON
 Mr. David G Fairchild, of the United States Department of Agriculture, passed through here on January 21st. He was on his way South in the "Herzog." He had been to Dar-es-Salaam to inspect the Botanical station there and had thus only a few hours to devote to Zanzibar. Mr. Fairchild is well known in Planting circles in Ceylon, Singapore and the East and West Indies. He is especially interested in fruit and one of the principal objects of his mission is to discover the best fruits that are grown and to collect seeds and plants of them for his Government. He visited the fruit market here and took away with him samples of our oranges, mangoes and bananas. He has promised to send us a brief report upon their quality. Mr. Fairchild was much interested in all that he saw in Zanzibar and was especially struck with the signs of life and vitality that are to be witnessed here in our busy centres.

SIR JOHN KIRK, OF RUBBER FAME.

Sir John Kirk, G.C.M.G., K.C.B., F.R.S. arrived here on January 27th by the "Yangtse" and proceeded to Mombassa by the "Juba" the next day. He goes up the line and returns here it is hoped by about the 20th February to allow him a few days in Zanzibar before proceeding home by the February French mail. Sir John Kirk was British Agent and Consul-General here, but retired in 1887, in 1858 he joined Livingstone's first great Zambesi expedition as chief officer. It was in this Expedition that Lake Nyasa was rediscovered and laid down, the lower Zambesi, the Shire and Rovunia explored. In 1895 Sir John was appointed a member of the Government Committee for the construction of the Uganda Railway and he is now on his way to inspect the line. It is, however, as a naturalist and especially a botanist that Sir John Kirk is perhaps best known. His contributions to the Flora of Tropical Africa have been considerable. The greater part of what is known of the Flora of Zanzibar is due to the investigations of Sir John Kirk. He practically created the Rubber trade of the East Coast of Africa and the best-yielding species, *Landolphia Kirkii*, is called after him.—*Zanzibar Gazette*, Feb. 4.

TEA IN 1902-3.

AN INDIAN END-OF SEASON VIEW

The 1902-03 season is now drawing to a close and it is time to form an estimate of what has been done in the way of lightening the burdens of the tea producer in the immediate past. In the first place the results of the present season have been disappointing so far as we have gone, and there is not time enough left of the London selling season for last year's crop, to materially alter the aspect of affairs. The general average of all tea sold in London on garden amount for the eight months of the season that have elapsed is lower by nearly a half-penny than the average for the corresponding period of the 1901-02 season, and even below the average for the eight months of the 1900-01 season to end of January. We have during 1902-03 averaged a little over 7½d against nearly 8d in 1901-02 and 7½d in 1900-01. At the end of two years of short crop this result would be disheartening were it not a mere indication that our efforts have not been commensurate with the magnitude of the evil. Our demand needs to be put on a much broader basis, if we desire to make it

firm and constant. There is yet time in the four months of the London selling year remaining, for the averages to advance comparatively, but it is clear that they have fallen too far behind to more than catch up with 1900-01, an admittedly disastrous year for prices generally. Those who pin their faith to the natural flow of trade would do well to note that though advance has been made in the last two years, it has not been sufficient to enable us to contemplate with equanimity the recurrence of another crop of the magnitude of 1900.

On the other hand, having come through so much the future certainly looks brighter, perhaps by contrast. London, fairly indifferent for three years, has woken up to the growing scarcity of tea, and it looks as if the boom in common teas which prevailed in the early days of 1899 were to be repeated. Having in memory the time of depression that was ushered in by that abnormal rise in rates for teas for price, we cannot think the whole battle won by the attainment of inflated prices for this class, even if they should come topas in the immediate future. We cannot forget that these prices for a particular class of tea were explained at the time as subversory of all true values in other grades and not to the general interest of the industry as a whole. It is to be hoped that when the short excitement of a "boom" is past, we may be able to prevent the reaction and settle all teas on a firmer and truer basis of prices than before.

For the rest 1902 has been replete with good work. The Russian buyers have been attracted to the merits of the Indian article and an important trade has come, we believe, to stay. There has been a general quickening of demand for many minor centres, in the aggregate compensating for the Australian trade which in some unaccountable manner we continue to lose. In America, British grown tea has at last a chance of making further inroads upon the Far Eastern article, our previous expansion having checked upon reaching the limit of the black tea consumption of the Transatlantic countries, British and Yankee. During the year suit-advances in machinery for making the "true" green article, as approved by the Americans, have taken place, and though Ceylon and India by the application of the patent laws appear likely to be served with different machinery for the purpose, it seems that both countries are equally advanced, and time alone can show if either possesses an advantage over the other. Further ingenuity will no doubt be called out to overcome details in the process and place us mechanically equal with the hand labour of China and Japan. Even now we are able to undersell those countries with ease, and in these days of cheapness the result should be a foregone conclusion. In two important markets, therefore, Russia and America, our advance seems certain, and if the crop does not unduly rush forward this circumstance should render prospects for 1903-04 much brighter than any presented to our view for years past but only if the situation is treated with continued prudence.—*Indian Planting and Gardening*, Feb. 23.

COFFEE IN QUEENSLAND.—In a letter from Queensland dated February 2nd, the continued drought in that colony is spoken of as very serious. "We have only had one half crop now in four years," says the writer, "and last year was a total failure. This year promises to follow suit."

MOSQUITO BLIGHT ON TEA RUSHES.
REMARKS BY MR. C. R. NEWTON, OF
"TEA ENZYME" FAME.

(To the Editor of the "Englishman.")

Sir,—Neither of your correspondents, Mr Harold Mann or R P Mongpoo seems to have noticed one constant habitat of "Helopeltis theivora" or the tea mosquito, viz., the cardamom fields. In the greater part of the Darjiling District it is known by the natives as the alinchee kera or eardamom insect, and is found throughout the year on the young cardamom shoots. I have delayed this communication in order that the result of previous observations might be confirmed and from Christmas to the end of January this year, when nearly all trace of it had disappeared from the tea except in a few unpruned portions which were flushing slightly, I have always with the aid of some sharp native children who had been employed throughout the year in capturing the insect on the tea, been able to obtain a number from the cardamoms, as also from other sheltered places where there was succulent jungle. In fact in my opinion it is rather an omnivorous feeder than a special tea one as described by Mr Mann. In artificial experiments the tea insect when fed on cardamoms acquires a lighter colour resembling those bred on the cardamoms. In fact, the insect seems to vary in colour within certain limits according to what plant it has been feeding upon. From observations during a number of years made by several planters, it always appears first on their tea in the neighbourhood of cardamoms or of special pieces of sheltered jungle and then spreads very rapidly. The crushed insects caught in the tea have also generally a decided smell resembling cardamoms. The reason I imagine that Helopeltis has not often been noticed on other jungle is that that the planter invariably looks for the black spots so typical on the tea, but not so on other plants. The blackness is due to the tanning. The shape of the marks depends on the shape of the plant cell in cardamoms where the cell is oblong, and the cell walls are longitudinal straight lines, rather hard. Several punctures generally occur together, often involving three or more cells; hence the mark, instead of being round as on the tea, may be oblong a quarter of an inch long by one thirty-second broad. Mr Stebbing, the Forest Entomologist, has I see recently recommended the burning of all jungle in the neighbourhood of cultivated crops, as a protection against blights. This I have advocated for years. There is no doubt that the blights have increased and the health of the inhabitants decreased in many districts since the Forest Department took steps to prevent the annual fires which used to take place every cold weather, consuming a lot of noxious jungle, that is now allowed to rot on the ground and harbour any amount of insect pests and fungus blights.

C R NEWTON, F R M S.

—Englishman, Feb. 26.

TEA IN UGANDA.

In a report on Exotic Plants of Economic Interest in the Botanic Gardens at Entebbe, Uganda, Mr J Mahon states that tea grows with but moderate rapidity. The rainfall is not great enough. During a period of rains it flushes nicely, but its cultivation on even a moderate scale

would necessitate resort to irrigation. Mr Scott Elliot, the naturalist and traveller, seemed satisfied from his exploration in the Ruwenzori country that large areas there offered a fine field for the cultivating tea on a large scale.—*Planting Opinion*, Feb. 28.

PLANTING NOTES.

ELDORADO FOR YOUNG MEN WITH MODERATE CAPITAL—is the attractive opening of an advertisement in an Indian paper referring to Alabama and it runs on as follows:—"Productive fruit land for sale in the beautiful and fertile State of Southern Alabama, U.S.A. Also good grazing land in the heart of the cattle belt. A few thousand acres going cheap in the rapidly enlarging colony of Beaver Meadows, the Chislehurst of the Southern States, situated 400ft. above gulf level, and six miles from the famous health resort of Citronelle. Lovely climate. Pure water good hunting and finishing, one mile from station, 25 from the City of Mobile."—We should think South Africa or Australasia would have the preference with Britishers.

"THE BOTANICAL MAGAZINE" for February contains coloured figures and descriptions of the following plant:—*Sansevieria grandis*, J D Hooker, tab. 7877.—A supposed native of tropical Africa, but introduced into Cuba in the hope that the fibre it contains, which is of extraordinary strength, might be turned to commercial account. The plant is growing in the temperate-house at Kew, and has a tuft of broad, obovate, oblong, acute leaves three to four feet long, six inches wide, pale green, with transverse stripes of a deeper colour, and a central stalked raceme some three feet high of numerous regular, erect, funnel-shaped, greenish flowers, each about two inches long, the linear perianth-segments as long or longer than the narrow tube. As an ornamental plant, it has high claims on the attention of gardeners, and its cultivation would seem to present no difficulty.—*Gardeners' Chronicle*, Feb. 7. [Can this be very much the same as our *Sansevieria Zeylanica* which also gives a good fibre?—ED. C.O.]

ARAMINA FIBRE.—In the Rio de Janeiro district of Brazil experiments have given proof of the excellent qualities of aramina fibre. Steps were taken to manufacture certain goods from it, and in June last year an exhibition of these goods, which consisted of rope and other woven products, took place in the city of S. Paulo. A factory is in course of construction in S. Paulo exclusively for the manufacture of goods from aramina fibre. The weaving machinery has already been erected, and other materials, which are being imported from the United Kingdom, are expected to arrive shortly, and the factory will then be in a position to begin work. The aramina plant is being extensively cultivated at two estates in S. Paulo. It is expected that the annual production of these two estates, which extend over about 325 acres of land, will yield from ten to twelve tons of dry husk, or four and a half to five tons of fibre for every six acres cultivated. The growth of the plant is rapid and it needs no special care. The price paid by the S. Paulo factory for clean aramina is about 1d. per lb.—*British Trade Journal*, Feb. 1. [What is the scientific name of the Aramina plant?—ED. T.A.]

TO THE PLANTING WORLD.

Seeds & Plants of Commercial Products.

Hevea Brasiliensis.—Orders being booked for the coming crop August-September delivery 1903, booking necessary before the end of April, quantities of 100,000 and over at special low rates. Plants available all the year round, 100,000 and over at special low rates. A leading Rubber planter in Sumatra, who purchased 50,000 seeds in 1899, and 100,000 in 1900, writes us, under date 15th November, 1900:—"I received your letter of 20th October, from which I learn that you added another case of 5,000 seeds to replace the loss, &c. I am satisfied hereby, and even after this adding I am satisfied by the whole delivery of this year." Special offer, post free on application.

Castilloa Elastica.—True superior variety cultivated in Mexico, seeds from specially reserved old untapped trees. Orders booked for October-November delivery 1903, immediate booking necessary; large quantities on special terms; Plants in Wardian cases.

A foreign firm of Planters writes under date 11th October, 1901:—"We beg to enquire whether you would procure us 100,000 Castilloa seeds, in which month we might expect them, and what would be the average price." Special offer, post free on application.

Manihot Glaziovii.—Seeds and Plants available all the year round, 100,000 and over at special low rates. A Mexican planter in sending an order for this seed wrote on the 22nd August, 1900:—"If they arrive fresh and germinate easily I may send you larger orders, as they are for high ground where the Castilloa does not thrive."

Ficus Elastica.—Seeds available in May-June; booking necessary before the end of March; also plants.

Mimosa Giobosa (Balata) wood of the tree is much sought for buildings, fruits sweet like a plum and eaten, oil from seeds, said to yield as much as 45 lbs. of dry rubber per tree per annum, the milk is drunk and when diluted with water used as cow's milk, grow from-sea-level up to 2,000 feet, orders being booked for seeds and plants, price on application.

Cinnamomum Zeylanicum (Cinnamon superior variety).—New crop of seed in April to June; booking necessary before the end of February, also plants.

Coffea Arabica-Liberian Hybrid.—A highly recommended leaf-disease resisting hardy new variety of Coffee (cross between Arabian and Liberian). New crop March-April; immediate booking necessary.

A foreign Agricultural Department writes dating 9th September, 1901:—"Please accept our order for 175 lbs. of Tea seed and for 2,000 Coffee beans. In regard to Coffee seed I would say that this will be the first importation made by this department, and we will leave the selection of the varieties to be sent to your judgment."

OUR DESCRIPTIVE PRICE LISTS.

The following six Descriptive Price Lists are now being forwarded with Circulars and special offer of Seeds and Plants of Rubber and other Economic Products:—

1. Tropical Seeds and Plants of Commercial Products, enlarged edition for 1902-1903.
2. Seeds and Plants of Shade, Timber, Wind-Belts, Fuel and Ornamental Trees, Trees for Road-sides, Parks, Open Spaces, Pasture Lands, Avenues, Hedges, and for planting among crops (Tea, Coffee, Cacao, Cardamoms, &c.)
3. Seeds and Plants of Tropical Fruit Trees including Mango grafts.
4. Bulbs, Tubers and Yams.
5. Orchids—Ceylon and Indian.
6. Seeds and Plants of Palms, Calamus, Pandanus, Cyeads, Tree and other Ferns, Crotous, Roses, Draeinas, Shrubs and Creepers.

Special Arrangements made with foreign Governments, Botanical and Agricultural Departments, Planters and others for supplying seeds and plants of Commercial Products in larger quantities.

"South Africa."—The great authority on South African affairs of 25th March, 1899, says:—"An interesting Catalogue reaches us from the East. It is issued by WILLIAM BROTHERS, Tropical Seed Merchants of Heuaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great Powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbing. We recommend the great Powers and Concessionaries under them to go to William Brothers."

Agents in London:—MESSRS. P. W. WOOLLEY & Co., 90, Lower Thames Street.

Agent in Colombo, Ceylon:—E. B. CREASY, Esq.

Agent in British Central Africa:—T. H. LLOYD, Esq., Blantyre.

Telegraphic Address:

J. P. WILLIAM & BROTHERS,

WILLIAM, HENARATGODA, CEYLON.

Tropical Seed Merchants,

Liber's, A.I. and A.B.C. Codes used.

HENARATGODA, CEYLON

Correspondence.

To the Editor.

THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

Liverpool, Jan. 1903.

DEA SIRs,—In compliance with a suggestion made at a Conference with His Excellency the Governor of Lagos, Sir William MacGregor, K.C.M.G., C.B., M.D., held in Liverpool on November 17th, 1902, under the auspices of the Liverpool Chamber of Commerce, and in accordance with the advice given by His Excellency on that occasion, the Liverpool School of Tropical Medicine have drawn up a set of simple instructions for the preservation of health for the use of agents of firms trading in the Tropics. I am requested to send you copies of the instructions in question. The Chairman of the School (Sir Alfred Jones, K.C.M.G.), and the Committee, are convinced that the adoption of the recommendations contained in the instructions would tend greatly to improve the health of Europeans living in the tropics. They trust, therefore, that the Principals of firms at home, having houses in the Tropics, will act on the advice of Sir William MacGregor, and will send copies of the enclosed instructions to their agents or responsible clerks in the Tropics, with strict injunctions that the recommendations are to be carried out.—Yours faithfully,

A. H. MILNE, Hon. Secretary,

P.S.—Additional copies of the instructions can be obtained.

CONCERNING SNAKES.

Padukka, Jan. 15.

SIR,—In answer to Virus *re* "Snake against Snake," my belief is that snakes devour each other for its food. The undermentioned incidents are the datas from which I draw my conclusion.

One day whilst fishing at a pond, I saw a large rat-snake glide into the waters and in a short time it re-appeared with a large water cobra and, dragging its victim ashore, swallowed it up and again went in search of prey, coming to the surface again with a similar one. This time the poor thing clung to the grass and I, through compassion, aimed a blow at the rat-snake with my fishing rod, which made it hook off abandoning its prey and again I have myself killed a cobra and as it seemed to have gobbled up something unusual, I got my cooly to rip it up. When lo! to my astonishment I found that it had swallowed up a rat-snake. On measuring the snake I found the former 5 ft. long and the latter 4 ft. long. *Re* venom of one snake being fatal to another, I have no experience.—Yours truly,

B. S. R.

FEEDING MILCH COWS AND BUTTER-MAKING.

London, Feb. 13.

DEAR SIR,—I should like to tell "A Planter's Wife" that she has not quite appreciated the process for producing butter by the absorption of the moisture contained in the cream. The whole action is to take

away this moisture as rapidly as possible, and a new paper is to be introduced of a considerable thickness, with an absorption much higher than that of the best blotting paper, so that as the cream is poured out on to this paper it will be immediately dried. This process should be of great value for a much larger percentage of butter can be obtained from the cream, as there is no waste whatever of fatty matter. So that your readers may quite understand the theory, I would suggest their pouring—say, a tablespoonful of cream—on to three or four thicknesses of good blotting paper. The latter must be completely dry.

I would suggest to "A Planter's Wife" that she can increase the yield of cream from cows if it is possible to procure linseed at a reasonable rate in your country. - The plan to be adopted is to put the linseed into a large stewpan with plenty of water, and let it simmer very slowly throughout the day. In this country I mix bran or crushed oats, but I am not sure whether you have any such meal which could be used to take its place. There is nothing which will so improve the quality of the milk as this mixture.—Yours truly,

THOS. CHRISTY.

[We thank Mr. Christy on behalf of many planters' wives as well as other residents in Ceylon for his most useful hints. Cotton seed with poonac—coconut cake—is largely used for milch cows in Ceylon. Is linseed better, and has one used it out here? As regards butter-making, Mr. Christy must favour us with a few sheets of the new "patent" paper when it is ready.—ED. T.A.]

MANA GRASS FOR MANURE.

DEAR SIR,—Could you or any of your readers kindly give the chemical constituents or manurial value of Mana Grass as a green manure buried with

PRUNINGS.

[The following is the analysis of Ceylon Guinea Grass, grown near Kandy, made by Mr. Cochran, after it had been dried in the sun:—

Moisture, 9.06, Albuminous compounds, 8.10, Fat (either extract), 2.80, Sugar, 4.70, Mucilaginous compounds, digestible fibre, &c., 41.07, Vegetable fibre, 22.50, Ash, 11.77.—Total 100.00. Containing nitrogen, 1.295, ditto 4.55.—Total nitrogen 1.750.

As regards mineral matters guinea grass is very rich in potash and has also a considerable proportion of phosphoric acid.

—ED. T.A.]

"THE CURE FOR MOSQUITOES."

Tangalla, Feb. 23.

SIR,—I was much interested in the article "The cure for Mosquitoes" which appeared this month. These pests make life unbearable here and anything appearing regarding a cure is of great interest to me. I enclose under separate cover two varieties of *Ocimum* growing here. One is called Maduru Tala and is used by the natives here as a cure for mosquitoes. The pungent odour is not lasting; it only keeps away the mosquitoes for a few hours and

through a whole night. But there is no doubt that this plant does keep away mosquitoes to a certain extent. The mere fact of the plant growing in a bed room will not, I am afraid, keep away the insects. The leaves have to be bruised between the hands and placed under the bed and scattered about the room. The other variety is called Tala and is used by the villagers here for chewing when the betel leaf is not procurable.—Yours faithfully,

A. D.

GROWTH OF RUBBER IN MATALE DISTRICT.

Colombo, March 4.

DEAR SIR,—The following information re the growth of *Castilloa Rubber* on the Ambanganga Estate in the Matale District may be of interest and merit inclusion in your next issue of the *Tropical Agriculturist* :—

No.	Height.	Girth.	No.	Height.	Girth.
1	19'3	23	8	16'6	23
2	21'11	25	9	16'8	24
3	18'7	26½	10	12'9	24
4	23'	24	11	14'	23½
5	21'4	26	12	15'3	22
6	18'7	25	13	18'3	23
7	18'3	23½			

All the above are in a clearing planted in November-December, 1900, and so 2½ years old only. Can the Straits beat this? It is interesting to compare these measurements with those of the same clearing published by you some six months ago, where the average girth was 16 inches only and average height 12½ feet only.—Yours faithfully,

W. E. GILDEA.

THE TROPICAL AGRICULTURIST.

March 12.

DEAR SIR—What a convenience it is to have all the Directors' Reports of Ceylon Companies given in the *T. A.* They are so handy for reference that I, for one, much appreciate your monthly on this score alone. All the London and Ceylon Tea Sales is another easy bit of reference for our estates.—Truly yours,

TEA-BUSH.

THE FEDERAL MALAY STATES.

Resident General's office, Selangor, Malay Peninsula, 21st February 1903.

The Editor "*Ceylon Observer*" and "*Tropical Agriculturist*," Colombo.

SIR,—In reply to your letter of the 5th instant, I am directed by the Resident-General to furnish you with the following information :—

FEDERATED MALAY STATES.

Revenue. Expenditure.

Actual 1901 \$17,541,507'23 \$17,273,158'57.

„ 1902 Returns not yet completed.

Estimated 1903 \$18,377,421'00 \$18,561,463'00

(Inclusive of Expenditure on Capital Account \$3,638,868).—I have the honour to be, Sir, your obedient servant,

OLIVER MARKS.

Acting Secretary to Resident-General, Federated Malay States.

PLANTING NOTES.

BANANAS.—Messrs. Elders and Fyffes inform us that, in round figures, the consumption of Bananas during the past two years—*i.e.*, since Mr Chamberlain's effort to aid Jamaica—has risen from 1½ million to 3½ million bunches per annum, which speaks eloquently for the growing popularity of this fruit.—*Gardeners' Chronicle*, Feb. 14.

BLUE HYDRANGEAS.—It appears from a communication of M André to the *Revue Horticole*, that a certain soil near Augers, consisting of sand and humus, is made use of for the production of blue Hydrangeas with more or less success. The soil has been analysed and found to be chiefly silicious in its nature, but very rich in humus and organic matter including nitrogen and with a fair proportion of phosphoric acid and iron. Potash and lime are in very small proportions, so that it is recommended to grow the plants in soil destitute of lime.—*Gardeners' Chronicle*, Feb. 14.

AGAVE AMERICANA.—I was much interested with the supplementary illustration in the *Gardeners' Chronicle*, January 31, and the article on the Agave in Britain. I have observed some good specimens of the Agave in the Scilly Isles, but I was of the opinion they were much too tender for planting out near London. There are two fair specimens planted in a garden near Farnham Station, which up to the present look well, although 17' of frost have been experienced. I shall note their appearance later on, for if they survive I shall try them in different positions in the gardens here.—*W J P, gr. Frenshaw Farnham.*

TEA GROWING IN AMERICA.—Some parts of America are still under the delusion that theirs is a tea growing country. The professional tea taster who said that teas of Yankee origin were superior in bouquet and flavour to the finest Assams must have been fond of a joke! This is the latest from the *Galveston News* :—

Commissioner of Agriculture LeDuc, who introduced the ensilo and sorgo, or, as they prefer terming it, sorghum cane, once experimented with tea in South Carolina. The cash sunk in that enterprise would have floated a daily, but the tea materialised. We once tried to introduce the yerba tea of the chapparal into London; we were running a rural weekly in the Parish of St. Pancras at the time and the sanctum was a sort of Texas museum—jerked buffalo, chile, gum, cochineal, iftile, madder and cotton. We introduced it secretly among the samples of a professional tea taster, and awaited a verdict. He said afterwards that the bouquet and flavor was superior to the finest Assam teas, but its Yankee origin would condemn it. Its Yankee origin condemned it abroad and its Texas origin condemned it at home. It reminds us of the early reception of the American book and American wine. Someday we will all become more reasonable, if not patriotic, and instead of looking towards Battle Creek, Mich., for the correct thing in daily sustenance we will live like plain folk at home.

THE YATADERIA TEA COMPANY, LTD.—All concerned in this well regulated Company are to be heartily congratulated on the excellent results divulged at the last annual meeting. A 25 per cent dividend plus a 5 per cent bonus is certainly an exceptionally high return. The Directors too deserve credit for the very full and comprehensive report (on page 698) which through their agents and secretaries they submitted to the shareholders, and to which we direct the attention of our readers.

TOMATOES IN MEXICO.—More than 1,200,000 pounds of tomatoes were sold last year by the Bernal Orchard Company, Forlon, Tamaulipas, according to A E Graham, vice-president and general manager of the Company. The tomatoes were produced from a tract of 177 acres between the months of December and May. Mr Graham said that 220,000 pounds were shipped by express to the States, a large portion of them going to the New York market; 800,000 to the States by freight, and 200,000 to the markets of Mexico.—*Modern Mexico*, for February.

A REVOLUTION IN MINERAL PROSPECTING.—One of the latest inventions, news of which we publish today, is calculated to revolutionise the work of the prospector for valuable minerals. This is an electrical ore-finder brought out by Messrs. L. Daft and A. Williams of Meadow House, Ealing, by means of which the location of lodes of ore can be effected. The numerous experiments already made prove that its usefulness is no imaginary thing and that even tin sunk at no small depth can be located by means of the instrument. If there is gold in Ceylon—and we have so often said it is to be found in unworkable quantities—prospectors might well wait until the instrument is available for local use. Meanwhile, in finding new veins of plumbago, it should become useful at an earlier date?

WHY WE SHOULD EAT APPLES.—German chemists have established the fact that apples contain a large per cent of phosphorous, the element essential to the removal of the nervous matter of the brain and spinal cord, while the acids are of signal use to persons whose livers are sluggish owing to sedentary habits, the acids serving to eliminate from the system noxious deposits which would retard the action of the brain and induce skin ailments and produce boils. Hence the wisdom as well as relish of taking apple sauce with roast pork and goose. The malic acid of ripe apples, either raw or cooked, will naturalise any excess of chalky matter engendered by eating too much meat, says the *St. Louis Republic*. It is also a fact that such fresh fruits as the apple, the pear, and the plum, when taken ripe and without sugar, diminish acidity in the stomach rather than provoke it. Their vegetable salts and juices are converted into alkaline carbonates, which tend to counteract acidity. A good, ripe, raw apple is one of the easiest of vegetable substances for the stomach to deal with, the whole process of its digestion being completed in eighty-five minutes.—*Journal of Agriculture of Western Australia* for Feb,

“**HYPOPELTIS**”—is the name given (!) to the local insect-pest, by *Nature* in the issue of Feb. 5th, in which a short summary appears of Mr. E E Green's recent studies on the subject.

MOSQUITO SCREENS IN LORENZO MARQUES.—Portuguese East Africa. The United States Consul at Lorenzo Marques, under date of 16th December, 1902, reports that there is an opening for the sale of mosquito netting in that district. The Consul says:—“This place has long been noted for its mosquitoes and for its malarial fever. Until a year ago, the only nettings used were the canopies for beds. Recently, some of the foreign residents have had mosquito screens put in their doors and windows, and this idea is now beginning to gain popularity. I would suggest that manufacturers of mosquito nettings, as well as manufacturers of screen doors and window screens send samples of their different makes, with complete price lists.”—*Board of Trade Journal*, Feb. 19.

PAPAW TREE AS MOSQUITO BANE.—In a recent number of *Nature*, Mr Shipley called attention to the influence of the leaves of *Ocimum viride* in banishing mosquitoes. Following up this subject, Mr. Percy Groom narrates how his house at Whampoa was comparatively free from the invasion of these insects, a circumstance which he attributes to the presence of a line of Papaw-trees which intervened between his house and the river. Other houses in the same island were more or less infested with these insects. Once, after a typhoon had blown two of the trees, and left a gap, the number of mosquitoes in the house increased. Mr Groom further states that he never saw an insect on these trees, though he frequently examined them, and observed flies and other insects upon the Bamboos and Bananas near by. As the Papaw has usually unisexual flowers, and is in fact generally dioecious, it becomes interesting to know by what means fertilisation is effected.—*Gardeners' Chronicle* Feb. 7.

“BUYERS, BLENDERS AND DISTRIBUTORS. The economics of tea. Facts and fallacies about competition and combination,”—is the title of a paper in “Tea” for February by W Forbes-Laurie. We make two interesting extracts:—

To prove to what a low ebb tea-growing has reached, I annex a table showing the apportionment of cost in making an average pound of tea:—

Government duty	6 00
Cost to producer laid down in London, including office and all expenses*... ..	6.10
Growers profit	1.00
Dealers profit	0.60
Retailers profit	3.00
Average cost to consumer	16.70

One undoubted conclusion all agree in, that a low Market grinds down, until grower, dealer, broker and employee from manager to assistant, are in the lowest form of remuneration; and from this cause alone arises mutual recriminations. The market for producer and dealer is at its lowest ebb, neither are wrong, except in not seeking mutually to relieve the pressure at the right spot—they are on the horns of a dilemma. *Yet it has its remedy.*

MATALE AND ITS SURROUNDINGS.

A MODEL COUNTRY TOWN.

"What a charming country station is Matale"—says a recent visitor—"and how great the improvements since I first saw it in 1864 (!) or even since my last visit in 1891. I should scarcely know the place save that the Rest-house and Residency are in the same situations and that the mile-of-street-and-boutiques (like the lang toon o' Kirkaldy) along the North Road, shows as busy a scene as in the most prosperous of

COFFEE DAYS.

Alas! how are the mighty fallen—since the day when Ectapolla, The Borders, The Glen, Asgeriya and even Hampshire and Wiltshire were among the "crack" plantations of the island—all in their pristine vigour as I saw them in the early sixties; after which I rode across to Sylvakande (E J Young), Dambulagalla (D Watson), and on to "The Valley" (*par excellence*)

OF KELLEBOKKA

to see D Webster on Greenwood, and by Goomera to the centre of Rangalla at Battalagalla—now Duckwari. Some years later, a start from Matale led to Rattota, Opalgalla and Gammadua and back to join W D Gibbon and C Catto (who long ago passed the last bourne) in an expedition from Hoolankande across the Knuckles range to new clearings on the Eastern spur; and later still, Matale was the starting-point of a memorable expedition I made with poor A G K Borron right over

LAGALLA

and down on the other side through the region where Wingate, Hope, Mackie and a host besides buried many British sovereigns, bright anticipations and much labour and health in the vain hope that coffee crops would mature where the soil was rich and the rainfall good, even though for three months every leaf was blown off the bush by the swirling South-west winds rushing over and down from the high mountain range into the hot low-country of Bintenne. Our expedition was, however, for a goal much farther on—to inspect an arnatto clearing on one of the blocks at the back of the Knuckles which, when originally surveyed by Mr Vetch, of the Survey Department, he thought so much of that he induced his own brother to invest and settle, with disastrous results. Neither did the arnatto prove a success. When ever "new products," without over-production warrant attention to outlying forestland there are many lots privately owned, on the Eastern slopes between Lagalla North and Nitre Cave, available for the exploiter.

But my theme is "Matale" as a centre and starting-point and I have yet to refer to expeditions to North Matale towards Nalande, over land newly developed by Messrs. Ross, Milne, Taylor, Davidson and others, and where so much rich cultivation in cacao, tea and coconuts now prevails. The way in which the

COCONUT PALM

has flourished in response to extensive planting all along the Matale valley is quite surprising and the total crop must now supply no inconsiderable part of the annual food requirements of the town and surrounding country; for, we suppose, none of the nuts are, as yet, turned into oil or used for export? We visited only one plantation on the present occasion: the young extensive and promising property of

CLODAGH

where we were not only gratified at the evidence on every hand of careful substantial work but truly surprised at the extent and magnitude of the operations of the enterprising proprietor, who has as much at heart the good of the people in his employ as well as of the surrounding villagers, as the success of the plantation in which he has invested so much capital. Clodagh is made up of many lots of forest and waste chena land bought from Government and the natives to a total extent of quite 1,000 acres, and of this over 400 are planted with flourishing cacao, and over 300 with tea, very fine in parts—all equal, healthy fine jät from Norwood seed—the oldest field giving probably 500 lb an acre—while in some clearings, the work of "supply" has been a heavy, continuous one. We should be afraid the country was too dry here; but the record shews a fairly good, well-distributed rainfall, and certainly at our visit, everything looked vigorous—not the least, the really splendid coconut-palms (grown from Goluapokuna seed nuts), of which Mr. Malcomson has (or is to have) some 20,000 distributed, at wide planting distance apart, through his property. Nevertheless, if they all succeed,—as with such large holes and careful planting and attention they certainly should,—he should have the equivalent of an ordinary coconut estate of over 25 acres fully planted!

WHITE ANTS

have been a great trouble hitherto; and to get rid of them, Mr. Malcomson began by paying 25 cents for each "queen-ant" brought in; but he soon found this was extravagant and gradually came down until now the rate is as low as 3 cents; and yet from first to last, 1,000 queens have been disposed of and still they come from the latest clearings! All the works on Clodagh—roads, drains and especially buildings—have been executed after, the "pucka" fashion that would have delighted the late Messrs. Worms and Sabonadiere of Fussellawa. Bungalow and Factory are exceptionally well-finished, the proprietor being his own architect and very much his own engineer. The steam engine and boiler (a "Shanks") we were interested to learn was that imported by the ill-fated European Gemming Company to Rakwana; while Jackson's most improved tea machines are in use. We found a Cacao-drying Barbacue and Store in course of construction as also substantial "caddies" where the coolies can be supplied with good curry-stuffs, &c., at fair prices or rice-barter, without having to rush into Matale, or to villages *en route*. Not the least conspicuous, or commodious building on the property is the School-house where also services are held under the auspices of the "Friends' Mission" of which Mr. and Mrs. Malcomson are honoured members; while they have now got colleagues set apart entirely for Mission work in Matale and elsewhere, in Mr. Long (an experienced Missionary with many years of work among the Tamils in Coimbatore district, S. India, behind him), and Mr. Arden and Miss Cheale. It was certainly a fortunate day for Ceylon—and especially for much of the Matale district—when Mr. Malcomson decided to remove from his Irish ancestral home on the pleasant banks of the Clodagh in County Waterford, to establish himself and family in old Lanka.

Never did pioneer, planter and missioner deserve a fuller measure of success in all he has set his hands to, or his heart on.

It only remains to remark on the wonderful growth of introduced trees at this elevation: a four-year-old "Albizia" quite astonished us by its size, while young "Pehimbias," with their graceful foliage, and the Na ironwood, with its white flower in contrast to scarlet leaves, remind planters that they need not go beyond local jungles for handsome ornamental, as well as useful, timber trees. Clodagh tea-fields are planted all over with the grevillea—the "silky oak" of Queensland—which indeed is a distinguishing feature on all the plantations and clearings around Matale. The scenic outlook from Clodagh is very charming—the front view embraces Hunasgeriya peak and the range right along to the end of Laggalla, terraced rice valleys in the foreground adding variety, and only "water" in river or lake being wanted to complete the picture. There is a river running through one part of the property which (like so many of the Matale streams,) rises so rapidly as often to endanger life; but a useful suspension bridge, thrown across it, is not the least of Mr. Malcomson's improvements. From a point behind the bungalow, Adam's Peak and the False Pedro range are often visible; while the West Matale hills up to old Ambokka and the valley leading out to Nalande and Tamankaduwa are very near. The minor road as well as the main Rattota road we found in excellent order and Mr. Malcomson had only praise for the present active Assistant Agent in this and other connections.

But we must return to

MATALE TOWN

which we left with one long street, whereas it has now developed a back street quite as fully occupied with several busy cross streets; while the amenities—in parks, tennis greens, well-kept roads for the carriage, bicyclist or pedestrian, circling round the town, surprised us by their attractiveness and convenience. The Local Board and its President deserve much praise for these and other improvements in Lighting, Water Supply (not yet complete) and Sanitation. The town altogether has become a model outstation for Ceylon; but nature has richly endowed it in umbrageous and flowering trees and grassy glades,

So fair a scene, so rich a sod

Our English fairies never trod.

The most conspicuous building in Matale is the new "Club-house," erected by the enterprising Mr. Perera, formerly resthouse-keeper, and which he has built all at his own cost, immediately opposite the resthouse which it dwarfs and dominates. The planters are expected to make the investment a remunerative one. "The Borron Hall and Library" near the green, the Roman Catholic Church and Convent (the "sisters" being all Ceylonese) in the back street, the neat little Anglican Church on the Hill in the midst of the well-kept Cemetery, the Baptist Chapel and Hall in the middle of the town are farther institutions, not to mention the time-honored Kachcheri and Police Court with its, no doubt, indispensable "Lock-up" (Was it not an Englishman who, washed ashore from a wreck on a strange land, returned thanks that he was among a civilised people because the first object he saw was a gallows!) The airy-

situated, neat-looking Hospital and grounds are a special feature near the old coaching entrance to the town; while the Railway Station, though not attractive in itself, has two of the finest flower-gardens we have seen anywhere along the line—the show of chrysanthemums is specially striking. Much good work is being done by the "Padres" in and around Matale, through in-door and open-air services, in schools and in other ways. The climate we found in February to be truly pleasant—never too hot nor too cold—a happy mean between Colombo and Nuwara Eliya.

A CEYLON PLANTER IN CALIFORNIA.

MR O. H. GREENSLADE: HIS NOTES ON CEYLON PRODUCTS.

A letter has been received by a Colombo merchant from Mr O H Greenslade, formerly of Dehiowita, Kelani Valley, dated "Kern County, California, January 30th." He had been at work there, without moving once from the town since he last wrote in July, 1902; the railway is just across the road, where he lives. From his letter we are permitted to make the following extracts:—

"We live a very quiet life, to bed at 9:30 every night. I am greatly improved in health, and feel very strong and young, and fit to do any work. A travelling 'bed renewer' (a man who re-stuffs mattresses) was working here yesterday. I showed him the sample of 'mattress fibre.' He said 'Yes, I know it; it costs 22 to 24 cents per lb' at the lower price. The ton of 2000 lb, equals \$140.00, against your quotation. Mattress fibre, £2 per ton, equals \$10. The Collector of Customs, San Francisco, writes me the following on *Import duty*: on Mattress and Palmyra fibre, he answered 'Don't know what this is'; Desiccated Coconut, 2 cents per lb. Cocoa, answered "prepared" 2½ cents per lb up to 50 per cent.—"raw" free. Plumbago free. Cardamoms free. Gum, unrefined free. Cigars \$1.50 per lb and 25 per cent. Tea free."

"You notice that Coconut fibre is not imported at San Francisco—also that there is a very fine margin on the retail price.—Import duty on Cigars is quite prohibitive (I got a lot of samples from Madras).—I believe there is quite a fine trade, to be done in Ceylon products, and only wish I could travel, or start in, and sell them. Brushes are made here, with 'broom-grass,' which makes a very good brush. Straw, and hay, is bailed up with wire; if the coconut fibre rope would hold the bail together, it would soon be in great demand. [Wire is cheaper and better for bailing.—Ed. T. A.]—Tea sells retail from .50 to \$1.00 per lb; it can be landed here for under 25 cents.—Railway travelling is high; commercial travellers are allowed ten dollars a day.—Is there much 'gum' to be found in the forests of Ceylon? Every body (boys and girls) chew gum here. Note that there is no import duty on raw gum. There should be a big trade in this article, for I have seen gum frequently in Ceylon."

"Snow is thick all over the country, the first good fall for ten years in this part. Prospects for a good crop are good; but the rainfall is very small eight or ten inches a year, and unless spring rains come, the prospects fall flat."

THE ROEBERRY TEA COMPANY OF CEYLON, LIMITED.

DIRECTORS:—Hon. Mr Stanley Bois, Mr G H Alston and Mr H O Hoseason.

ACREAGE :	
Tea in bearing ..	497 acres
Tea 5 year old ..	109 do
Tea 4 do ...	36 do
	642 acres
Cardamoms ..	4 do

646 acres in cultivation

The Directors have now the pleasure to submit their Seventh Annual Report and Accounts, being those for the year ending 31st December, 1902. The yield of tea during the period has been 301,545 lb. costing 24.10 cents per lb., against 291,324 lb., costing 24.42 cents per lb last year, and realising 36.39 cents per lb., against 37.66 cents for the same period. After providing for commission due Superintendent and making a liberal allowance for depreciation of buildings and machinery, the amount at credit of profit and loss is R27,052.29. To this must be added the sum of R461.82 brought forward from last year, making a total of R27,514.11 now available for distribution. The Directors recommend the payment of a dividend at the rate of 5 per cent on the paid up capital of the Company, which will absorb R15,000; that a sum of R12,000 be placed to extension account—thus bringing it to R32,000; and the balance R514.11 be carried forward to current season's account. The Directors are pleased to state that the mortgage has been finally liquidated. The estimate for the current year is 320,000 lb. of tea on an expenditure of R75,170 which includes the cost of clearing and planting 10 acres of tea. The retiring Director is Mr G H Alston, who is eligible for reelection. The appointment of an Auditor for the current year rests with the meeting.—By order of the Board,

Bois Brothers & Co., Agents and Secretaries.

TALGASWELA TEA COMPANY OF CEYLON, LIMITED.

DIRECTORS:—Messrs. W Rae Sands, W Macgregor, Hector Van Cuylenburg and J W Erskine.
AGENTS AND SECRETARIES:—Baker & Hall.

ACREAGE,	
	acres.
Tea in full bearing ..	455
Abandoned ..	135
Cinnamon and Tea abandoned ..	43
Ravines ..	113
Forest boundary belts ..	53
Forest ..	1,229

Total Acreage .. 2,028

The Directors have much pleasure in placing before the Shareholders their Fifteenth Annual Report with a duly audited Statement of the Company's affairs to the 31st December, 1902. During the past season 143,131 lb of tea have been secured against 133,760 lb. last year. 30,151 lb. of tea were manufactured and sold on behalf of the Gallinda Estate. The cost of tea this year laid down in Colombo is cents 23.12 per lb. and same has realised cents 30.68 nett against cents 28.39 last year all tea having been sold in the local market. Profit and Loss account shows a profit on the year's working after writing off R2,388.07 to Depreciation, of R7,735.52 from this has to be deducted debit balance of R22.42 brought forward from last year and after payment of interest to preference shareholders viz. R2,100 there remains the sum of R5,313.10 which the Directors suggest should be dealt with as follows:—Payment of dividend 2½ per cent on ordinary shares absorbing R5,000; Carrying forward to current season R313.10. Since the last meeting Mr. J W Erskine has joined the Board; Mr.

Hector Van Cuylenburg retires from the Directorate by rotation and being eligible offers himself for reelection.

The appointment of an Auditor rests with the meeting.—By Order of the Directors, BAKER & HALL. Agents and Secretaries.

Colombo, 26th February, 1903.

THE CLYDE TEA ESTATES CO., LTD.

REPORT OF THE DIRECTORS.

DIRECTORS:—Messrs. F M Laurie, E D Harrison Robt. Davidson. Agents and Secretaries:—Messrs. Lewis Brown & Co.

ACREAGE :	
Tea above 4 years old ...	525 acres,
Jungle, &c.	190 "
	Total .. 715 "

Your Directors beg to submit their Report and the Accounts for the year 1902. The quantity of Tea made was:—From Estate leaf 170,647 lb and from bought leaf 5,395 lb. against original estimates of 175,000 lb. and 5,000 lb respectively. The shortage in Estate leaf is due to the very unfavourable weather experienced during the closing months of the year, but for which the estimate would have been exceeded.

The expenditure on Manuring during the year amounted to R3,732.70 which, along with sundry items for Rubber extensions &c. totalling R1,907.80 have been charged against revenue. The cost of Estate tea exclusive of these, but including transport to Colombo and selling charges was R46,587.57, equal to 27.30 cents, per lb. The average price realised for 27,601 lb black tea was 33.71 cents and 148,432 lb green tea (inclusive of Thirty Committee bonus) 36.24 cents per lb. The Capital Expenditure during the year on additions to buildings and machinery was R344.70 and R4,336.61 respectively. Depreciation on buildings has been written off at the usual rate of 2½ per cent, and on machinery at 5 per cent on the total book values thereof. Including the balance of R499.89 brought forward from last year, the sum now available for distribution R6,084.61, from which the Directors recommend the payment of a dividend at the rate of 2 per cent. This will absorb R5,400 and leave R684.61 to be carried forward. In terms of the Articles of Association, Mr. F M Laurie retires from the Board, but is eligible for re-election. The Shareholders have to appoint an Auditor for 1903.

THE CLAREMONT ESTATE CO., LTD.

ANNUAL REPORT.

The Directors submit herewith their Report and Accounts for the year ended December 31st 1902.

Crop for the year proved very short indeed. 63,383 lb only being realised against estimate of 85,000 lb. This great shortage may be attributed to the very unfavourable season, which was general, and also to the scarcity of labour, which however has since been remedied.

The cost of production was 28.09 cents per lb as against 26.47 cents the previous year, the small crop accounting for the enhanced rate. The Teas netted 33.67 cents as against 29.35 cents in 1901.

It will be seen that after taking into account Interest and all other charges, the balance at debit of Profit and Loss is 10,008.83. Interest on Mortgage has been paid to September 30th, 1902, but the interest on the mortgage Debentures still remains unpaid. The Directors have again waived their fees.

The existing mortgage of £3,000 has been called up, but the Directors hope to be able to effect a fresh mortgage on suitable terms.

Mr R H Elliot retires from the Board of Directors by rotation, but, being eligible, offers himself for re-election. Another Director has also to be elected to make up the number to that required by the Articles of Association.

It will also be necessary to appoint an Auditor for 1903.

THE NAHAVILLA ESTATES CO., LTD.

DIRECTORS:—Messrs. J M Mason, E S Grigson, W Anderson, Gordon Pyper; Agents and Secretaries:—Messrs. George Steuart & Co.

NINTH ANNUAL REPORT OF THE DIRECTORS.

The Directors have the pleasure to present their Report for the year ended 31st December, 1902, the accounts in connection with which show the Company to be now in a sounder financial position and afford ground for a better dividend than last time. The surplus of Revenue over Expenditure (R45,440.59) is much the same as for the previous season, but there is now less need to make provision for further improvements. After placing R7,500 to Depreciation Account, and the payment of Interest on Mortgages and Sundry other charges, the Profit and Loss Account shows a sum of R23,482.49 available for distribution, out of which the Directors propose to pay a dividend of 5 per cent on the paid up Capital of the Company. This will absorb R19,825.00, and the balance R2,657.49 after payment of Directors' Fees they propose to carry forward to next season's account. The Tea Crop fell short of Estimate, and only amount to 515,611 lb against 524,840 the previous year. The Average Price realised was however, somewhat better, being 35.43 cents as compared with 34.84 last year. The cost of Production including 1.22 cents for Manuring and Burying of Prunings was 28.11 cents against 28.06 last year. Coffee realised only R6,789.40 as compared with R8,846.11 the preceding year. The Water-Power Installations recommended in last Report have been completed on both Ury and Nahavilla, and are working satisfactorily. A new Roller and a Drier have also been placed in the Nahavilla Factory, besides Fans; but Fans are still required for the Ury Factory to improve the condition of the wither in the busy months. The Tea Crop for the coming season is estimated as 590,000 lb to be produced at a cost of 25.65 cents per lb exclusive of any manuring or capital expenditure that may be decided upon. The manufacture of Green Tea at certain seasons of the year is under consideration.

ACREAGE.

	Nahavilla.	Ury.	M. P. G.	Galalla.	Total.
Tea in full bearing	317	521	252	287	1,377
Tea in partial bearing	48	—	—	—	48
Tea not in bearing	90	16	—	—	106
Coffee	30	41	—	—	71
Cardamoms	—	—	5	—	5
Forest	45	41	—	72	158
Grass, Fuel Trees, Patna &c.	71	147	84	254	556
Total	601	766	341	613	2,321

Mr J M Mason retires from the Board by rotation, and does not seek re-election, as he is about to leave for England. The appointment of an Auditor for the ensuing year rests with the meeting.

YATADERIA TEA COMPANY OF CEYLON, LIMITED.

DIRECTORS.—Messrs. Frank Liesching, David Fairweather and Henry Valentine Masefield (Managing Director); Agents and Secretaries—The Eastern Produce and Estates Co., Ltd.; Superintendent of Estate—Mr. J R Fairweather; Bankers—Bank of Madras; Solicitors—Messrs. Julius & Creasy; Auditor—Mr. J D Forbes.

The Directors have pleasure in submitting the Balance Sheet and Profit and Loss Account for the year ending 31st December, 1902.

The Profit for the year is R72,657.16 to which must be added R1,245.99 balance from 1901, and the Directors recommend that a Dividend of 25 per cent and bonus

of 5 per cent absorbing R57,000 be declared, R9,500 reserved for Working Capital and the balance R7,403.15 carried forward.

It will be seen that the Property representing Capital stands in the Balance Sheet at approximately R194 per acre cultivated as compared with the same figure in the previous year's accounts, and that the Profit is R75.21 per acre in bearing and 38.24 per cent on the Capital.

The total Tea Crop was 656,820 lb (630,643 lb. Black 26,177 lb. Green Tea) or 76,820 lb more than the estimated quantity, the heavy crop being attributed to improvement in the bushes under the system of allowing them to get well up from pruning before tripping; the appearance of the Tea is good and prospects of crop for 1903 fairly satisfactory; the Superintendent estimating an outturn of 541,512 lb. Green Tea from Estate leaf.

The total quantity of Tea for disposal was 695,374 lb including 38,554 lb made from purchased leaf, of which 541,002 lb were sold locally averaging 29.17 cents per lb and 154,372 lb shipped to London in the earlier months of the year averaging 27.85 cents per lb.

The cost of Tea per Superintendent's Estate Report was 15.27 cents per lb and the total cost delivered to buyers or put on board ship including all charges was 18.02 cents per lb; or exclusive of Depreciation 17.11 cents per lb the net value realised from sales was 28.88 cents per lb. R14,084.43 was spent in 1902 on New Machinery and Factory Extension and further outlay estimated for at R12,500 on New Engine and Boiler and a Dryer will be incurred in 1903. Manufacture of Green tea was commenced on 8th December, 1902, 26,331 lb being made by the end of the year which realised with the bonus 37.82 cents per lb; Green Tea manufacture will be continued for the first six months of 1903 the crop for that period not exceeding 300,000 lb having been sold on Contract at 35 cents per lb, the bonus accruing to the sellers.

The Company's Property consisted on the 31st December, 1902 of:—

Acres Tea	Planted in	Yield in 1902 tea per acre lb	Compared with lb in 1901
172	1885	610	580
208	1887	522	527
100	1888	587	541
42	1889	642	723
6	1890	842	857
52	1891	1,107	888
120	1892	831	725
68	1894	936	687
37	1895	625	863
75	1896	851	682
33	1897	617	332
29	1898	610	240
24	1899	277	not in bearing
1	1900		
14	not in bearing	—	—
	do	680	515

average on 966 acres average on 342 acres 22 Acres, 1,311 Coconuts planted in 1896, and Para Rubber planted in 1898, and Factory site.

10 ,, Cardamoms,
255 ,, Forest, etc.

Total 1,268 Acres.

PARA RUBBER.—During 1902 some 42,647 plants were put out, the growing plants and trees on the Estate of all ages being estimated at 55,000, of which 843 trees have been tapped.

Mr David Fairweather retires from the Board, and being eligible offers himself for re-election and the shareholders will be requested to elect an Auditor for the current year. By order of the Directors,

THE EASTERN PRODUCE & ESTATES CO., LTD.,
Colombo, March 2, 1903. Agent & Secretaries.

RUBBER IN MEXICO:

OVER 8 MILLION TREES PLANTED
AND 1½ MILLION IN NURSERIES.

We begin to think that Mr. John Darley and some other Ceylon planters who have made their home in Mexico are right as to the great future before this favoured land, and that the London Deputation which included, if we remember rightly, Mr. James Sinclair and Mr. John Clark, among other practical men, were a little hasty in deciding against taking up land and establishing a plantation west of the Gulf of Mexico. The number and variety of crops that are successfully grown in a territory which extends from 7 to 32 degrees North Latitude is, of course, very notable; but the chief factor to financial success is found in the great and ever-growing market "next door" in the United States. Making due allowance for optimism and exaggeration, it is not possible to doubt the liberal returns got from coffee, cacao (indigenous) and the very rapid growth of the planted rubber trees. Plants (of Castilloa, the indigenous rubber, we presume) put out in July 1900, at a distance of 18 feet apart, had a girth of 8 inches by February 1901, of 20 inches a year later and of 25 inches in November 1902, and early this year, the branches were touching each other across the 18 feet. "Seeing is believing" and the statements are accompanied by illustrations which appear to bear out the figures given At Henaratgoda and Peradeniya it took 9 or 10 years for Castilloa trees to attain a girth of 40 to 43 inches; but they have done better with Major Gordon Reeves in the Matale valley; and Mr. Gildea the other day showed, for Ambanganga estate, a growth of Castilloa trees in 2½ years up to 26½ inches girth. *In this Ceylon beats Mexico, the indigenous home of Castilloa!*

On page 700 we give a letter to the New York periodical "Modern Mexico" (February 1903) from Mr. George Cullen Pearson, which bears the impress of truth; and he shows that Messrs. Lewis & Peat of London have valued his sample of rubber, taken from trees *three years old*, at 2s 8d per lb. and pronounced it "thoroughly marketable." We say nothing of the great things Mr. Pearson expects to do—nor of the anticipation of an income of £15,000 from 100,000 trees in their 7th year, to be doubled by the 9th year; but this is certain, that without the stimulus of such statements, rubber-planting has *already* become a vastly extended industry in Southern Mexico, although as yet there is probably not a single plantation which has arrived at the age for its rubber to be regularly harvested.

In other words, the rush into planting has taken place during the past four or five, and chiefly within the past two and three, years. Nevertheless, on certain of the coffee and cacao gardens there are old trees planted simply for shade purposes and

we are told that some of these, said to be 7 and 9 years old, when tapped experimentally, yielded 2 lb. of rubber per tree; another statement is that trees 6 to 8 years gave 1 lb. each on an average, of marketable rubber; while yet a third account mentions 350 trees (a few of them 20 years old) which yielded altogether 800 lb. of clean rubber.

But now to turn to the future of rubber in Mexico. Our contemporary of the "India Rubber World" of America has caused a census to be taken (by circular letter addressed to all the incorporated rubber-planting companies operating in Mexico) of these total plantings and they have had a response from 26 Companies (one beginning work in 1897, two in 1899 and the rest of 1900 or since.)

The number of trees per acre ranges from 200 to 2,000! 800 seems a favourite number. Here then we have 5,400,000 trees planted out, and over 11,400,800 plants in nurseries ready to put out, say in 1903-4. The work done, or to be done, by Companies not reporting may be taken to cover any over-sanguine estimates, or exaggeration, or failures in nursery plants; and our American contemporary reckons that numerous private planters in Mexico represent perhaps half as much again as the Companies. This would give us a total of over 8 million Castilloa trees planted out in Mexico, chiefly under three years old, apart from the indigenous forest trees.

We are naturally led to compare our progress in rubber-planting in Ceylon and the Straits Settlements with the wonderful start made in Mexico by American Companies, during almost the same period (the past three or four years); but our information is not sufficiently up to date as we write, for any but a rough estimate. We cannot suppose, at the most, that the planting in Ceylon of Para and Castilloa (or even if we count some Ceara and other kinds) exceeds 4 to 5 million trees; while the Straits and Borneo may also have 4 to 5 million trees planted out of all ages.

Is there anything in the Mexican and our Eastern figures to cause an alarm as to over-production in the future of five or six years hence? We do not think so. Suppose that the close of this decade, say 1909, sees 13 or 14 million planted trees yielding a pound of clean rubber each, what would this crop be, —however profitable to the growers as we expect it to be—to the growing requirements not simply of the world; but of the United States alone! The latter seems to require at present from 30 to 50 million lb. of rubber a year, for the manufacture of bicycle tires alone! When the numerous other uses for rubber are considered, and the immense development in new industries, which, we are assured, would follow a slight reduction in price, of the raw product, we may well bid good-speed to all the Mexican, Straits and Bornean, as well as to our Ceylon, planters of rubber trees —whether Para or Castilloa—and feel assured that there is "a good time coming" for most, if not all, of them.

AN EXPERIMENT STATION FOR INDIA. SOME LESSONS FROM AND FOR CEYLON.

(From a correspondent.)

The article in the *Indian Planting and Gardening*, just to hand, by Mr Harold H Mann, is one likely to attract attention in Indian circles and it is hoped that the Government will see their way to encourage the establishment of one or more Experiment Stations in the districts mentioned. The power of an Experiment Station with an agricultural people is very great and were it not for their existence in America, West Indies and Germany the vegetable economic products mentioned by Mr Mann would still have a very limited distribution.

The experimental cultivation of new products, the improvement in modes of cultivation and manufacture of products already existing, and the preparation of standard samples of products frequently adulterated, are subjects of vital importance to all planters and can only be dealt with by Government in places established for the purpose. It is a matter for congratulation to the people of this colony that Sir West Ridgeway has granted an Experiment Station, to be controlled by a recognised scientific staff of workers and assisted by some of our most prominent representatives of the Planters' Association. The constitution of

THE EXPERIMENT STATION AT PERADENIYA, the organisation of the staff and the work already in hand on the newly-acquired grounds, some 550 acres in extent, might very profitably be considered by our Indian friends. H E the Governor in his last annual speech informed us that Mr Herbert Wright had been appointed Controller of the Experiment Station and that a Committee comprising Messrs J C Willis, J B Carruthers, E E Green, M Kelway Bamber, the Hon Messrs E Rosling, Joseph Campbell, and S N W Hulugalla and Messrs J Fraser, T C Huxley and Edgar Turner, together with the Controller, had been formed. A stronger Committee could hardly be appointed and the Colony may confidently leave the future of Agriculture in their hands. There are several POINTS WHICH OUGHT TO BE CAREFULLY WATCHED lest the work turned out from the Experiment Station lack the fullness and vitality which we know Mr Herbert Wright would wish it to have. The first point, mentioned by Mr Mann, is that an Experiment Station is not a revenue-making place. Certainly nothing should be wasted, but, on the other hand, Government should be well aware of the fact that, in establishing new products or improving the old, many futile experiments must be made and these cost often large sums of money. Further, many experiments similar to those carried out at Rothamstead cannot possibly give any return in money to the station, but the agricultural community are placed in possession of knowledge which allows them to get more from their land and resist the ravages of insects and fungi in an intelligent manner.

A second point is *re* the subject of new products. It is a matter of

COMMON KNOWLEDGE THAT PRODUCTS COME AND GO

and the past few years have convinced us that tea is by no means sure of staying long. Cacao is becoming diseased in all parts of the island and cardamoms, citronella, cinnamon, and many other products appear to be passing through stages

familiar to those who have seen coffee bloom and fade away. In our opinion the Experiment Station should see that at least a $\frac{1}{4}$ acre plot of *e very* tropical product be established to show the planters what will grow and how best to grow it. Planters cannot afford to speculate on these products and it is a duty of Government to see that the *estate* in Ceylon is developed to the utmost. New products we must have and there are plenty which have never yet been scientifically cultivated in Ceylon.

We have heard from several planters of the work which is being carried on at the Experiment Station and though we must be patient and wait until the old cacao estate has been transformed into its proper form we should

LIKE TO SEE SOMETHING DONE WITH CACAO at an early date. No better place could be chosen for experiments with cacao and as Mr Wright knows, there is plenty of work to be done *re* fungicides and modes of attacking the cacao canker, with shade trees and wind belts, in methods of curing and fermenting and in manual work in general.

The first annual report issued from the Station should prove interesting and until it arrives further comment is scarcely required.

A MEXICAN RUBBER GROWER SPEAKS REGARDING PROFITS.

£15,000 A YEAR IN THE 7TH YEAR FROM 100,000
TREES.

Having planted and watched the growth of several hundred thousand trees for the past four years and a-half and having devoted much attention to the preparation of rubber in a series of experiments extending over the last three years, some marketable results I have obtained may be of interest to those who have taken up the rubber industry in Mexico. I may be permitted to state that my property is not in the market and that I can have no interest in deceiving myself. Two years ago, I sent a sample shipment of Mexican rubber prepared by myself from trees growing on the estate to the leading firm of rubber brokers in London, Messrs, Lewis & Peat. The rubber was valued at three shillings and nine pence, the best Para being then four shillings and two pence per pound. The quality was reported as excellent. This—I was informed—was the first sample of good marketable rubber ever sent from Mexico to London. Last year, when in London, I had sent me from the plantation a sample of rubber from three-year-old trees. The trees were only very lightly tapped, but sufficient rubber was obtained to enable me to present a sample on which a quotation could be made. It was valued by the same firm of brokers at two shillings and eight pence, and pronounced thoroughly marketable. I do not present this as a precedent to be followed, but it is interesting as showing that even at the early stage of the tree's growth, clean and careful preparation will produce a rubber which commands a price considerably over that yielded by mature trees when ignorantly and slovenly handled. I am now sending off a large sample shipment of rubber to London, prepared by an improved method (my own) which I, perhaps conceitedly, believe to be the finest rubber ever sent out of Mexico, and which will, I have no doubt, fetch the highest price next to best Para.

It is regrettable that statements should be irresponsibly made, disparaging an industry which will certainly become a source of wealth to those who give thought, care and patience to its development, by any one who has not studied its methods and is manifestly unacquainted with the principles which make for success. For my own part, I am more than satisfied with the growth and prospects of my own enterprise. Let us take the case of a man possessing a hundred thousand trees, and put the yield at the seventh year at one pound only—I believe this to be below what the result will actually be. Let us put the price of good, clean, sound rubber at three shillings per pound, which my brokers inform me it is quite safe to assume will be its value. The result would be £15,000 sterling—fifteen thousand pounds—for the first year, which would be doubled certainly by the ninth year, an income for which I, for one, am quite content to work and wait.

GEORGE CULLEN PEARSON.

Puebla, Mexico, January 4th.

PROSPECTS.

Again:—The following is taken from the letter of a gentleman residing in Mexico who has no interest in rubber lands, and may be considered an impartial statement:—

I am in receipt of your favour of the 15th inst. in which you ask me to give you the location of the various districts of sub-tropical Mexico where conditions are favourable to the cultivation of rubber, and stating that you contemplate establishing a plantation if available land can be found where rubber would likely prove a profitable crop. The rubber tree is found growing wild in the forests which cover a strip of country ranging from ten to one hundred miles in width, and extending from the port of Tuxpan on the north to the western boundary of the State of Campeche, a distance of probably five hundred miles. There are probably more rubber trees to a given acreage of forest in the vicinity of Frontera, in the State of Tabasco, than elsewhere in the rubber-producing country of the Gulf Coast. Near Belize, on the east coast of Yucatan, rubber trees are abundant. Around Soconusco, on the west coast of Chiapas, and in the vicinity of Pochutla, State of Oaxaca, rubber plantations have been started. As rubber grows only on the moist low lands of the coast, the width of the rubber belt varies greatly. In places it follows the river valleys for a considerable distance inland, but, where the mountains approach the sea, it is narrowed to a few miles of country lying along the coast. Nearly all the rubber produced in this Republic is collected by the Indians from the wild trees growing in the forests.

The rubber tree matures at the age of 6 years. They should yield from 6 to 48 pounds of milk annually. In the coagulation of the milk there is a shrinkage of about 50 per cent, leaving from 2½ to 3½ pounds of crude rubber, which is worth 50 to 80 cents per pound gold. The process of coagulating the milk is simple and inexpensive. The annual profit of a bearing plantation of 100 acres should not be less than \$8,000 Mexican money. However, up to the present time, the actual profitability of cultivated rubber is, in a measure, a matter of conjecture, as no one, to my knowledge, is yet making money from a bearing plantation in this Republic.

In the southern portion of the Republic, particularly in the rubber-producing districts of Chiapas

and Tabasco, a large number of rubber trees are annually being killed by too frequent tapping by the Indians. This is causing a great decrease in the rubber production of the country.

Capitalists seeking profitable investment in Mexico are fully warranted in going into this subject scientifically. Something is already being done in an experimental way, and a few years should do a great deal toward demonstrating what results are obtainable from the systematic cultivation of the rubber tree in Mexico. There has been a constant increase in the consumption during the past few years. The annual exportation of Brazil has reached \$100,000,000. The Central American countries are also largely exporting this commodity. The price of rubber is also advancing. The United States alone consumes \$30,000,000 worth of rubber in the manufacture of bicycle tires. It is my belief that the price of rubber will not materially decline. The increased use of electrical apparatus, the probable general adoption of rubber-tired vehicles, the extended utilisation of rubber in the manufacture of belting, clothing, etc., will prevent any notable depreciation in the value of this commodity. A decline in price will be quickly followed by an increase in consumption.—*Modern Mexico* for February, 1903.

A HARDY, RUBBER-YIELDING TREE

Eucommia ulmoides was figured and described by Prof. D Oliver in Hooker's *Icones Plantarum*, tt. 1950 (1891). 2361 (1895), from specimens collected in the Province of Hupeh, China, by Dr Henry. It forms a tree 20 to 30 feet high, with a branch-system resembling that of the common Hazel, the deciduous leaves resembling those of the Elm; the flowers small, and unattractive; and the fruit in clusters, samaroid, winged, about an inch long, ¼ inch wide, each containing a single oblong seed. The genus is related to *Trochodendron*, *Cercidiphyllum*, and more distantly to *Hamamelis*. A plant of it was presented to Kew in November, 1897, by M Maurice de Vilmorin, and in the space of four years it has grown from a small plant a foot high to a sturdy bush 7 feet high, and 6 feet through. It has stood the frost of that period in the open air without any protection, and appears to be quite as hardy as the Witch-Hazel. Cuttings of the branches root readily, and large branches of it may be successfully layered. This plant has a special interest from its caoutchouc-yielding property, as will be seen from the following note. "Tu-chung" (*Eucommia ulmoides*) is a native of Central China, where, according to Dr Henry, it is cultivated in the districts of Chang-yang and Patung, in Hupeh, N. lat. 35°; it is also, according to Farges, cultivated in about the same latitude in eastern Sze-chuen, in the district of Tchen-keow-tin. A singular feature about this plant is the extraordinary abundance of an elastic gum in all the younger tissues, especially in the bark, the leaves, and petioles. Any of these snapped across when dry, and the parts drawn asunder, exhibit the silvery sheen of innumerable threads of this gum. The bark itself (to which, according to Dr Henry, tonic, invigorating, and other properties are ascribed) is a most valuable medicine with the Chinese, selling at 4s to 8s per lb. Further, the leaves are eaten when young, and the fruit is astringent. The merits of the Tu-chung as a caoutchouc-producing plant are entirely unknown; it is, however, deserving of notice. It would be

likely to thrive in semi-tropical countries, such as Algeria and Florida, and in the mountainous parts of Southern India and the West Indies; it might also survive the winters of southern Europe (Morris, 1898). Messrs Vilmorin, Andrieux & Co., Paris, who offer young plants of the *Eucommia*, give the following particulars in their *Catalogue des Graines d'Orangerie, et de Serre pour 1903*:—"M J Dybowski, the eminent Director of the Colonial Garden at Vincennes, has called attention to this tree, which contains in all its parts a notable quantity of gutta-percha of good quality. Unlike all other caoutchouc-yielding trees which are confined to the tropics, the *Eucommia* may be cultivated with success in a temperate climate. We have a plant which has stood for five years in the open air without protection, which has not suffered in the least, although the thermometer has fallen to -8° Cent. (17° Fahr.), and we believe it will support a temperature still lower than this." Plantations of this tree are being formed in France. There is good reason for believing that it would be worth while to plant it in the warmer parts of the British Islands as a probable source of rubber, and also for its medicinal properties. The Kew plant is in a border near the Economic house (No 12.) *W. W., Kew.*—*Gardeners' Chronicle*, Feb. 14.

THE NATAL TEA INDUSTRY.

ITS FUTURE PROSPECTS.

[BY "NEMO."]

Few people are aware, notwithstanding the ever-increasing flow of immigrants to South Africa from all the world over, what small strides the Natal tea industry is making. Bearing in mind that Natal is the only tea producing Colony in South Africa, the large and steadily-growing market for tea, and the absence, up to now, of any keen competition from other countries, by reason of the protective duty of 6d a lb. on imported produce, there are only a dozen estates, or thereabouts, of any importance, and all of these manufacturing coarse, rough tea. So far, the public have had very little choice in the purchase of tea, and the local planter has taken advantage of this fact to turn out of his factory the greatest possible quantity, with little or no pretension to quality. This line of action, however, is at last beginning to tell on the industry, for, apace with the growth of the Colony, imported teas, from India and Ceylon chiefly, are fast making their way in every other household, while import statistics prove that year by year the quantity imported is largely increasing, and local planters cannot sell off their stocks as easily as in days gone by. Beside this, Government can hardly be expected to protect these few estates at the expense of the tea-drinking public, and, sooner or later, the duty will either be abolished or at least greatly reduced, unless the industry makes more rapid strides to increase both quantity and quality of its produce. There is absolutely

NO REASON WHY NATAL CANNOT PRODUCE AS FINE TEAS AS ANY OTHER COUNTRY.

The labour conditions are precisely the same, while the wages paid are not much more than is customary in Assam and Ceylon, and, if these countries can produce, ship, and, after paying a big duty, sell their teas at a profit, it does not speak very highly for the energy or

enterprise of our Colonists. There is a big future for tea in Natal, and, if more capital was put into the venture, care taken to produce as near as possible teas like either the Indian or Ceylon manufactured leaf, and at a price within reach of all, there is little fear of imported teas finding room in our market, especially as it has been proved scientifically that a good Natal tea contains less tannic acid, is less pungent, and therefore more easily digested, than the produce of any other country. The indentured

COOLIE IN NATAL DOES TWICE AS MUCH AS HIS BROTHER IN INDIA,

and gets a third as much again as wages for his work, so that, theoretically, Natal planters ought to produce their teas about as cheaply as their Indian or Ceylon competitors.

A further hindrance to the progress of the Natal tea industry has been the marked absence of men with the necessary experience as proprietors or managers. Not one of the owners of any Natal tea estate has had any practical training in a large tea-producing country, and few employ Indian men. Most owners have become so puffed up with their own importance by being able to make, so far, a good thing of their tea, that they are jealous of any Indian or Ceylon planter about the place, preferring, should they need a manager, or assistant, to select a candidate who knows nothing about tea, and less about Indian labour, and set up to teach him a profession they know little about themselves. This narrow-mindedness can hardly be expected to improve what promises to become a big source of income to the country, and it is to be hoped men with broader views start more estates on better lines. If men from India and Ceylon were imported, well paid, and properly treated and freely employed, and a better class of coolie than the weeds being brought into this country now indentured with all the facilities tea-growing offers in Natal, there is no reason why the finest quality tea should not be made, at prices everybody can afford.

THE SOIL IS EMINENTLY SUITED

to the tea plant, and every condition favourable to its growth. The writer has seen and tasted samples of Natal tea, specially manufactured by a firm of tea-planters employing an experienced manager with Indian training, which cost 4½d per lb. to manufacture and which compared very favourably with a fine Assam Broken Pekoe selling in London at 8d to 9d per lb. Allowing, say, 1d for packing and handling before it reaches the customer surely there is a big enough margin for a profit when there is no duty to pay. More experience and more capital is needed to give this pleasant and paying industry the impetus it requires, and we ought easily, with both these conditions to back us, be able to produce in Natal every ounce of tea consumed in South Africa. The life of a tea-planter will appeal to many, and the pure country air and congenial employment has a charm peculiar to itself which must be experienced to be understood. Coffee production went to ruin here because no one thoroughly understood the venture, and the trees, delicate at best and fond of light shade, were expected to crop out in the open, with no pruning, or any other attention so necessary to this tree. The result was: every known blight and disease soon made their appearance, and presently exterminated every plantation and then the country was blamed for the failure.

LUCKILY FOR NATAL, THE TEA PLANT IS HARDY, being an evergreen of the camellia family, so that it can stand to a large degree the rough usage it receives. Pruning of tea bushes—an art in itself, and the most important work on an Indian or Ceylon estate—is reduced to mere hacking down the bush with the largest sized pruning knife obtainable, and often in the hands of a raw coolie; and as a result a heavy mortality usually ensues on some estates. Plucking, another very important work, is done in a most primitive fashion, and it is a wonder the trees “flush,” or send out new shoots again, after the handling they get. By careful plucking—i.e., by removing two or three leaves with the “bud,” or topmost unformed leaf, and leaving an “eye” or embryo shoot below, carefully protected by the stalk of the last leaf picked, a new shoot soon forms, and springs out ready to be gathered in seven to ten days. The local fashion is to tear off the “flush” in handfuls, and in some cases the writer has counted no less than eight leaves on a single stalk, the stalk being torn away from the parent branch, and every chance of a succeeding flush lost. It can easily be understood, therefore, that, by careful and fine plucking, and nursing the next gathering—though the amount for the day be less than if picked by the local way—the former and correct method produces more flushes for the season than the latter, and in the long run a greater quantity is obtained per acre, while the quality is of course, incomparable.

SUITABLE LAND CAN BE HAD IN ANY QUANTITY at moderate prices, and a capitalist starting on a holding of, say, 500 acres, with 50 Indians as a beginning, and an experienced manager, if he is not one himself, could easily commence his tea garden, and by ordinary perseverance and imitating Indian and Ceylon methods of production, would soon develop it into a very paying concern, and the source of a very comfortable income.—*Natal Mercury*, Feb. 26.

A FERMENT OF THE TEA LEAF.

A most interesting paper on “Ferment of the Tea Leaf”—II.—reaches us today from the Secretary, Indian Tea Association, written by its Scientific Officer—Mr. H. H. Mann, B. Sc. His conclusions, from experiments dealing with the “enzyme” of tea, are:—

1. That, during withering, the amount of oxidising enzyme or ferment in the leaf increases up to a certain point corresponding under normal withering conditions with the point at which the leaf is ready for rolling.

2. That the two processes of loss of moisture and production of ferment by no means necessarily take the same length of time, and that the leaf may be withered (in very dry weather) long before it is chemically ready to roll, and in very wet weather may be ready, chemically, to roll long before it is withered.

3. That, at the temperature studied (76°–86° F) the normal time which the leaf requires in order to be chemically ready for rolling is 18 to 20 hours with normally withered and over-withered leaf, and several hours longer (it may be up to 25 hours) with leaf prevented from withering by a very wet atmosphere.

4. That the object of the tea manufacturer should be not merely to get his leaf in the best physical condition for rolling but also in the best chemical

condition, and for this purpose he should arrange, so far as is possible, to have the leaf soft for rolling when the chemical constituents of the leaf are at their best.

Other experiments in fermentation are recorded in the same paper and, being of high importance to all manufacturers of tea, we quote them at once in full:—

1. The time required for making the leaf chemically ready for rolling is independent, or nearly so, of that required to render it soft enough for this purpose and at a temperature of 76° F.—86° F., varies from 18 to 24 hours, according as the leaf dries normally, too quickly or not at all. Hence the object should be to wither the leaf in the time. If it be withered too quickly, as by heat and fans, the leaf is soft enough to roll before being chemically ready; if it be withered too slowly, as on a wet day, with a saturated atmosphere, it is chemically ready long before it is soft enough. I hope to be able to, later on, after further experiments, prepare a table giving the best time for withering at various temperatures and under different conditions.

2. The absolute cleanliness of every thing during the manufacture becomes more and more evident and the cleanliness necessary can only be reached by scalding every implement and machine, and the floor of the fermenting house with boiling water. There seems moreover considerable reason to suppose that by the addition of a small quantity of Salicylic Acid to the fermenting leaf the effect of outside microbes may be entirely eliminated (the salicylic acid being entirely driven off during the subsequent firing), and the tea correspondingly improved.

RUBBER IN UGANDA.

PARA PLANTS DOING WELL.

It is only a question of the activity of traders to determine the time during which our natural supplies of rubber will last. So says Mr. J Mahon, in a report to the Foreign Office on various exotic plants in the Botanic Gardens at Entebbe, in Uganda, and that being so, importance attaches to the efforts being made there to furnish by systematic cultivation supplies to meet the demands of the future. So far not a great deal has been done, but, despite some unfortunate circumstances, one of the Para rubber seedlings sent out from Kew in 1901 is now over 7 ft. high. It remains to be seen whether the climate and elevation. (4,000 ft.) will continue to prove favourable, but Mr. Mahon appears to have some hope that on the lake shores the Para rubber will do well. The Central American variety, *Castilleja elastica*, which is more or less highland plant, is likely to find suitable conditions at Entebbe, and a seedling Ceara rubber of eight months is already 4 ft. high. Satisfactory progress has also been made with plants of *Theobroma cacao*, and Mr. Mahon believes that since an excellent wild coffee flourishes, introduced sorts would do well.—*H and C Mail*, Feb. 13.

MAN—is born an agriculturist; and it is both bad morality and bad policy to invite him, by fortune or by honours, in other words, by avarice or by ambition, to leave the plough and the fields. It is a mistaken idea to give education to the children of peasants only to make them come out of their sphere. No one is too learned to be an agriculturist, hardly anyone is learned enough for it. (Alphonse Karr.)—*Agricultural News*, Feb 14.

PRIZE ESSAYS FOR TEA PLANTER :
THEORETICAL POINTS IN TEA
CULTIVATION.

The present age is not one which desires to obtain its knowledge through laborious research nor time-consuming experiment; but rather at second-hand in the concentrated form of hand-books and manuals. It matters not what aspect of truth with which the seekers desire to acquaint themselves, whether it be philosophy, theology, or history, the reading public demands its pabulum in a nutshell, and craves for mental stimulation in the form of literary tabloids. No province of literature exists without these royal roads to learning, and any student of fair capacity, can, by walking therein, cram a subject so successfully, as to make a very fair show, indeed, when he goes up for his examination. The result to the student may not exactly be what is meant by education, and to the man who stops at that point, who is content with a pass, and the smattering of knowledge he possesses, the benefits he has received are questionable. If, however, he is bent on widening his horizon, and recognises that education here ends only with life, the superficial knowledge which these rough sketch-plans afford, is not without its value when later on he labours to fill in the details for himself. To know the headlands may not mean an accurate knowledge of the coast; but it is useful in this way that you can locate your position, very nearly, and are not wholly at your wit's end as to what next to do. Tropical agriculture is not different from other studies in the demand for hand-books, and when any special culture bids fair to draw to its cultivation the money and brains of the West, the creation of a new manual is assured. The continued issue from the *Observer* press of complete treatises on almost every brand of tropical planting enterprise, and the steady call from all parts of the world for these cultural guide books, are evidence enough that they supply a needed want, and have a wide and appreciative public. But to attain to the full measure of their usefulness, the reader must be generally informed on tropical agriculture, and the wider his knowledge and experience, the more highly appreciated is the special manual. The Planters' Association—during its literary age—added considerably to the stock of tabulated information available for the outdoor worker in the tropics, and we suppose we may take, as evidence of the dawn of happier and better times, the readiness of the Committee today to accept the onerous task of adjudicating the merits of the Planting Essays to be sent in, in competition for Messrs. George Steuart & Co.'s handsome R500 prize. The principal point which the essayist will have to deal with is Pruning, and on this subject there will be ample scope for the ingenious mind. It will be hard, however, to make the theme intelligible or of much practical value without the aid of illustrations, but if these are employed "he that reads may

run." In the February number of *Country Life in America*, there is an article on Pruning, which, however, refers to the garden, and not to a tea estate; but the principles which guide the cultivator when he desires to bring, say, a peach or a cherry tree into prime condition, do not differ in any way from those which obtain when the planter has a field of tea requiring the knife. "Before one prunes a plant"—says the American writer "he (*sic*) should know why he (*sic*) prunes it." That statement may at once be accepted as the theoretical standpoint of the scientific cultivator. To successfully treat and advise on such a subject as Tea Pruning—where the plant thrives from sea-board to a six thousand feet elevation—it is clear that no rough and ready rule of thumb will avail; and when we add jāt, exposure, soil fertility, and the health conditions of the bush itself, a very complicated problem is evolved calling for special directions, which may modify any general principles before formulated. Root Pruning, which in Arboriculture is about as important as branch pruning, is a dark subject yet as regards tea; certainly what root pruning the tea bush gets, is done in a rough, blind and unintentional fashion; the tool, a mamotie, or a digging fork; and the rule of guidance, blind chance. Roots get cut in manuring operations, but the man has yet to arise who has made the root-pruning of tea a study and who can guide his brother-planters in the matter. He may make his advent among the coming essayists, and he is certain to be hailed when he appears above the horizon. In the early days of coffee-leaf disease, when no one would credit that what was in process before their eyes was a tragedy—the ruin of an industry, there were several men who claimed to have discovered a cure which, alas! on trials made, came to nothing. Some followed well-known remedial lines, but a few originals struck out in a wild way. A German chemist poulticed the stem of the trees with mud and carbolic, and the trees died! Another, an eccentric Frenchman, would have built a miniature paddy field around each individual plant. After a trial of his system in several parts of the country, and no beneficial results obtained, he still lost neither heart, enthusiasm nor resource. "The roots of the tea wanted attention," he said, "have them uncovered and white-washed and recovered afresh and then"—here his eyes blazed and rolled in the fine frenzy of the prophetic soul,—“mon Dieu, you will see!” Nobody ever did see; for men were sick at heart, and felt that to have decorated the roots with ribbons of the newest Parisian shade would have salted the tail of the deadly fungus as effectually as white-wash could have done, and been very much more artistic. The next coming authority on root culture who is to appear amongst us will be—let us trust—of a sane mind, and be able to give a reason for the hope that is in him, without requiring to fall back on Gallic hysterics, or the heroics of the Teuton. The

value of buried prunings in particular, and manuring generally is to be a supplementary branch of the essayist's theme. Accurate and reliable information on these subjects will, we feel assured, be very acceptable to the planting community; for the matter is not one where a solid vote would be given one way or another, there being still much variance of opinion especially in regard to buried prunings, while there are districts which are ready to tax all fertilisers. Let us trust when the information is available, it will not be of the technical nature which requires a chemical expert to interpret it; but rather that it may be of a nature easily assimilated by the mind of the everyday-planter, and the man of ordinary intelligence.

REPORT ON SAMPLES OF RUBBER EXTRACTED FROM HEVEA BRASILIENSIS IN THE FEDERATED MALAY STATES.

STRAITS SETTLEMENTS, NATIVE STATES.—No. 432.

Downing Street, 31st Dec., 1902.

SIR,—I have the honour to transmit to you for your information and for communication to Mr Stanley Arden, Superintendent of Experimental Plantations, the papers noted in the subjoined schedule.—I have, etc.,

(Signed) ONSLOW, for Secretary of State.

(Copy.)

Royal Botanic Garden, Kew, Dec. 24th, 1902.

SIR,—I have the honour to inform you that I have received from Mr Stanley Arden, Superintendent of Experimental Plantations in the Federated Malay States, series of samples of Para rubber coagulated by various methods, with a request that I would obtain a commercial report upon the results. A copy of the brokers' report is enclosed. Without entering into unnecessary details it is sufficient to notice that Nos. 1 and 6 were naturally coagulated; No 2 was coagulated by the addition of acetic acid; No. 7 was "scrap rubber" collected off the tree; the remaining samples were coagulated by various mineral acids. It is quite clear from the brokers' report that natural coagulation affords the best results and that the only admissible artificial coagulating agent is acetic acid. The point, however, which it is important to notice, is that Para rubber can be produced in the Straits Settlements from ten years old trees, which is worth eightpence a pound more than the best equivalent Brazilian product. I may be permitted to feel some satisfaction at this result seeing that the trees which have furnished the rubber now reported on are the descendants of those transmitted from Kew to the Straits Settlements in 1877; these were part of the first consignment of Para rubber trees to the tropics of the Old World. I have no doubt that the Straits Settlements is now in possession of a new and important cultural industry. The facts stated above are therefore of sufficient importance to bring under the notice of the Secretary of State and to be placed on permanent record. Mr Chamberlain will no doubt cause them to be communicated to Mr Stanley Arden, in official course.—I am, etc.,

(Signed) W T THISELTON-DYER.

MESSRS. HECHT, LEVIS AND KAHN TO ROYAL BOTANIC GARDENS, KEW.

36, Fenchurch Street, London, E.C., Dec. 19, 1902.

DEAR SIR,—We have examined the samples of Para Rubber from Selangor which you submitted to us. We are of course not chemists, and can only judge the rubber from its elasticity, strength and freedom from dirt. With ordinary Hard Cure Fine Para worth today 3s 8d per lb., we should estimate the value of your samples as follows:—

No. 1 about 4s 4d per lb. Nos. 2 and 6 about 4s 3d per lb. No. 5 about 4s 2d per lb. No. 4 about 4s 1d per lb. No. 3 about 4s per lb. No. 7 about 3s 4d per lb.

Numbers 3 and 4 are decidedly weaker than the others, and on the whole we think the less acid used in coagulation the better. Sample No. 1, coagulated without acid at all, is certainly the best of the lot.—We remain, etc.,

HECHT, LEVIS AND KAHN.

PRODUCE AND PLANTING.

The chairman of the Mazawattee Tea Company, like some other sanguine people interested in tea, is hopeful that the Chancellor of the Exchequer will be in a position to

TAKE OFF THE EXTRA DUTY ON TEA imposed in 1900, when he introduces his next Budget. Tea is certainly much more entitled to relief than some of the other commodities whose vendors are clamouring for reduced taxation; but justice does not necessarily govern these matters.—Commenting on

THE DUTY QUESTION AND THE TEA MARKET the *Grocer* says: "Operators in the tea trade naturally think that they ought to be relieved of part at least of the Customs' duty before anybody else, and have been inclined to abstain from clearing stocks out of hand faster than was necessary, so as to be in a better position to enjoy the full advantage of a reduction in the impost, should such a proposal be made and carried through. The actual state of the market for tea at the moment is so peculiar as to be almost beyond influences of a fiscal nature, and the change that has come over it within the last fortnight has created quite a surprise. Attributable in the first instance to the shortening of the supplies immediately on offer, by importers restricting the number of invoices to be catalogued for public sale every week for a long while past, the dealers and others have not been overburdened with unmanageable duty paid stocks as they were at this period last year. The consequence has been a great strengthening of the market, as time and opportunity have been given for all surplus quantities in the hands of the trade to be worked off; and as the principal blenders have again entered the market to renew their purchases and replenish stocks, a fresh and stronger stimulus has been imparted to the upward move of late, which has become so marked this week that prices for the common qualities have advanced fully 4d per lb.—a rally in no way connected with the question of the lowering or raising of the duty on tea."

If we may judge by the hints given in one of their trade organs,

GROCERS DO NOT KNOW ABOUT TEA

as much as they ought to do. The journal says: "It is a pleasant thing to see a grocer's window smartly dressed with samples and showhowls of tea, and in anyone connected with the trade such a sight generally arouses a feeling of admiration. But how rarely are such efforts to win back the tea trade shown by the one-shop and two-shop tradesmen of today! Yet it is not easy to blame them; there are excuses for this want of interest. The truth is that the retail tea trade has been so exploited, and in such a variety of ways, that numerous grocers have grown

indifferent about the cultivation of a tea trade. It is too large an order. They find it better business to push groceries and even brushes and hardware. If a customer wants tea they are content to sell a packet of an advertised proprietary article for a very small profit. The result often is that such tradesmen, though competent in every other branch of the business have little or no knowledge about tea. As an instance showing how ill-informed some grocers are on the subject, a grocer said, in all seriousness, last September, 'I suppose now is the time for autumnal teas'—imagining that the autumn of the tea gardens was the same as the autumn of the English harvest field."

According to the Bureau of Statistics of the United States Treasury Department, the value of the TEA IMPORTED INTO THE UNITED STATES was 14,570,285 dols in 1902, 8,744,190 dols in 1901, and 11,783,317 dols in 1900. The exports of tea during 1902 amounted to 924,544 lb, making the net imports 107,822,920 lb. The Chinese imports were 56 per cent of the total, and Japanese 32.1 per cent. The imports for December, 1902 were 16,479,579 lb, against 7,565,451 lb for December, 1901.

The *Daily News*, quoting the current issue of "India" calls attention to

THE PLANTERS' LABOUR BILL, now being considered by the Madras Legislative Council. "India" declares that this measure "might more truly be called the Madras Slavery Regulation Bill," and that it will be a public scandal if it is allowed to become law: and the *Daily News* thinks that while the question of forced labour in South Africa is under discussion the Madras Bill should be given a share of attention.—*Hand & C Mail*, Feb 27.

PLANTING NOTES.

PLANTING IN NYASSALAND.—For a chatty hopeful letter from a Ceylon planter see another page. He says tobacco is to make the fortune of plantation owners, supplemented by tea grown for local sale at 3s a lb! We trust there is a good time before all Nyassaland and B C A. proprietors.

THE PEARL FISHERY.—In answer to a correspondent, we may say that the most elaborate and best account of the Pearl Fisheries ever published was contained in letters by the late A. M. Ferguson, C.M.G., to the *Ceylon Observer* in 1887, summarised and reproduced in "Ceylon in the Jubilee Year."

SEA COCONUTS.—Amongst the many curiosities cast up on the shores of the West Indian islands by the sea are numbers of brown, globular fruits, with a hard rind or shell, about the size of a hen's egg. These are popularly known as 'sea coconuts. In reality they are fruits of the Timite palm (*Marcaria saccafera*, Mart.) which grows abundantly in the swampy lower districts of Trinidad and along the river banks of the South American mainland. The tree produces large quantity of seed, which falling into the water are borne by ocean currents to the shores of the West Indies. Dr. Morris in his article on 'A Jamaica Drift Fruit' thus refers to this sea waif:—"In the West Indies the ripe fruits of a palm unknown in the greater Antilles are continually brought up by Gulf Stream from the South and washed ashore at Jamaica and other places. They are locally called [in Jamaica] sea-apples or sea coconuts. They are the fruits of the 'Bussu Palm.' The white kernel is sometimes fresh enough to be eaten after long immersion in salt water. The fruit was gathered by Sloane as long ago as 1687, and he remarked that it was frequently cast on North-west islands of Scotland by currents in the sea."—*Agricultural News*, Jan. 17.

VANILLA.—Only 43,991 pounds of vanilla were exported from Mexico in 1901, with a value of £57,426, as against 64,921 pounds in 1900 valued at £62,565, due to a failure of the crops by heavy frosts in the early part of the year. The value of the exports as here given makes the value of each pound £1 6s whereas in the previous year it was only £1 0s 6d, a difference which coincides with the silver value declared at the custom-houses.—*B. and C. Druggist*, Feb. 27.

THE TONACOMBE ESTATES CO. OF CEYLON.—The annual meeting of this Company was held today and the report submitted by the Directors, as will be seen elsewhere, is a model in respect of the comprehensive and interesting information it offers to the shareholders. A dividend of 5 per cent was declared besides a balance of R5,654.06 standing to the debit of Buildings account being written off and a sum of R8,642 carried forward. Other announcements which ought to please the shareholders were made—that the Debenture Debt has been further reduced by £500 during the year and that the Kalugalla estate has been purchased during the year for R17,500. A report of the meeting will be found elsewhere.

MERIT OF ORANGE JUICE.—Professor Kiosto, an eminent Japanese bacteriologist, also Prof. Koch and others, have shown that the acid of lemons, apples, and other fruits, citric acid and malic acid are capable of destroying all kinds of disease germs. Cholera germs are killed in fifteen minutes by lemon juice or apple juice, and typhoid fever germs are killed in half an hour by these acids, even when considerably diluted. If you squeeze a lemon into a glass of water containing cholera germs and let it stand 15 or 20 minutes, you may drink the water with impunity, as the germs will be dead. These juices will kill other disease germs. Instead of telling a man to have his stomach washed out, we can now tell him to drink orange juice, which will cleanse the stomach as thoroughly as a stomach tube, providing it is not a case of gastric catarrh. The fruit diet will cleanse the stomach and the alimentary canal, and drive off disease germs, which are responsible for a large share of our ailments.—*Journal of Agriculture* of Western Australia for Feb.

A RIVAL TO KANDY.—Mr. W. R. TOWNSEND, a recent visitor to Java, writes a description of that country which appears in the *San Francisco Argonaut Inter alia* he says:—"At Buitenzorg thirty-three miles from Batavia, at an elevation of one thousand feet or so, with towering volcanoes to the east and west, the climate is much cooler than at Batavia, and the place is a popular resort for Batavians. Here the governor-general's residence is located in what is claimed to be the finest botanical garden in the world. It certainly is ahead of anything we have seen, greatly excelling those at Calcutta and Kandy in Ceylon, both of which are famous. There is an avenue of kanary-trees, each tall trunk covered with a different species of giant creeper, some of them orchids, which are wonderfully fine. The collections of palms, orchids, water lilies, bamboos, and innumerable other trees and plants embrace almost every known variety, and are beautiful beyond description."

Correspondence.

To the Editor.

COCONUT PLANTING IN FIJI.

ENORMOUS FRUITING ON OUR PALMS.

Tavanni, Fiji, Feb. 5.

DEAR SIR,—Just a line to describe a very peculiar freak I have just seen. A young coconut tree, 5 years old just coming into bearing: It has three spathes or blossoms and on the largest of the tree I counted 30 spears to the spathes and on one of the spears I counted 51 nuts, making a total of about 1,500, on the one spathe. There are about 1,000 each on the other two so that at the present time there are about 3,400 nuts on the tree. There are two more tremendous spathes that will be blossoming in a few days when we expect to see over 5,000 nuts on the tree—nearly a ton of copra. Now can you Ceylon chaps beat that? When you can let me know, will you? I can assure you it is a positive fact I have often seen from 1,000 to 1,200 nuts on a tree, but this caps all.

We are having a magnificent year—better, in fact than last, I think. I am trying to get hold of some averages this year and will let you know result bye-and-bye. The whole country is looking very well.—Yours faithfully, H. V. TARTE.

[A practical coconut planter's remarks on the above are:—

“The degree of ‘proliferous’ of the coconut palm varies greatly and although an average of 60 nuts per tree per annum in Ceylon is considered a good yield; yet there are individual trees which bear 400 to 500 nuts a year. However, I have never seen or heard before of such a phenomenon as a coconut spathe with 1,000 to 1,500 fruit on it. I doubt whether such a huge cluster of nuts would reach maturity, as the stalk is sure to break down with their weight before the nuts are even half ripe. Trees of vigorous growth send forth a spathe once a month. The wonderful 5-year old tree, your Fiji correspondent refers to, has already produced 5 spathes, all of abnormal size, and we may expect at least 3 more before the oldest nuts are ripe enough to be gathered.

“The tree should then carry over 9,000 nuts, beside about 3 dozen fronds, but would the stem support such a ponderous load? Mr Tarte should have the tree photographed at once, so as to show the several clusters of young nuts of different stages. It would be interesting to know the length and girth of one of these extraordinary spathes. Mr Tarte says he has often seen 1,000 to 1,200 nuts on a tree. It will be of much interest if he will give the average yield of, say, 1,000 trees in full bearing on his plantation.”—ED. T.A.]

INFORMATION ON THE CASTOR OIL TREE WANTED.

Batticaloa, March 14th.

DEAR SIR,—Can you or any of your readers be so kind enough as to let me know, through the medium of your valuable paper, if there is any book in which the cultivation of Castor, is dealt with? If there is any, I shall be much obliged, if I will be informed by you or any of your numerous readers, where such a book could be procured. As an experiment is to be tried in the

cultivation of Castor in the Island, I shall deem it a favour if you or any of your readers could furnish me with the following particulars:—

- (1). Nature of soil required for the cultivation of castor.
- (2). How castor is planted? How many feet apart from each other?
- (3). In how many months will castor bear fruit?
- (4). How many years after, will the plants yield?
- (5). What will be the yield for a year, per acre?
- (6). How are the crops collected?
- (7). What should be the temperature of the place?
- (8). What is the average price of a bushel of castor in England, and in Ceylon?

Yours faithfully,

SUPPRA.

[We take the following from the “Treasury of Botany,” as the fullest information we can find:—

CASTOR OIL PLANT is botanically known as *ricinus communis*, the seeds yielding castor-oil. The plant is a native of India, but is now widely distributed over the warmer regions of the globe and throughout the Mediterranean region. It is even cultivated in England as an annual and is known under the name of Palma Christi. In the English climate the stems do not attain a height of more than from three to five feet; in India however, they grow from eight to ten feet, while in Spain, Crete, Sicily, and elsewhere the plant is stated to become a small tree. The stem is jointed of a purplish-red colour, and covered with a glaucous bloom like that of a plum. The leaves are large stalked palmate deeply divided into seven lance-shaped segments and at the junction of the blade with the stalk of the leaf is a small saucer-like gland. The flowers are in spikes, the males being placed below, the females above. There are several varieties of this plant, differing in sundry slight particulars and amongst others in the size of the seeds. These latter are oval flattened of a greyish colour mottled with brownish blotches. At the upper end of the seed is a small sponge-like excrescence. It is stated that the best oil for medicinal purposes is derived from the small seeds that procured from the large seeds is coarser and in India employed for lamps and in veterinary practice. A still prevalent error is that the acrid purgative principle resides in the seed-coats and in the embryo only while the albumen is destitute of it. The oil is extracted by boiling the seeds and by pressure in an hydraulic press the latter process yields the most esteemed oil. After expression the oil is purified by being allowed to stand, by decantation, and by filtration. In India the oil after having been obtained by pressure is mixed with a certain proportion of water and boiled till the water has evaporated. In France the oil is obtained by macerating the bruised seeds in alcohol but the process is expensive, and the product inferior. The larger quantity of the oil used in this country is imported from India. Castor-oil is very largely used as a gentle and efficient purgative; its nauseous taste is however, a great objection to its use. This may partially be overcome by mixing it with orange-wine, gin, or peppermint-water, or by making it into an emulsion with the yolk of an egg or mucilage. The leaves are used for various purposes, for which their size and coolness render them serviceable, and topically as an application in rheumatism.—ED. T.A.]

CEYLON GROWN RUBBER IN LONDON.

London, Feb. 27.

DEAR SIR,—We wrote you re Ceylon grown Para Rubber a few weeks ago and now have to

report further sales which, we think, will be of interest to your readers:—

Mark	Cases		Sold at per lb
Culloden	6	Fine thin biscuits	4/2
do	2	Good scrap	3/4½
do	1	Large balls scrap	3/0½
do	1	Scrap good	3/2
do	1	Scrap fair	3/0½
Edengolla	3	Fine thin biscuits	4/2
do	1	Good scrap	3/1½
Clyde	2	Fine thin biscuits	4/
do	2	Scrap	3/
Kumaradola	1	Fine in small biscuits	3/4½
Yatipauwa	3	Scrap	3/0½
Igalkande	1 crate	Fine thin biscuits	4/2
Aberdeen	1 case	Fine thin biscuits	3/10
do	1 bag	Good scrap	3/1½
Tudugulla	5 cases	Fine thin biscuits	4/2½

The market is strong and prices seem likely to go higher. Kindly insert above in your paper, as planters are much interested.—We are, dear Sir, yours faithfully,

LEWIS & PEAT.

P.S.—Fine Para 3s 8½d to 3s 9d.

PLANTING NOTES.

THE NAHAVILLA ESTATE CO. LTD.—The directors and shareholders and the Agents and Secretaries of this Company have our warm congratulations on the return of prosperous times after some two or three years decidedly discouraging balance sheets. The report appears on page 698, and it will be noted a 5 per cent dividend is declared.

VANILLA.—An item that will have some interest to vanilla growers is the following:—A consignment of about 300 kilos of vanilla cultivated in German East Africa arrived in Hamburg a short time ago. The beans are said to be of fine dark chocolate colour and are commencing to crystallise. They are of various lengths, and are reported to compare favourably with the best Bourbon quality.—*Agricultural News*, Feb. 14.

FAILURE IN THE RUBBER TRADE.—At a meeting yesterday afternoon of the creditors of Messrs Kramrisch and Co, rubber merchants, of Liverpool, the liabilities were stated at £111,663 11s, and the assets at £7,089, leaving a deficit of about £104,000, in regard to the absence of Mr Kramrisch abroad, about which rumour has been busy, it is stated on good authority that he has been endeavouring to arrange matters for the benefit of his creditors and will shortly return. A committee has been appointed to carry out a deed of assignment.—*London Times*, Feb. 25.

GUM ARABIC.—The unsettled condition of several parts of the world, notably Somaliland and Morocco, has influenced the position of some well known products, one of which we may instance namely, gum arabic, a fact which shows the necessity, either of secondary sources for any indispensable product, or of some available substitute. Opposed as we are to substitutes generally, it would seem that out of the numerous species of *Acacia* known, a picked or sorted gum might yet be found to tide over a time of scarcity, which might perhaps end in establishing for itself a reputation of a lasting character, if not for use in food or medicine, at least for manufacturing purposes,—a remark that applies to products other than gums.—*Agricultural News*, Feb. 14.

THE FORMATION OF PEARLS.

A SEASONABLE ARTICLE.

By far the greater number of recent writers on pearls, whether scientific or otherwise, when discussing the cause of pearl-formation, have contented themselves with recapitulating what has already been written on the subject, without attempting to verify or refute the various hypotheses that have been propounded. The question is one which has called forth speculative theories since the earliest times of which we have any records; but, with the exception of the brilliant researches of Filippi and a few of his contemporaries, theory has prevailed to the almost complete exclusion of practical investigation.

In a recent paper, based upon an examination of large quantities of material comprising a number of the pearl-producing species of mollusca, I have tried to place our knowledge of the matter upon a more satisfactory basis. By observations upon pearl-bearing examples of the common mussel *Mytilus edulis* (which were confirmed in the case of all other species examined), I proved that the formation of the pearl takes place in exactly the same way as that of the shell, except that a true pearl is laid down in a closed sac of the shell-secreting epithelium, embedded in the subepidermal tissue of the mantle and completely cut off from the outer epithelium itself. Inside this spherical epithelial sac, the shell substance is laid down in the concentric layers that are so characteristic of the pearls, instead of in the parallel lamellæ which are found in the shell itself. Such a sac, with its contained pearl, may be compared to a human atheroma cyst. This makes it necessary for us to draw a sharp

DISTINCTION BETWEEN PEARLS PROPER AND BLISTERS OR PEARLY EXCRESCENCES

of the shell lining, which are secreted by the outer (shell-forming) mantle epithelium, to cover over foreign bodies that have intruded themselves between the mantle and the shell or to repair the damages done by shell-boring domiciliaries. "Concretions" are, again, distinguished from pearls as calcosphæritic bodies which have not a cuticular origin from an epithelium, but seem to arise by free crystallisation in the mantle or other tissues. The term "attached pearl" should be applied only to pearls which have become secondarily fused to the shell by absorption of the intervening tissues. From the facts of pearl-formation, it is easy to understand why the pearl presents the special characters of the particular species of shell from which it is taken, and also why, in the same mollusc, the characters of the pearls produced are determined by the part of the mantle in which they are formed. Thus, pearls formed in the extreme mantle margin are composed mainly of periostracum, e.g. the leathery pearls of *Modiola modiolus*, while those which occur in the part of the mantle concerned in depositing the prismatic substance are made up of concentric layers of rod-like prisms, as in the brown or "black" pearls of the Scotch river mussel, *Margaritana margaritifera* (Fig. 1). By far the greater part of the mantle epithelium deposits the nacre, and pearls which arise in this part of the mantle are the typical nacreous ones, to which the great majority of the marketable gems belong. Even the uncalcified substance of the hinge ligament of the shell may be represented in the pearls;

for example, in the great Australian mother-of-pearl oyster, *Margaritifera maxima*, Jameson, black leathery pearls are sometimes found in the dorsal body-wall. I next proceeded to investigate the

ORIGIN OF THE SAC IN WHICH THE PEARL ARISES,

and also the nature and origin of the "nucleus" which is so often to be found in the centre of the pearl. In a great many molluscs, among which were several of the pearl-oysters proper, the remains of trematodes were found to form the nuclei, a discovery which confirmed the observations of Filippi, Möbius and others. In one or two cases, however, other parasites played the same part. By confining my attention to the common mussel, I proved that the epithelial sac, which is all-important for pearl formation, is first formed around the live trematode which enters upon a resting stage in the tissues of *Mytilus*. A similar sac, surrounding a trematode, was found in an example of the Ceylon pearl-oyster, *Margaritifera vulgaris*, Schumacher, which I examined. For the formation of the pearl, it is not necessary for the trematode to persist as nucleus, for it often happens that it migrates out of the sac; but the sac, caused primarily by the specific stimulation of the parasite, is essential to pearl production. In *Mediola mediolus*, and probably in some other forms, similar sacks are formed around Sporozoa. The next subject to be investigated was the origin and

LIFE HISTORY OF THE PARASITE THAT CAUSES THE PEARL-SAC.

The common mussel was found to be the most convenient species on which to study this, and the pearl-bearing mussel-beds of Billiers, in Brittany, and Piel, in the Barrow Channel, were selected as suitable sites in which to begin the observations (Fig. 2) The parasite, like most trematodes, passes through a regular cycle of three hosts, two of which are invertebrates and the third a vertebrate. It arises in sporocysts in the "tapestry shell," *Tapes decussatus* and the cockle *Cardium edule*, the former acting as first host at Billiers, the latter at Piel, where *Tapes* does not occur. The young tail-less Cercariæ or trematode larvæ leave the mother sporocysts in the first host and migrate into the mussel. The transmission of the parasite from *Tapes* to *Mytilus* was proved experimentally in a tank at the Brighton Aquarium. In the mussel, the parasite enters into a resting stage, in the sub-epidermal connective tissue, and gives rise to the epidermal sac or "epithelioma" in which the pearl arises (Fig. 3.) If the parasite dies in this sac, a pearl is formed around its remains, or if it migrates to another part of the tissues, a pearl may be developed in the empty sac. Although it was found impossible to secure live uninfected material of the final host for experiment, it is almost certain that the adult stage of the parasite is *Distoma (Leucithodendrium) somateriæ*, Lev., a worm which occurs in the intestine of the elder duck, *Somateria mollissima*, and the black duck or scoter, *Oedemia nigra*. Both these birds feed almost exclusively on mussels. A number of scoters caught or shot in the immediate vicinity of the Billiers pearl-beds were found swarming with this worm. Indeed, one example of the worm, in an immature condition, quite indistinguishable from the resting stage which occurs in

Mytilus, was taken from the intestine of a scoter. Our knowledge of the life-stories of other trematodes, or "flukes" as they are popularly called, enables us to fill in the life-history of this parasite with considerable detail. The worm reaches maturity in the intestine of the scoter and eider, and the eggs pass out with the faeces. These eggs, or possibly "Miracidium" larvæ derived from them, enter *Tapes* or the cockle and there give rise to sporocysts, in which the young flukes or Cercariæ are formed. These larvæ, unlike typical Cercariæ, are tailless, and when they escape from *Tapes* reach the mussel chiefly by drifting with the tidal currents. On entering the mussel, they pierce the body wall and settle down in the subcutaneous tissues, in which they become surrounded by the pearl-sacs. If the mussel lives long enough, pearls will be formed in these sacs. If, on the other hand, a mussel containing these resting Cercariæ is eaten by an eider duck or scoter, the Cercariæ develop into the mature worms, which produce eggs, and the life cycle is repeated. As an

ECONOMIC RESULT OF THESE INVESTIGATIONS, it would seem that the artificial production of marketable pearls in large quantities should present no great difficulties, if the conditions essential to pearl production in the particular cases be intelligently investigated. The fact that trematodes have been ascertained to be at least one cause of pearl formation in several of the molluscs that produce the marketable gems gives us every reason to hope that, by learning the life-histories of these parasites, we may be able to infect any number of pearl-oysters of pearl-mussels to any desired extent, without any operation on the individual molluscs, by simply placing them in the roper surroundings, in company with infected examples of the first host. Once infected, the molluscs could be bedded out on suitable grounds, and left to care for themselves, until the pearls formed in them were of marketable size.

FUTILITY OF OYSTERS TRANSFERENCE.

These observations show the futility of the proposal that has so often been made, viz., that young pearl-oysters should be transferred from their native grounds to more accessible in-shore waters, as it must obviously be the first object of the scientific expert, before laying down the beds of young pearl-oysters, to assure himself either that they are already infected or that the conditions essential to speedy infection are present on the grounds to which the oysters are to be transplanted.—H. LYSTER JAMESON in *Nature*, Jan. 22.

THE CACAO CROP OF TRINIDAD—is expected to be very large this season. The *Port of Spain Gazette* estimates that during the month of December, close upon 20,000 bags (of 130 lb each) will have been brought down by the railway. The *Grenada St. George's Chronicle* draws attention to the necessity of supplementing the cacao industry with others, in view of the rapid increase in cacao production in other parts of the world. The export of this crop from West Africa has risen from 166,054 bags in 1898 to 297,054 bags in 1902. From South America also increased production is recorded. Bahia for instance exported 192,000 bags in 1900, and 236,548 bags in 1902 *Agricultural News* Feb. 14.

CINCHONA AND QUININE.

Messrs. C. M. & C. Woodhouse afford a good deal of generally interesting information in their annual review of the above markets published in February. They say that the bi monthly exports of bark from Java continue to exercise the chief controlling influence on the quinine market; although the total shipments for 1902 were by no means excessive. But when shipments for a fortnight in August were telegraphed at $1\frac{1}{2}$ million lb., a panic occurred, only abated when news came of short exports afterwards. Now the Java planters are expected to regulate shipments; just as India and Ceylon tea planters are expected to try and control the offerings of their staple in the London market—rather a difficult task. The Java Cinchona men have resolved “to offer during 1903 at every Amsterdam Cinchona Bark Auction, not more than 1-10th of the yearly production of every estate.” The largest monthly export last year was 1,577,000 lb. in October, and the smallest 776,000 in May. A great feature of the market was the large orders for quinine during the past six months, and Germany has been a large exporter, sending away 232,200 kilogrammes in 1902 against 195,400 in 1901. United States, Russia and Italy are the chief customers. The unit value of bark, in London varied from $1\frac{1}{2}$ d. to 2d. per lb. Altogether, the estimated production of cinchona bark is given, as equivalent to 14,489,000 ounces of quinine in 1902; and Java makes up 12,457,000 ounces of this, leaving only 2 millions for the rest of the world, of which again India gave more than half. South America, the original home of cinchona, gave last year bark only equal to 620,000 ounces of quinine; Ceylon 195,000 oz.; Africa 86,000 oz.—Java exported 700,000 ounces of quinine locally manufactured, against 11,757,000 oz. sent away in bark. So that the Java quinine manufactory of which we heard so much, does not deal with much more than 5 per cent of the whole crop of bark. The United States is the greatest consumer, importing 3,400,000 oz. of quinine beside bark for local manufacture equal to 2,496,000 oz. France takes bark equal to 1,802,000 oz. quinine; Germany consumes a million oz. of quinine; but exports 6,195,000 oz. exclusive of what goes to the United States, Russia and Italy each use up over a million oz., and Greece and Turkey rather more. The British Empire makes up another million; and Netherlands, Austria and other countries about $1\frac{1}{2}$ million more. The world's consumption is slowly increasing.

 THE FUTURE OF QUEENSLAND:

A SAD PICTURE.

Writing from Dornoch Terrace South Brisbane, Queensland, on 16th February, Mr. Donald Mackay (so well-known in Ceylon) tells us in the course of a chatty letter:—“I am working my way back from New Zealand to Malaya. The disorganised state of trade

owing to the ravages of drought makes it more difficult to get along round the north of Queensland and through the Eastern Archipelago for the lines that were formerly regular have become quite irregular for want of loading. I don't know what this poor country is coming to—what with the visitations of Providence and the intolerance of the labour-ridden Government of the Commonwealth which decreed that even tropical Queensland should be the close preserve of the white labour which cannot labour to any purpose. Even now a Government Agent is going about, arranging for the deportation to the New Hebrides of the Kanakas, many of whom have been here for years, some of whom have been here for twenty. The Government or the labour party, which is one and the same thing, think that by bonuses of two pounds per ton, sugar can be grown by whites. Assuming it can, what can be said of a policy that keeps up the price of labour by simply taxing the rest of the population? This is only one of the many examples of labour class legislation, to the detriment of the general body, that has been passed by the Parliament of the Commonwealth. Both N.S.W. and Queensland have suffered already from the Federal protectionist tariff, but this state has suffered most and it is for it a cause for bitter regret that it went into Federation in blind faith, without any guarantees. It was quite open to Queensland to have made terms as West Australia had, but the wise men of the former State had not the foresight of those of the latter who did not pin their faith on the word of any man, much less on those of the colonial politician on the lookout for office. It is stated, and I think with a good deal of truth, that the present Premier of the Commonwealth—to gain the support of the labour party—ate his own words, spoken when bidding for office, and allowed his legislation to be controlled and virtually ruled by the labour minority in Parliament. Hence it is that indirect taxation on necessities of the multitude, which was really little felt, was sacrificed and as a consequence resulted in a highly protectionist tariff which is now being strongly agitated against by the Opposition. The labour party, though a small minority, hold the fort because of their organisation outside which is complete. The other and larger interests of agriculture and commerce are not organised and consequently are not able to assert themselves to substantial effect in the control of legislation and Government of the country. The arrogance of the labour party and the ruinous results of their narrow, selfish policy will assuredly lead to counter-organisation of rival interests in Australia as it did in New Zealand, where the farming interest is organised and ready to strike in when the pinch of adversity makes labour arrogance intolerable. Labour is having its day of power which, in its short-sightedness, it is using most arrogantly; the more so the better, for the quicker will come the reaction and the more crashing the downfall, I cannot discourse any longer on the politics of Australia which are none of the sweetest, so must say good-bye and with best wishes &c.

Monthly Shipments of Ceylon Black Tea to all Ports in 1902-1903.*

(Compiled from Chamber of Commerce Circular.)

	UNITED KINGDOM.		RUSSIA.		CONTINENT OF EUROPE.		AUSTRALIA.	
	1902. lb.	1903. lb.	1902. lb.	1903. lb.	1902. lb.	1903. lb.	1902. lb.	1903. lb.
January ..	9056013	7720436	612958	323101	151934	127883	714247	1738760
February	7455219	7983166	919709	372474	121158	150846	1020948	1337353
March ...	8198179		896513		91081		1713916	
April ...	8521388		988698		93198		2081904	
May ...	9638555		238239		80669		2000522	
June ...	12563050		1984976		166479		1828695	
July ..	10724781		1779011		108785		1747960	
August ...	7396614		1065599		208894		1574498	
September	6652202		795315		70262		1857897	
October ..	6559765		360844		79943		1567796	
November	6386229		937757		218619		1033030	
December	9072552		285785		60628		1577381	
TOTAL ..	102,899,489		11,599,953		1,206,140		18,718,794	

	AMERICA.		ALL OTHER PORTS.		TOTAL.	
	1902. lb.	1903. lb.	1902. lb.	1903. lb.	1902. lb.	1903. lb.
January ..	125795	538166	389215	584321	11050212	11032667
February ..	115332	743733	385705	615790	10018071	11203362
March ...	566263		311191		11777143	
April ...	807390		290137		12782715	
May ...	242651		436410		12637046	
June ..	403005		714471		17660676	
July ...	464858		846036		15671431	
August ...	461229		678095		11384929	
September	563981		688730		10618487	
October ...	483085		655827		9707260	
November	282794		547508		9400936	
December	558864		626319		12181529	
Total ...	5,048,137		6,569,644		146194397	

Monthly Shipments of Ceylon Green Tea to all Ports in 1901-1902.

	UNITED KINGDOM.		RUSSIA.		CONTINENT OF EUROPE.		AUSTRALIA.	
	1902. lb.	1903. lb.	1902. lb.	1903. lb.	1902. lb.	1903. lb.	1902. lb.	1903. lb.
January ..	64021	95535	..	..	..	3000	..	..
February	24839	52407	4420	..	..	1430	..	..
March ..	14800	..	24210	..	..	..	..	..
April ...	13676	..	8000	..	..	..	..	..
May ...	70103	..	..	..	..	..	..	..
June ..	87340	..	74225	..	..	..	..	..
July ...	40574	..	..	..	..	..	..	..
August ..	70900	..	..	..	..	..	..	..
September	50771	..	..	..	..	..	..	..
October ...	68679	..	..	..	..	..	..	..
November	48076	..	..	..	..	..	..	..
December	40423	..	..	..	..	..	..	..
TOTAL ...	644,443		127,115					

	AMERICA.		ALL OTHER PORTS.		TOTAL.	
	1902. lb.	1903. lb.	1902. lb.	1903. lb.	1902. lb.	1903. lb.
January ..	113332	26534	..	..	177353	363883
February	26480	567474	515	..	56254	621616
March ...	62313	..	100	..	101423	..
April ...	53610	..	9165	..	84451	..
May ..	32676	..	3280	..	106059	..
June ...	84184	..	4500	..	250249	..
July ...	194016	..	..	..	234590	..
August	105982	..	1600	..	178482	..
September	333704	..	6800	..	391275	..
October	281168	..	..	..	349847	..
November	156653	..	20080	..	224809	..
December	365843	..	2240	..	408506	..
Total ...	1,968,456		48,280		2,796,844	

* It is impossible to get the figures for the last month in time for publication; but see pages 712, 713 for certain information.

SHARE LIST.

LONDON COMPANIES

ISSUED BY THE
COLOMBO SHARE BROKERS'
ASSOCIATION.

CEYLON PRODUCE COMPANIES.

Company	paid p. sh.	Buy. ers.	Sell. ers.	Tran. sactions.
Agra Ouvah Estates Co., Ltd.	500	920	...	920
Ceylon Tea and Coconut Estates	500	...	...	...
Castlereagh Tea Co., Ltd.	100	97.50	...	100
Ceylon Provincial Estates Co. Ltd.	500	550	...	550
(Ascent Estates Co., Ltd.	100	...	...	...
Clunes Tea Co., Ltd.	100	...	80	80
Clyde Estates Co., Ltd.	100	...	50	...
Doomoo Tea Co., of Ceylon Ltd.	100	75	...	...
Drayton Estate Co., Ltd.	100	...	...	...
Eliu Tea Co., of Ceylon, Ltd.	100	...	47½	...
Estates Co of Uva, Ltd.	500	...	300	...
Gangawatte Tea Co., Ltd.	100	...	...	...
Glasgow Estate Co., Ltd.	500	...	1200	1150
Great Western Tea Co., Ltd.	500	...	750	...
Hapugahalanda Tea Estate Co.	200	...	...	...
High Forests Estates Co., Ltd	600	500	...	...
Do part paid	400	...	400	...
Horrekelly Estates Co Ltd	100	...	100	...
Kalutara Co., Ltd.,	500	...	325	...
Kandyan Hills Co., Ltd	100	...	...	...
Kanapediwatte Ltd.	100	...	75	75
Kelani Tea Garden Co., Ltd.	100	...	40	...
Kirklees Estate Co., Ltd.	100	65	...	...
Knivesmire Estates Co., Ltd.	100	...	65	...
Maha Ura Estates Co., Ltd.	500	...	...	...
Mocha Tea Co., of Ceylon, Ltd.	500	780	...	780
Nabavilla Estate Co., Ltd.	500	...	400	...
Neboda Tea Co., Ltd.	500	...	...	...
Palmerston Tea Co., Ltd.	500	...	400	...
Penrhos Estates Co., Ltd.	100	...	92½	92½
Pitakanda Tea Company	500	...	...	...
Pine Hill Estate Co., Ltd.	60	...	47½	...
Putupaula Tea Co. Ltd.	100	...	...	...
Ratwatte Cocoa Co., Ltd	500	...	...	...
Rayigam Tea Co., Ltd.	100	50	52½	50
Roeberry Tea Co., Ltd.	100	100	...	100
Ruarwella Tea Co., Ltd	100	...	67½	65
St. Heiers Tea Co., Ltd.	500	...	500	...
Taigaswela Tea Co., Ltd.	100	...	35	37½
Do 7 per cent Prefs.	100	...	80	...
Tonacombe Estate Co., Ltd.	500	...	400	...
Union Estate Co., Ltd.	500	...	...	...
Upper Maskeliya, Estates Co., Ltd.	500	610	650	...
Uvakellie Tea Co. of Ceylon, Ltd	100	...	85 xd.	...
Vogan Tea Co., Ltd.,	100	...	60	60
Wanarajah Tea Co., Ltd.	500	900	...	com.
Yataderiya Tea Co., Ltd.	100	360	370	370

CEYLON COMMERCIAL COMPANIES

Adam's Peak Hotel Co., Ltd.	100	...	30	—
Bristol Hotel Co., Ltd.	100	70	80	—
Do 7 per cent Debts	100	...	...	—
Ceylon Gen. Steam Navigation Co., Ltd.	100	...	225	—
Ceylon Ice & Cold Storage Co. Ltd.	100	...	...	—
Ceylon Superereration Ltd.	100	...	225	—
Colombo Apothecaries' Co. Ltd.	100	...	152.50	—
Colombo Assembly Rooms Co., Ltd.	20	15	...	...
Do prefs.	20	...	...	...
Colombo Fort Land and Building Co., Ltd.	100	90	...	...
Colombo Hotels Company	100	...	290	290
Galle Face Hotel Co., Ltd.	100	192½	200	...
Kandy Hotels Co., Ltd.	100	130	...	...
Mount Lavinia Hotel Co., Ltd.	500	...	300	...
New Colombo Ice Co., Ltd.	100	...	97½	95
Nuwara Eliya Hotels Co., Ltd.	30	25	27½	...
Do 7 per cent prefs.	100	...	...	...
Public Hall Co., Ltd.	20	...	...	...

Company	paid p. sh.	Buy. ers.	Sell. ers.	Tran. sactions.
Alliance Tea Co., of Ceylon, Ltd.	10	8	9	—
Anglo-Ceylon General Estates Co	100	...	52-57	—
Associated Estates Co., of Ceylon	10	...	nom	—
Do. 6 per cent prefs	10	...	2-4	—
Ceylon Proprietary Co.	1	...	5-10	—
Ceylon Tea Plantation Co., Ltd.	10	...	24-25	—
Dimbula Valley Co. Ltd	5	...	5½-6	—
Do prefs	5	...	5½-6	—
Eastern Produce & Estate Co. Ltd.	5	...	3½-4½	—
Ederapolla Tea Co., Ltd	10	...	5-8	—
Imperial Tea Estates Co., Ltd.	10	5	6.6	—
Kelani Valley Tea Asscn., Ltd.	5	...	3-5	—
Kintyre Estates Co., Ltd.	10	...	4-5	—
Lanka Plantations Co., Ltd	10	...	3-4	—
Nahalma Estates Co., Ltd.	1	...	nom	...
New Dimbula Co., Ltd.	1	...	2½-3	...
Nuwara Eliya Tea Estate Co., Ltd.	10	...	10½	...
Ouvah Coffee Co., Ltd.	10	...	8-9	—
Ragalla Tea Estates Co., Ltd.	10	...	9-11	—
Scottish Ceylon Tea Co., Ltd.	10	...	10-12	...
Spring Valley Tea Co., Ltd.	10	...	2-5	...
Standard Tea Co., Ltd.	6	...	11-12	...
The Shell Transport and Trading Company, Ltd.	1	...	2½-3½	...
Ukuwella Estates Co., Ltd.	25	...	par	...
Yatiantota Ceylon Tea Co., Ltd.	10	...	6.7	6½
Do. pref. 6 o/o	10	...	9.10	9½

BY ORDER OF THE COMMITTEE.
Colombo, Ap. 11 3rd, 1903.
* Latest London Prices

RAINFALL RETURN FOR COLOMBO.

(Supplied by the Surveyor-General)

	1898.	1899	1900	1901	1902	Av. of 33yrs.	1903.
	Inch	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
January ..	2.32	.98	3.72	11.91	1.95	3.46	4.16
February ..	1.98	2.78	0.63	3.55	4.57	2.02	3.95
March ..	4.21	0.88	3.71	5.12	6.85	4.82	0.53
April ..	22.81	6.66	15.12	8.71	10.01	11.30	0 00*
May ..	5.80	17.73	10.63	6.28	11.89	11.86	
June ..	10.94	9.23	7.83	5.93	9.84	8.32	
July ..	6.15	1.11	6.77	4.52	4.63	4.46	
August ..	0.97	0.62	7.35	0.46	2.78	3.66	
September ..	6.90	1.48	4.00	3.93	8.18	5.04	
October ..	20.60	12.99	9.47	3.91	31.47	14.56	
November ..	17.38	8.58	9.25	19.84	20.10	13.00	
December ..	3.05	4.44	5.20	1.70	6.43	6.21	
Total..	103.11	73.48	83.68	75.86	118.70	88.71	10.64

* From 1st to 2nd April nil that is up to 9.30 a.m. on the 2nd April.—ED. C.O

CEYLON TEA: MONTHLY SHIPMENTS TO UNITED KINGDOM AND ESTIMATE.

Estimate for	Mar. 1903—8½ to 9 mill. lb.
Total Shipments	Do 1903—7,500,000 lb.
Do Do	Do 1902—8,198,179 lb.
Do Do	Do 1901—7,982,090 lb.
[ESTIMATE for Apr. 1903—8½ to 8¾ million lb.]	

"PHILIPPINES AND THEIR RICHES"—is the heading of an article (in *The Manila Times*, February 28th), in which Capitalists are urged to "go East"!—and we read:—

There are hundreds of thousands of acres of the most fertile sugar lands in the world merely awaiting capitalists to take advantage of them, while there are some millions of natives, honest and experienced, who are only too anxious to cultivate them.

TEA IN NATAL.—The article we quoted the other day from the *Natal Mercury* has elicited two further communications, quoted elsewhere. The first writer's acquaintance with the general conditions of tea-growing in Natal was, it will be seen, greater than with up-to-date methods of plucking &c.

COLOMBO PRICE CURRENT.

Furnished by the Chamber of Commerce.)

EXPORTS

Colombo, Mar. 30th, 1903

CARDAMOMS:—

All round parcel, well bleached per lb.	R1-00
Do. dull medium do.	R0-80
Special assortment, 0 and 1 only do	R1-20
Seeds do.	R0-70

CINCHONA BARK:—

Per unit of Sulphate of Quinine 8c—1½ to 3 per cent.

CINNAMON:—(in bales of 100 lbs. nett.)

Ordinary assortment per lb.	49c.
Nos. 1 and 2 only per lb.	56c.
Nos. 3 and 4 only per lb.	41c.

CINNAMON CHIPS:—(in bags of 56 lbs. nett. per candy of 560 lb.) R57-50

COCOA:—

Finest estate red unpicked per cwt	R45-00
Medium do do do	R37-50
Bright native unpicked and undried	R35-00
Ordinary do do do	R30-00

COCONUTS—(husked)

Selected per thousand	R47-00
Ordinary "	R38-00
Small "	R30-00

COCONUT CAKE:—

Poonac in robins f. o. b. per ton	R75-00
Do in bags	none.

COCONUT (Desiccated).

Assorted all grades per lb 17c.

COCONUT OIL:—

Dealers' Oil per owt.	R14-25
Coconut Oil in ordinary packages f. o. b. per ton	R32-50.—Business done.

COFFEE:—

Plantation Estate Parchment on the spot per bus.—R9-50.

Plantation Estate Coffee f. o. b. (ready) per cwt.—None

Native Coffee, f.o.b per owt.—None.

CITRONELLA OIL:—

Ready do per lb.—53c.

COPRA:—

Boat Copra per candy of 560 lb.	R45-50
Calpentyng Copra do do	R45-50
Cart do do do	R42-00
Estate do do do	R45-00

CROTON SEED per owt—R11-00

EBONY:—

Sound per ton at Govt. depot None—Sales of this day

Inferior None—Sales of this day.

FIBRES:—

Coconut Bristle No. 1 per cwt	R12-00
Do " 2	9-00
Do mattress " 1	3-00
Do " 2	2-00

Colr Yarn, Kogalla " 1 to 8

Do Colombo " 1 to 8 16-50

Kitool all sizes 12-00

Palmyrah None

PEPPER—Black per lb

None

PLUMBAGO:—

Large lumps per ton	R600-00	} Firmer.
Ordinary lumps do	R550-00	
Chips do	R350-00	
Dust do	R250-00	
Do (Flying) do	R125-00	

SAPANWOOD per ton R45-00—Nominal.

SATINWOOD (Sound) per cubic ft. R5-90—Sales of 26th Jan

Do (Inferior) per cubic ft. R4-40— do

Do (Flowered) per cubic ft. R10-70— do

High Grown Medium Low Grown

TEA:—

Broken Pekoe and Broken	cts	Average.	Average.
Orange Pekoe per lb	59	46	41
Orange Pekoe do	56	43	37
Pekoe do	51	39	36
Pekoe Sonchong do	40	35	33
Pekoe Fannings do	38	32	30
Broken mixed—dust, &c	33	29	29

CEYLON EXPORTS AND DISTRIBUTION FOR SEASONS 1902 AND 1903

COUNTRIES	1902		1903		Total
	1902	1903	1902	1903	
To U. K.	20518113	22460731	1716	1716	34678844
" Austria	12558	175	105	105	12733
" Belgium	34346	8137	289	289	35432
" France	0842	68969	161	1488	75312
" Germany	120883	106502	1488	1000	221385
" Holland	1092	3200	1000	11200	15402
" Italy	1227408	2404178	1626	36400	4467434
" Russia	800	500	156	8100	9456
" Spain	21682	174887	423	8100	197000
" Sweden	173980	174887	3291	13935	159901
" Turkey	4136379	2673995	46	9520	6840244
" India	1483401	693162	20	225	2176588
" Australia	99116	111029	62	62	210245
" America	1145-60	646300	219	1578	763557
" Africa	37940	27999	1578	1995	77939
" China	19382	1995	1578	1995	41320
" Singapore	70770	940-0	1578	1995	73342
" Mauritius	27513025	27513025	11696	69723	27629951
" Malta	109706	109706	92703	92703	219570
Total export from 1st Jan. to 30th Mar. 1903.	299210385	27513025	471650	697223	306782583

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Price Current, London, 11th March, 1903.)

	QUALITY.	QUOTATIONS.		QUALITY.	QUOTATIONS.
ALOE, Socotrine cwt.	Fair to fine dry	70s a 80s	INDIARUBBER (Contd.)	Foul to good clean	8d a 3s
Zanzibar & Hepatic "	Common to good	24s a 60s	Java, Sii g. & Penang lb.	Good to fine Ball	2s 6d a 2s 3/4 d
ARROWHOOT (Natal) lb.	Fair to fine	7d a 8d		Ordinary to fair Ball	2s a 2s 4d
BEE'S WAX, cwt.			Mozambique "	Low sandy Ball	9d a 2s
Zanzibar Yellow "	Slight y drossy to f ir	£6 10s a £6 15s		Sausage, fair to good	s 2d a 3s 2 1/2 d
Bombay "	For genuine	£5 30s a £6 10s	Nyassaland	Liver and Livery Ball	1s 9d a 2s 8d
Madagascar "	Dark to red polish	£6 7s 6d a £7 2s 6d		Fair to fine ball	2s 3d a 3s 3d
CAMPHOR, Formosa "	Crude and semi-refined	160s a 175s	Madagascar	Fr to fine; pink & white	2s a 2s 9 1/2 d
Japan "	Fair average quality	175s		Fair to g d black	1s 1d a 2s 3 1/2 d
CARDAMOMS, Malabar lb.	Clipped, bold, br ght, fine	1s 6d a 1s 8d	INDIGO, E.I	Niggers, low to fine	7d a 2s
	Middling, stalky & lear	1s a 1s 2d		Bengal--	
Ceylon, Mysore "	Fair to fine plump	1s a 3s 7 d		Shipping mid to gd violet	3s 8d a 4s
	Seeds	1s 2d a 1s 5d		Consuming mid. to gd.	3s 2d a 3s 7d
" Tellicherry "	Good to fine	1s 6d a 2s		Ordinary to mid.	2s 10d a 3s 1d
	Brownish	1s 3d a 1s 6d		Mid. to good Kurpah	1s 9d a 2s 3d
" Long "	Shelly to good	9d a 2s		Low to ordinary	1s a 1s 7d
" Mangalore "	Med brown to fair bold	2s 8d a 2s 11d	MACE, Bombay & Penang	Mid. to good Madras	1s 4d a 1s 10d
CASTOR OIL, Calcutta, "	1sts and 2nds	2d a 2 1/2 d	per lb.	Pale reddish to fine	3s a 3s 6d
CHILLIES, Zanzibar cwt.	Dull to fine bright	21s a 40s		Ordinary to fair	2s a 2s 9d
CINCHONA BARK.-lb.	Ledgeriana Orig. Stem	6d a 9d		Pickings	1s 9d a 1s 11d
Ceylon	Crown, Renewed	5d a 7d	MYRABOLANS,	Dark to fine pale UG	5s a 6s nom
	Org. Stem	2 1/2 d a 4 1/2 d	Madras } cwt	Fair Coast	4s 8d a 4s 6d
	Red	3d a 5 1/2 d	Bombay "	Jubbulpore	4s a 5s 6d
	Org. Stem	3 1/2 d a 4d		Bhimlies	4s a 7s 6d
	Root	3 1/2 d a 4d	Bengal "	Rajapote, &c.	3s 6d a 5s 6d
CINNAMON, Ceylon	Ordinary to fine quill	8 1/2 d a 1s 6d		Calcutta	3s
per lb.	" "	7d a 1s 6d	NUTMEGS--		
	" "	7d a 11d	Bombay & Penang "		
	" "	2 1/2 d a 10d			
CLOVES, Penang	Dull to fine bright bold	6d a 1s			
Amboyna "	Dull to fine	5d a 6d	NUTS, ARECA cwt.		
Zanzibar }	Good and fine bright	3 1/2 d a 4d	NUX VOMICA, Bombay	Ordinary to fair fresh	6s a 17s
Stems }	Common dull to fair	3 1/2 d a 3 1/2 d	per cwt. Madras	Ordinary to middling	5s 6d a 6s
		2d		Fair to good bold fresh	7s a 10s
COFFEE				Small ordinary and fair	4s a 6s 9d
Ceylon Plantation "	Bold to fine bold-coloury	90s a 115s	OIL OF ANISEED "	Fair merchantable	4s 2d a 4s 3d
	Middling to fine mid	70s a 100s	CASSIA "	According to analysis	2s 2d a 3s
	Small	59s a 62s	LEMONGRASS "	Good flavour & colour	5d a 5 1/2 d
	Good ordinary	40s a 50s	NUTMEG "	Dingy to white	1 1/2 d a 2 1/2 d
	Small to bold	36s a 40s	CINNAMON "	Ordinary to fair sweet	3 1/2 d a 1s 1d
COCOA, Ceylon	Bold to fine bold	65s a 88s 6d	CITRONELLE "	Bright & good flavour	9d a 10 1/2 d
	Medium and fair	58s a 64s	ORCHELLA WEEB.-cwt		
	Native	60s a 57s	Ceylon	Mid. to fine not woody.	10s a 12s 6d
	Middling to good	8s a 1s nominal	Zanzibar. "	Picked clean flat leaf	10s a 14s
COLOMBO ROOT				" wiry Mozambique	10s a 11s
COIR ROPE, Ceylon ton			PEPPER (Black) lb.		
Cochiu "	Ordinary to fair	£13 10s a £18	Alleppee & Tellicherry	Fair to bold heavy	5 1/2 d a 6 1/2 d
FIBRE, Brush	Ord. to fine long straight	£16 a £19	Singapore	Fair	5d
Cochiu "	Ordinary to good clean	£20 a £24	Acheen & W. C. Penang	Dull to fine	5 1/2 d a 5 1/2 d
Stuffing "	Common to fine	£7 a £9	PLUMBAGO, lump cwt.	Fair to fine bright bold	3s a 3s 5s
COIR YARN, Ceylon	Common to superior	£15 a £30		Middling to good small	20s a 28s
Cochiu "	" very fine	£12 a £32	chips	Dull to fine bright	9s a 15s
	Roping, fair to good	£10 a £14 10s	dust	Ordinary to fine bright	4s a 7s 6d
CROTON SEEDS, sft. cwt.	Dull to fair	15s a 25s	SAPFLOWER	Good to fine pinky	45s a 75s
CUTCH	Fair to fine dry	25s a 30s		Inferior to fair	60s a 60s
GINGER, Bengal, rough,	Fair	41s	SANDAL WOOD--		
Calcutt, Cut A "	Good to fine bold	80s a 85s	Bombay, Logs ton.	Fair to fine flavour	£15 a £30
B & C "	Small and medium	46s a 60s	Chips "	"	£5 a £8
Cochiu Rough "	Common to fine bold	34s a 40s	Madras, Logs "	Fair to good flavour	£15 a £30
	Small and D's	32s a 34s	Chips "	Inferior to fine	£4 a £8
Japan	Unsplit	30s	SAPANWOOD Ceylon "	Fair to good	£5 a £5 10s
GUM AMMONIACUM "	Sm. blocky to fine clean	10s a 35s	Manila "	{ Rough & rooty to good	£4 10s a £5 15s
ANIMI, Zanzibar "	Picked fr. fine pl. in sts.	£10a £13	Siam "	bold smooth "	£7
	Part yellow and mixed	£7 a £10	SEEDLAC cwt.	Ord. dusty to gd. soluble	117s 6d a 120s
	Bean and Pea size ditto	£7 5 a £9	SENNA, Tinnevely lb	Good to fine bold green	5 1/2 d a 8d
	Amber and dk. red bold	£5 15s a £7 10s		Fair greenish	3 1/2 d a 5 1/2 d
	Med. & bold glassy sorts	95s a £6 15s	SHELLS, M. o'PEARL--	Common dark and small	1 1/2 d a 3d
	Fair to good polish	£4 a £8	Bombay cwt.	Bold and A's	
	" red	£4 5s a £7 10s		D's and B's	
ARABIC R. I. & Aden "	Ordinary to good pale	2s 6d a 3s 6d	Mergui "	Small	30s a 140s
Turkey sorts "			Mussel "	Small to bold	£7 15s a £10 10s
Ghatti "	Pickings to fine pale	12s a 25s		Small to bold	17s a 55s
Kurrachee "	Good and fine pale	2s 6d a 30s	TAMARINDS, Calcutta...	Mid. to fine bl'k not stony	8s a 10s
	Reddish to pale selected	10s a 2s	per cwt. Madras	Stony and inferior	4s 6d a 6s
Madras "	Dark to fine pale	15s a 20s	TORTOISESHELL--		
ASSAFETIDA	Clean fr to gd. almonds	50s a 10 s	Zanzibar & Bombay lb.	Small to bold dark	15s a 22s
	Ord. stony and blocky	58s a 45s		mottle part heavy	12s a 14s
KINO	Fr to fine bright	41 a 5d	TURMERIC, Bengal.cwt.	Fair	
MYRRH, picked "	Fair to fine pale	75s a 120s	Madras "	Finger fair to fine bold	
Aden sorts "	Middling to good	65s a 95s		bright	9s 6d a 13s
OLIBANUM, drop "	Good to fine white	12s a 50s	Do. "	Bulbs	9s
	Middling to fair	10s a 42s 6d	Cochin "	Finger	9s 6d a 10s 6d
pickings "	Low to good pale	10s a 3s		Bulbs	9s a 9s 6d
siftings "	Slightly foul to fine	15s a 23s	VANILLOES--		
INDIARUBBER, Ceylon	Fine (grwn. fr. Para seed)	2s 8d a 4s 2 1/2 d	lb.	Gd. crysallized 3 1/2 a 8 1/2	7s 6d a 25s 6d
Assam	Good to fine	2s a 2s	Mauritius ... } 1sts	Foxy & reddish 3 1/2 a 8 1/2	6s a 13s
	Common to foul & mx'd.	7d a 1s 8d	Bourbon ... } 2nds	Lean and inferior	5s 6d a 8s 6d
	Fair to good clean	2s a 3s	Seychelles	Fine, pure, bright	3s a 3s 1d
Rangoon	Common to fine	6d a 2s 6d	VERMILION	Good white hard	62s 6d a 65s
Borneo			WAX, Japan, squares cwt		

THE AGRICULTURAL MAGAZINE, COLOMBO.

Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."

The following pages include the Contents of the *Agricultural Magazine* for April:—

Vol. XIV.]

APRIL, 1903.

[No. 10.

PRINCIPLES OF NUTRITION AND NUTRITIVE VALUE OF FOOD.



THIS is the subject of a learned paper by Prof. W. O. Atwater, of the United States Department of Agriculture, who as special agent in charge of nutrition investigations, speaks with authority on this very important subject. There is so much in it that should come within the knowledge of both grower and consumer, that we have decided to summarise the contents of the paper for the benefit of our readers who will no doubt be able to learn a great deal about the true value—nutritive and pecuniary—of food, as well as the general subject of diet, the errors of which has so much to do with the welfare of mankind.

It is well known that the chemical substances of which the body is composed are made up of the same elements as those of the foods which nourish it. The most abundant of the 15 or 20 elements occurring in the human body are oxygen, hydrogen, carbon, nitrogen, calcium, phosphorus and sulphur, which combine to form a variety of compounds. The most important among these latter are the substances distinguished as protein, fats, carbohydrates, mineral matter and water, whose functions stated generally are to build and repair the various tissues of the body, and to supply it with heat and muscular energy.

Water is among the most important compounds, forming over 60 per cent of the weight of the body of the average man, being itself a component of all the tissues.

Mineral matter or ash forms 5 or 6 per cent of the body weight, and is found chiefly in the bones and teeth, though also present in the tissues and fluids. Phosphate of lime is the mineral basis of bone, and compounds of potassium, sodium, magnesium and iron are found in the body and are necessary to life.

Protein includes the principal nitrogenous compounds and is familiar in the form of meat, white of egg, &c. It forms 18 per cent of the body weight in the average man. The albuminoid proteids include substances similar to white of eggs, lean of meat, curd of milk, &c. The gelatinoids occur principally in the connective tissues, and with the albuminoids are the most important constituents of our food, forming the basis of bone, muscle and other tissues. They yield heat on combustion, and are to some extent transformed into fat and stored in the body. Proteids are most abundant in the animal foods though also present in cereals, and, in large proportion, in legumes. It should be added that the gelatinoids are less valuable than the albuminoids for nutriment. The "extractives" though classed as proteids are very different from the two already mentioned. They are the chief ingredients in meat extracts, such as beef tea, &c. They are believed neither to build up tissue nor supply energy, but act as stimulants and appetisers. The nitrogenous compounds of vegetables contain more or less of the so-called amids analogous to the extractives of meat. Fats occur chiefly in animal foods, but are also found as oily matter in seeds. When the food supply is short, fat, and also protein, is drawn upon to supply heat. Fat forms 15 per cent of the average body weight. The tendency to fatness is not

decided by food and exercise alone, but depends also on personal idiosyncrasy or some other little understood factor. Sugar and starch of foods are charged into and stored as fat in the body.

Carbohydrates.—These include starches, sugars and cellulose which occur chiefly in vegetable foods, though, milk contains much sugar. The carbohydrates form less than 1 per cent of the body. Starches and sugars are important as being a source of energy, and are easily digested.

In discussing the nutritive value of food we must discard the refuse part of it, such as bones of meat, shells of eggs, skin and seeds of fruit, in order to find the actual cost of the nutrients.

The potential energy of food is transformed in the body into heat and mechanical power. The latter is required for work, the former is used to keep the body warm, and when more is generated than is needed for that purpose it is wasted. The body is indeed a machine, but unlike other machine it is self-building, self-repairing and self-regulating. It is, however, more than a machine in that it has a nervous organisation, sensibilities, and the higher intellectual and spiritual facilities, the right exercise of which undoubtedly depends upon the right nutrition of the body.

Shortly stated the uses of food are (1) to form the material of the body and supply its waste, (2) to yield heat for the warmth of the body and furnish muscular and other power for its work. The principal tissue formers are the proteids, especially the albuminoids which make the frame-work of the body, build up and repair nitrogenous materials (muscles, tendons) and supply the albuminoids of the blood and other fluids. The albuminoids of food are transformed into albuminoids and gelatinoids of the body. Muscle, tendou, cartilage, bone, skin, blood corpuscles, the casein of milk are all made from them. The gelatinoids of food, such as the finer particles of tendon and the gelatin (which are dissolved out of bone and meat in soup) though not believed to be tissue formers, protect the albuminoids from consumption. When the food contains gelatinoids in abundance, less of the albuminoids is used. The proteids can be so changed in the body as to yield fats and carbohydrates, and are also burned directly in the body like carbohydrates. The material of lean meat may be converted into muscle and its energy into heat and muscular power, but a one-sided diet of meal is unsuitable. Fats and carbohydrates (starch, sugar) are the chief fuel ingredients of food—the former being the more concentrated fuel. The fat stored in the body for food, and that formed in the body from carbohydrates, act as reserve supplies of fuel. While the functions of the different nutrients are interchangeable, only albuminoids can do the work of building and repair.

Heat and muscular power are forms of force or energy. The energy latent in food is developed as the food is consumed. When combustible matter is oxidised, be it meat or wood, bread or coal, the latent energy becomes active and is transformed into heat and power. Again, as various kinds of fuel differ in the amount of heat they produce, so various kinds of food give off

different amounts of energy, and hence have different values as heat-producing substances.

When a man does no muscular work (beyond respiration, circulation, &c.) all the energy leaves the body as heat; otherwise it is expended partly in this way and partly in muscular work. Any way, the interesting point is that the energy given off is exactly equal to the latent energy of the material burned in the body. The body thus obeys the great law of the conservation of energy which obtains in the physical world. In practically applying the principle of this law to the body, we have to take into account the chemical composition of food, the proportion of nutrients actually digested and oxidised, and the proportion of the whole latent energy of each which becomes active and useful for warmth and work. Taking our common food materials as they are used in ordinary diet, the following is a general estimate for the energy furnished by 1 lb. of each class of nutrients:—

Protein	fuel value, 1,820 calories per lb.
Fats	" 4,040 " "
Carbohydrates	" 1,820 " "

[One calorie is equal to very nearly 1.54 foot tons, that is to say, one calorie of heat, when transformed into mechanical power, would suffice to lift 1 ton 1.54 feet.]

It will thus be seen that a pound of protein of lean meat or albumen of egg is about equivalent to one of starch or sugar as regards fuel value, and that a little over 2 lbs. of either would be equal to a pound of meat or butter fat.

Thus the fuel value depends upon the amounts of the nutrients, especially fat.

Here are a few instances of the fuel value of common foods themselves:—

Wheat flour	... 1,625 calories per lb.
Butter	... 3,410 " "
Milk	... 310 " "
Cream	... 865 " "
Skin milk	... 165 " "

(To be continued.)

OCCASIONAL NOTES.

The flowering tree now pretty common about Colombo and popularly known as "Madre de Cacao" has at last been fully named *Milletia atropurpurea* by Sir Joseph Hooker. The seeds originally came to the late School of Agriculture from Central America in exchange for seeds of the Dhall or pigeon pea (*Cajanus indicus*). The tree is very easily grown from cuttings, and is rapidly spreading as a shade and hedge plant, while the blossoms, which appear in February-March, are really handsome.

The curious name "Arthapal" by which the English potato (*Solanum tuberosum*) is locally known is only a corruption of "earth apple" (pome de terre) not to be confounded with earth nut or ground nut (*Arachis hypogaea*). "Potato" is said to be derived from "batata" (the Spanish for sweet potato) which must therefore have been known before the former. By-the-bye has any one heard the term "rata-inala" applied to the

English potato? Watt mentions this as the Sinhalese name. Of course, the innala (*Plectranthus tuberosus*) is known as the "country potato."

The Sinhalese word *ala* is indiscriminately applied to all kinds of yams, including the potato, and is apparently equivalent to tuber or bulb. In some cases a prefix serves to distinguish different varieties as in "dehi-ala." The sweet potato is bathala, which some say signifies "the yam which is farinaceous like rice" (bath), and others consider as only a modified form of the Spanish and Portuguese Batata. The specific term *batatas* is believed to be the original South American name.

Some authorities, however consider the sweet potato a native both of the old and new world, that it formerly grew wild in the forest of the Malayan Archipelago, and that *batatas* is the Malayan name. Nicholls states that the plant was first mentioned by Pigafetta who visited Brazil in 1519, and found the Indians using the tuber. Soon after the plant went to Spain and spread over Europe, being introduced into England long before the English potato. Dr. Pavy says that the tubers were imported into England by way of Spain, and that it is the article referred to as the potato by writers before the middle of the 17th century.

With us the term "yam" is applied to the products of either the Araceæ or Dioscoreaceæ, but not so in the West Indies. The name *Tania* is applied to the tuberosus rhizomes of *Colocasia antiquorum* (Sin. Gahala,) while the term Yam is confined to the several species of Dioscorea.

The pineapples of the Matale district, where oranges also flourish, are becoming famous. Dr. Van Royen has succeeded in growing excellent pines that turn the scale of 16 lbs., and with the careful cultivation he is adopting we shall not be surprised if he beats the record of 20 lbs. reached by Henaratgoda, another pine-growing district.

The Colombo Agri-Horticultural Society's Show to be held at Henaratgoda Gardens in July next promises to be a great success. The Mudaliyars of the contiguous Korales are showing great enthusiasm over the coming Exhibition, the first to be held by the Society out of Colombo city, and the Honourable the Government Agent of the Western Province, to which the Show is to be confined, is not less enthusiastic than his chiefs.

One of the prizes offered is for the best School Garden in the five neighbouring Korales. This is an innovation, and is creating keen competition among the village schoolmasters. The first prize will be a large silver medal, a smaller silver medal going to the second best garden.

The renovation of "black cacao" by the aid of anatto (*Bixa orellana*) dye has now become quite an art, and it is a common sight to see

Moormen—dealers in cheap cacao—churning the seed in a sheet of coarse cloth together with the colouring medium, made up of cacao juice and anatto. Unfortunately the colour is not a fast one, and the Colombo Broker has, it is said, discovered a convenient and extremely simple means of distinguishing the genuine from the spurious "bold bright red," viz., rubbing the seed against a white substance,—when the dye (like similar capillary washes) comes off!

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF MARCH, 1903.

1	Sunday	...	Nil	17	Tuesday	...	Nil	
2	Monday	...	Nil	18	Wednesday	..	Nil	
3	Tuesday	...	Nil	19	Thursday	...	Nil	
4	Wednesday	...	Nil	20	Friday	..	Nil	
5	Thursday	...	Nil	21	Saturday	...	Nil	
6	Friday	...	Nil	22	Sunday	..	Nil	
7	Saturday	...	Nil	23	Monday	...	Nil	
8	Sunday	...	Nil	24	Tuesday	...	Nil	
9	Monday	...	Nil	25	Wednesday	...	Nil	
10	Tuesday	...	Nil	26	Thursday	...	Nil	
11	Wednesday	...	Nil	27	Friday	...	Nil	
12	Thursday	...	Nil	28	Saturday	...	10	
13	Friday	...	Nil	29	Sunday	...	Nil	
14	Saturday	...	Nil	30	Monday	..	Nil	
15	Sunday	...	23	31	Tuesday	...	44	
16	Monday	...	Nil	1	Wednesday	...	Nil	
							Total...	77

Mean.. '02

The greatest rainfall recorded in any 24 hours, on 31st March, 1903, 44 inches,

Recorded by ALEX. PERERA.

SCHOOL GARDENS IN WEST INDIES.

The following account of the efforts made in Trinidad to encourage a practical interest in plants by means of School gardens is taken from the Annual Report for 1901-02 of the Inspector of Schools for the Colony:—

Of the 82 Schools in operation on March 31, 1902, 67 had taken up Practical Agriculture previous to that date, and out of the 80 schools examined, 30, or 37.5 per cent. presented this subject, the results being in my opinion satisfactory for the first year.

In some schools, notably Mayaro Government, and New Gaand, E.C., to which the award of "Very Good" was given, the subject had been treated in a systematic and intelligent manner, whilst at other schools, notably—Hard Bargain, North Trace, New Grant and Princes Town Government, 5th Company, 6th Company and Neckchuddy Road E.C. the work deserves great credit.

My chief object has been to impress upon the teachers that a school garden is not for the purpose of merely growing vegetables, but to be cultivated in such a manner as to impress upon the children by means of experiments the benefits

to be derived from *true* Agriculture. I have also recommended teachers to try and induce the parents of children to come and see the results for themselves which will do more, I think, than anything else, to make them believe in the benefits to be derived from the proper training of this most important subject, and cause its more rapid spread and adoption amongst the labouring part of the community; and this I am glad to say has already commenced, as some of the parents of the children attending 5th Company, 6th Company, and Neckchuddy Road E.C. Schools, have been to the teachers asking for information as to the methods used to grow the fine vegetables obtained at these schools.

The chief faults in the school gardens are:—

(1) Overcrowding, and mixing of different plants, which renders 'rotation of crops' impossible.

(2) Planting only with a view to get as much as possible out of the land, without any regard to exhaustion of the soil, and without experiments.

(3) Insufficient use of green manure.

(4) Want of compost heaps.

(5) Insufficient mulching during the drying season.

In order to remedy these mistakes, I am advising the teachers:—

(1) To set aside a plot for each kind of vegetable, and plant at regular distances.

(2) To set aside a portion of each plot for experiments.

(3) To bury in each plot as much as they can of the plant refuse.

(4) To form compost heaps of any surplus vegetable refuse, weeds and grass.

(5) Always to mulch as far as possible in the dry season.

I have been careful to inform teachers that it is not the look of the garden on the day of examination for which the award is given, but for the general work during the year.

On the whole I am sure that, I think the outlook for practical agriculture in this district is very promising, and if an instructor could visit the different schools two or three times a year, and take practical work, as well as give lectures, the results would be marked, as I have no doubt that after a time some of the more intelligent adults would also attend sometimes, more especially if the subjects of the lectures were known beforehand.

I am sorry to say that the parents of pupils attending Russillac C.M.I. School have refused to allow their children to work in the school garden, and have threatened to take them away if they are compelled to do so. In consequence practical agriculture has ceased to be taught at this school.

VETERINARY NOTES.

Still another cure for tape-worm is powdered kamala. This is a dark ochre-coloured powder, consisting of minute glands and hairs obtained from the surface of the fruits of *Mallotus philippinensis*. It may be given in a little milk or

water, or as pills made with flour and water. Being very light it is difficult to mix it nicely with water. The dose for a lamb or kid is a teaspoonful heaped; calves twice that quantity; dogs half to a full teaspoon according to size and age.

Mallotus Philippinensis is an Euphorbiaceae plant called in Sinhalese *Himparilla*. It was formerly known as *Rottlera tinctoria*. Trimeu mentions that the powder of the seeds is used as an anthelmintic in cases of tape-worm and as a cure for itch. The bark is used for tanning, and the capsule yield a dye giving a permanent rich flame colour.

The following treatment for foot-and-mouth disease is taken from "Diseases of Stock and their Treatment" (Cape of Good Hope, Department of Agriculture): In the first stage, the internal administration of Epsom salts, one pound in three quart-bottles of water; followed by Epsom salts 1 oz., Hyposulphite of Soda $\frac{1}{2}$ oz., Chlorate or Nitrate of Potash 2 drs., given in drinking water for a few days. For a mouth wash: Carbolic acid 1 dr., vinegar 1 pint, water 1 pint, or borax 1 oz., alum 1 oz., water 1 quart.

For the teats: Permanganate of potash 20-grs., water 1 qt.; or tincture of myrrh 1 oz., glycerine 10 oz. to be applied twice daily.

For the feet, after thorough washing, and, where necessary, poulticing, apply sulphuric acid 1 oz, diluted with 4 oz. water to the abraded surface with a feather, and apply a bandage previously well soaked in Stockholm or Archangel tar,

An epidemic, recognised to be Indian "Surra" has been causing great mortality (estimated at from 75 to 80 per cent) among horses, mules, and oxen in the Mauritius, and as a result the cultivation of sugarcane has been seriously interfered with. The local Government has, it is reported, decided to apply for the services of Dr. Edington from the Cape of Good Hope,

Owing to the prevalence of Lathyrism in the Central Provinces of India, Major Buchanan, I.M.S. and Mr. Stockton, M.E.C.V.S., late Professor of Pathology in Edinburgh Veterinary School have been appointed to enquire into the cause and prevention of the disease. The malady is regarded as arising from the consumption of large quantities of the food grain known as *Lathyrus sativus* or teora, when not prepared in such a way as to eliminate the poisonous principle which it is believed to contain.

The following will give an idea of the disease: To begin with there is a feeling of weakness and drowsiness, with pains in legs and occasional cramps in the calves. Suddenly the patient falls, and being unable to rise, is confined to bed for a month or two. This is due to the paralysis of the lower extremities. The attempt to stand brings on spasms in the legs. There is also rigidity

of the muscles of the spine. Improvement is slow (assuming a change of diet) but gradual. There is no fever. Males appear to be more susceptible.

NEW VARIETIES OF SWEET POTATOES.

(*J. W. Mollison Inspector-General of Agriculture for India.*)

I imported three American varieties of sweet potatoes last year. These were first tried on the Bombay farms. The first Bombay crop was propagated from imported tubers, the second crop was propagated in the usual way from cuttings. It was planted on the 8th of April and was lifted at the end of July. A large number of cuttings were distributed from the first crop to various parts of India; therefore only about one-fourth acre was planted for the second crop. The area was too small for very reliable outturn figures. I give, however, the results as under:—

	lbs. per acre.
Nansemound	14,470
New Jersey	16,782
Virginia	21,413

The land was not directly manured but was in good condition. The produce from the whole plot ($\frac{2}{50}$ th acre) was sold for Rs. 90, or Rs. 303 per acre.

2. The crop also yielded a very large number of cuttings which have been used for distribution and for planting an extended area at the Bombay farms. I have now seen these varieties growing on various descriptions of soil in the Punjab, Bengal, Central Provinces and Bombay. The plants everywhere show great vigour of growth. I believe the introduction of these varieties to be an undoubted success. It is important, therefore, to have these American varieties tried in all districts where the crop is important. Cuttings can be supplied during October for experimental trials if applications are made to my office at Nagpur.

3. The crop does best on deep alluvial soil of a sandy or loamy character, but will also do well on any free working naturally dry soil of fair depth. The best crops are grown under irrigation in the rabi season; but in districts where the cold of winter is severe and the total rainfall is not excessive, the crop will probably do best if planted in June-July. The American varieties are not likely to thrive on deep black-soil.

4. The results reported from Poona show that the tubers were all sound and of good shape and size. They were proved to cook well and have good flavour. The Virginia variety produced 4 or 5 tubers from each plant. These tubers were larger than those usually obtained from indigenous varieties. The Nansemound and New Jersey varieties produced 16 to 18 tubers from one plant. These tubers were smaller than those from ordinary indigenous varieties, but were all of good marketable size. The tubers of each variety grew not far from the surface in clusters, and were much easier to dig than those of ordinary Indian varieties.

5. The cultivator of sweet potatoes is put to no particular expense for seed. He simply uses as cuttings the haulms of a previous crop. These cuttings may have to be planted in a nursery. A small nursery planted in March when the rabi crop is harvested will provide cuttings for planting a kharif crop in July, and this crop will, in its turn, provide cuttings for the next rabi crop which should be planted in October-November.

6. Full details regarding methods of cultivating this crop are given in Volume III of my *Agricultural Text-book*, but for easy reference I may refer to important points here.

7. The soil should be of suitable class and be well worked by repeated ploughings and harrowings. Beds should be formed if irrigation is required. The crop can be propagated from tubers, but more economically from cuttings or pieces of mature stem having four nodes to each cutting. The best cuttings are got from the middle portion of the stems. The date of planting the main crop will depend upon the usual custom in any particular district. The main crop is sometimes planted in flat beds and sometimes, in ridges made about 18 inches apart. The latter method is preferable. The cuttings, if planted in ridges, should be buried half way between the base and the apex and on each side of each ridge. Each cutting should be planted with two nodes buried and two ends above ground. A vigorous growth of long trailing stems is soon produced if the crop is healthy and very little hand-weeding is required. No irrigation is given in the rains, but if planted in the rabi season irrigation is necessary every 8 to 15 days according to the character of the soil.

8. The stems when in contact with wet soil after rain or irrigation become attached to the soil by rooting at the nodes. This must be prevented, otherwise small thin tubers of no marketable value form at each point of attachment. The tubers which form at the main root, moreover, will not grow so large as when the stems are kept quite free. The stems during growth must be repeatedly lifted clear from the ground and turned over to prevent the formation of these roots. These operations must be done often if the crop is good and the foliage luxuriant, and always with care, so that the stems and leaves are damaged as little as possible.

9. In a luxuriant crop the growing points of the long trailing stems may be pruned off without damaging the crop in any way. These prunings provide a delicate vegetable.

10. The crop should be lifted when the stems near the growing point get hard and fibrous and the leaves turn yellow. The vines should be reaped close to the ground and cuttings selected for a nursery. Such of the vines or portions thereof as are green and succulent can be used as cattle fodder. Irrigation water should be withheld as the crop approaches maturity. When the tubers are ripe they should be lifted at once, otherwise much damage will be done by rat and white-ants, &c.

THE CAROB OR LOCUST BEAN BEET.

This is also known as the Algaroba bean or St. John's Bread, and botanically as *Ceratonia Siliqua*. The seeds are said to be the original of the carat weights of jewellers.

According to the *Kew Bulletin* it is a native of Southern Europe. The tree is leguminous and usually grow 15 to 25 ft. high, with few branches and dark green pinnate leaves, composed of 2 or 3 pairs of leaflets of a leathery texture. The flowers are polygamous or dioecious (self-fertilising or unisexual on different plants). The pods are full of sweet mucilage, 6 to 10 inches long and contain many seeds. They are often eaten by the poorer people in the Levant and serve as a useful food for cattle. The seeds are also said to be used in the preparation of mucilage. In Italy and Southern Spain the tree is cultivated in dry strong localities and yields valuable crops. The value of beans exported from Cyprus reaches, in some years, £65,000. There are several cultivated varieties. As the tree is dioecious, male or female branches as is necessary must be engrafted to ensure fertilisation.

For cultivation in hot and dry districts, with strong soils, says the *Kew Bulletin*, there is little doubt that the carob is a valuable tree and deserves to be widely cultivated. It requires warmer conditions than the orange, and is said to prefer a calcareous sub-soil. We fancy it should therefore suit the northern part of the Island. It begins to bear about 3 years old, and a single tree may yield pods weighing in the aggregate about 2 cwts.

Dr. Balfour refers to the locust bean tree as the Husk tree, and mentions that the term locust in St. John's Bread (German: *Johannisbrod*) was given to the tree from a mistaken notion that its pods were the locusts referred to in Matt. iii. 4, and Mark i. 6, as forming part of the food of the Baptist.

The Greek word *Ceratia* or *Keratia* (which is given to the pods owing to their resembling a slightly curved horn, (*keras*) has been translated "husks" in the passage occurring in Luke xv. 16, "the husks that the swine did eat." The tree is common in the South of Europe as well as Syria and Egypt, and the pods were formerly used in large quantity to feed swine and cattle. Horace has the following reference to them: "Vivit siliquis et pane secundo" in *Epist.* II. i. 123. *Perseus* and *Juvenal* also allude to them, and *Pliny* describes them as food of pigs (*Lib.* xv. cap. 23, 24).

A tree will sometimes produce 800 or 900 lbs. of pods, useful for feeding horses, asses and mules. They were given to the British horses in the Peninsula war, and are to some extent imported into England for both horse and cattle food. Farmers mix the beans with oil cake and meal.

Another Algaroba bean tree distinct from, but closely related to the above is *Prosopis Julifera*, the mesquit or algaroba blanca, also with sweet succulent pods used as food. The tree is growing freely in the Government Stock Garden, and can be propagated by cuttings.

TOMATO WILT.

By A. DESPEISSIS.

This disease has been unusually prominent on tomatoes this season. The trouble is a bacterial blight. G. Delacroix, a French scientist, who has it under observation, first attributed it to an organism described *Bacillus solanacearum*; subsequent studies have since led him to state that the disease in question is not to be attributed to this organism, but to another apparently undescribed, to which the name of *B. solannicola* is given.

The attacked plants wilt suddenly and after a time leaves and stalks become discoloured and die. If a section is made of the stem, the pith channel is found brown, small warty spots on the stem, not unlike the water core of apples, let droplets of dirty white liquid exude. This liquid is full of bacteria. In potatoes this discolouration extends down the stalk to the tubers, which turn brown and rot. The disease is mostly spread by inoculation caused by the bite of insects; it is also associated with a web-like ground plant fungus, *Rhizoctonia Solani*, which extends its meshes from plant to plant, boring directly into the healthy cortical cell and thus giving and an entrance to the bacteria.

The first step to take is to spray with a poisonous mixture, and destroy those insects which feed from plant to plant, thus spreading the disease. One ounce of Paris green in ten gallons of Bordeaux mixture will effect this. Carefully dig round the diseased plants and prevent the spread of web-like fungus to healthy plants. Root up and carefully burn diseased plants.

The organism causing this trouble is believed to be present in the soil from which it spreads to the plants, and unfavourable meteorological conditions are a contributing cause of the infection. Sour ground aggravates the disease.

Tomatoes, potatoes, egg-fruit, black nightshade, Cape gooseberry, among other plants, harbour the germs of the disease, and for that reason should be avoided in the course of rotation over infested ground.—*Journal of the Department of Agriculture, Western Australia.*

CONDENSED MILK.

Few people have a clear idea of how condensed milk is prepared, and Mr. M. A. O'Callaghan's contributions on the subject in the *Agricultural Gazette* of New South Wales for January and March of this year (from which we summarise the information given below) are worth perusal by all consumers of the article in question. In Ceylon the use of Nestle's and the Anglo-Swiss Condensed Milk Co.'s milk is very extensive.

Condensed milk may be defined as new milk reduced by evaporation in a vacuum pan to about a third of its original volume. Before sterilising by heat was understood, the addition of cane-sugar was deemed essential; now, however, we have both sweetened and unsweetened milk

in the market. Many brands of condensed milk contain a very large amount of sugar—as much as 40 per cent in some cases. The result is that it is necessary to add a large quantity of water to dilute it sufficiently for use, and this is of course a serious objection.

Of eighty-six samples of condensed milk examined in the Government Laboratory, London, at the instance of the Committee appointed in 1899 to enquire into the use of preservatives and colouring matters in food, none were found to contain chemical preservatives. The use of such preservatives in condensed milk would thus appear to be unnecessary.

But for what is known as *concentrated milk* a preservative, and especially boric or boracic acid, is commonly used. The question will no doubt be raised as to what is concentrated milk, and what is the difference between it and condensed milk? The former is a product peculiar to Australia as far as the manufacture is concerned. It corresponds to the unsweetened milk of Europe. To state the difference clearly, condensed milk is milk from which a considerable part of the water has been evaporated and which has been *sterilised* by heat; it may or may not contain added sugar. Concentrated milk on the other hand is *pasturised* milk from which a certain proportion of water has been evaporated and which contains no added sugar. Condensed milk again is put up in 1 lb. tins which are filled and hermetically sealed. Concentrated milk is generally put up in gallon tins, and sometimes distributed from open vessels. Concentrated milk is not intended for long keeping, and indeed will not remain good beyond a few days, unless kept in cold storage. It is principally used on board-ship where it is much preferred to condensed milk. The question of using preservatives has been warmly discussed, and Mr. O'Callaghan is of opinion that .25 of boric might be allowed to be added before concentration, so that .5 or .75 will appear in the end according to the degree of concentration.

The following is given as the general technique of manufacture:—

(1) The milk is sometimes separated or centrifuged to remove all possible impurities before starting.

(2) The milk is now warmed (sometimes boiled) and sugar added when sweetened milk is to be made.

(3) Some factories heat it in open vats for some time before placing it in the vacuum pan. This is to help sterilisation.

(4) It is then evaporated till only a little over more than $\frac{1}{3}$ of the original amount remains, the evaporation being carried on in a vacuum pan, where the milk boils for a couple of hours. The temperature at which the milk is evaporated is an important point.

(5) After evaporation has been completed to the desired point the milk is drawn off, cooled, and packed in tin vessels.

(6) If the concentrated milk is required the process is now complete, but if sterile milk (condensed) is required, further heating is carried

on, and this is what is technically known as *processing the milk*.

(7) The milk is then held for some time to test its keeping qualities before sending it to market.

The following is given as the fat analysis of the better known milks:—

Ideal	... (unsweetened)	11.09	per cent.
Rowansborn	... (do)	10.90	" "
Nestle's	... (sweetened)	10.73	" "
Anglo-Swiss	... (do)	10.30	" "
Gold Medal	... (do)	10.30	" "
Highlander	... (do)	10.22	" "
Map brand Skim milk	do	1.53	" "

POUDRETTE.

(J. W. MOLLISON, M.R.A.C.)

A practical and profitable method of utilising human excrement as manure is specially important in India. In the light of up-to-date sanitary knowledge there is no doubt that with a properly organised water-closet system and regular house-to-house connections the sewage drainage of any city can be so purified that it can be used as a source of irrigation and of manure for crops without producing unsanitary effects. The purification is effected by several processes, the most effective of which is a septic tank and filter bed system. Other effective processes are known as "Dibden's filters" and the "macerating tank system." We have had each system in experimental operation in connection with sugar-cane experiments at Manjri (Poona), and the results are fully reported in my annual report 1899-1900. It is unnecessary to enter here into full detail. The purification is brought about through the influence of bacteria, and in the space of 24 hours the whole of the solid matter of the sewage disappears. The organic matter is converted into soluble inorganic salts. The test of complete purification is the conversion of all the organic nitrogen into nitric acid. In the Poona experiments the purification were not quite complete, the nitrogen being converted mostly into nitrites. The effluent has been proved a most valuable and quick-acting manure for sugar-cane and other crops, and at present I believe that it can be used as continuously as canal water for irrigation without causing unsanitary conditions of any kind. It is proposed to apply the system to the whole of Poona; and the Poona sewage scheme as engineered by Mr. J. C. Pottinger, Sanitary Engineer, Government of Bombay, is described in two addresses to the Municipality which he has recently published. Pure sewage cannot long be used for irrigating and manuring one particular area because the land to which it is applied requires intervals of rest. If used continuously the pores of the soil get choked with slimy organic matter which obstructs aeration, and in consequence an unhealthy condition of vegetation is produced.

In rural districts in England the earth closet system is practised. The same system is common in Ceylon. This consists in covering the solid and liquid excreta with earth. The urine is absorbed, the solid excreta deodorized. Earth, particularly good loam, has this power. The effect is due to

humus and clay. In Poona and many towns in India the deodorizing power and absorptive effect of earth or carbonized material is taken advantage of in the preparation of poudrette. The night-soil is collected and also the town sweepings and leaves &c., and carted to a depot outside the Municipal limits. The sweepings are burnt or rather charred. The ashes still containing a good deal of carbon are mixed with the night-soil. The ashes, if used in the right proportion, exercise a disinfecting power in deodorizing the whole mass. The resulting manure is a source of handsome revenue. A decided caste prejudice existed for years against its use until its effect upon sugar cane and garden crops was made perfectly clear to the cultivators.

The following is a method of manufacture of poudrette at Poona:—A series of beds 18 feet long, 15 feet wide, and 1 foot deep are floored with *marum*. A layer of ashes about 1 inch deep is laid on this floor, and night-soil poured thereon to a depth of about 5 inches. The mass is immediately covered with another thin layer of ashes one inch deep, and thereafter allowed to stand 24 hours during the fair weather, and for three days during the rains. Wooden rakes are then used to mix the night soil with the ashes. Another layer of ashes is now added, and the whole allowed to remain from three to eight days according to the state of the weather. It is then removed from the beds and dried on dry open ground. In the hot weather it is dry in five days and ready for sale and use. In the rains the whole process is conducted under cover and takes a longer time. When moist poudrette is heaped up sometimes, as with farmyard manure, an excessive degree of heat is generated which causes loss of nitrogen.

In the cantonments of Poona another method is adopted which is decidedly more sanitary. Pits of convenient length and width are dug, sometimes five feet deep. Into these pits the night-soil and dry pulverized earth are put in alternate layers and equal proportions. A capital manure results, but it is not ready for use for several months. It is not of course so concentrated a manure as poudrette made in the ordinary Poona way: Poudrette is recognised as an active and powerful manure for all irrigated crops in which a rapid and luxuriant growth is desirable. It is very suitable for sugarcane, lucerne, vegetable and all fodder crops. It is too forcing for grain crops and fruit trees. The plant is stimulated into active growth at the expense of fruit or grain.

Poudrette is seldom applied except where irrigation is practised. It is worth at Poona as much as R3 per cart-load, but in seasons of scant rainfall when a supply of irrigation water cannot be guaranteed it falls in value to less than R1 per load. Poudrette is applied at the rate of 15 loads per acre, up to as much as 80 loads per acre for sugarcane.

Dr. Leather's analyses show that Poona poudrette contains about one per cent of nitrogen, and generally a slightly higher percentage of phosphoric acid. The percentages of these ingredients vary with the percentage of moisture. If Poudrette was generally manufactured through-

out India at all populous centres, it would probably be the cheapest and best manure procurable.—*Textbook of Indian Agriculture.*

SOME PROBLEMS OF THE RURAL SCHOOL.

(From an American Point of View.)

That there are many important matters in connection with our system of rural education requiring urgent consideration there is no denying; and the publication of a paper on the subject of rural educational problems by Dr. True is very opportune, as likely to direct attention to questions that are closely connected with the best interests of the island, at a time when a good deal is being said or written about educational matters.

We therefore summarise the paper referred to for the benefit of our readers:—

The elementary rural school, free to all children, has undoubtedly done much to raise the general level of intelligence. But in considering the benefits of the system, we have lost sight of its shortcomings, and it has, at times, been in danger of becoming a "petrified institution" deprived of the progressive spirit which can only enable it to adapt itself to changing environment and advancing knowledge. With the growth of large towns and cities, men of influence have succeeded in developing a public school system to meet the needs of the stronger and more active communities,—a complicated system of public education for the urban youth—in order to equip him for various professional and industrial occupations. On the other hand the progress among rural communities has been along very narrow lines. The chief effort of the educational forces in the rural districts has been to provide schools of some sort to meet at least the simplest educational needs of a widely scattered multitude of children. The motto of our leaders would seem to have been, "Let us put a school house in every valley and in every hill-top," but little attention was given to make the curriculum of the country school suitable to the condition of the children. The problem was put aside with the remark—"These schools are no doubt unsatisfactory, but we see no present hope of their improvement. Let us go on building school houses, and trust the future to bring forth some plan for the betterment of the schools."

Fortunately, however, there has at length been aroused an interest in plans for the improvement of country schools. In these plans are contained much that promises to work to the advantage of agriculture, as well as to the greater welfare and happiness of the rural population.

The character of Agriculture is rapidly changing in many particulars which need not be here specified, and wider knowledge and greater skill is now needed. It is very important, therefore, that the agricultural people should understand the relations of rural schools to the progress of their art. When every other industry is ally-

ing itself closely with schools and seeking changes in the school courses, it surely will not do for agriculture to hold aloof from the educational movements of our time. It is true that attempts are being made to improve the condition of the rural school, but this must not be left entirely to the "schoolmen." The patrons of the schools, and the land-owners in the neighbourhood, should take an active part in the movement, and impress upon the schoolmen their real educational needs, and help to adjust the schools to the advancing requirements of agriculture.

Obviously the fundamental problem of our public schools is to give all the people at least the simplest rudiments of education. But this primary task they have not established as census reports can prove. Indeed it is illiteracy among the agricultural classes that is one of the greatest obstacles to the progress of agriculture. This "inert mass of absolute ignorance" prevents the introduction of better crops and better methods of cultivation; and the effects of the few intelligent ones to improve matters are largely defeated by the stupidity of those who must be looked to, to give practical effect to suggestions for improvement. There is, then, yet a great work to be done by schools among our rural communities.

The great object before every school is to find a way of getting all the available children within its walls, and keep them there long enough to give them a satisfactory training. For this funds are necessary, and the greater part of the money required for the proper maintenance of schools must be raised by taxation. This may not sound well, but the fact cannot be got over. There are, however, certain general principles to be applied in levying school taxes: (1) The aim should be to provide every child of school going age with equal opportunities for an education. (2) The whole wealth of the "State" should be made available for educating all the youth of the State. (3) The individual communities requiring schools should contribute according to their means towards the support of their own school. The failure to observe these rules has resulted in keeping up the percentage of illiteracy, and has imposed too large contributions on the rural communities, or left them without proper inducements to contribute their share. The main object as regards maintenance, is to have such an adjustment of State aid and local self-help as will make the schools efficient and keep their patrons alive to their best interests. It is not necessary here to discuss the merits of laws to check the evil of non-attendance at schools because of the money value of the labour of school children; but it is sufficient to say that one of the important educational problems to be solved is the securing of more general attendance of children at the elementary schools provided for them.

Though in some respects urban schools have the advantage over country schools, in others the reverse is the case, and there are many natural advantages in the latter. The free and open life of the country imparts greater vigour of mind and body; the occupations of the country necessitate a more varied exercise of both mind and body, and

the country environment furnishes a much wider range of materials for interesting study, which (the greater the pity) is almost entirely neglected by the schools. Given a bright, energetic and well-trained teacher, and 25 to 40 healthy and active country children between 5 and 18, and we may easily have a school where educational results will be of great merit, though it lacks the organisation and equipment of the city school. There are such schools, and they are doing a grand work; but these serve at present only to brighten in a slight degree the glooming picture which portrays the unsatisfactory condition of the ordinary village school. The fact remains that if we are to improve our agriculture and compete with others on the best terms, if we are to make the conditions of country life attractive enough to keep the bright boys and girls in the country, if we are to equalise the advantages of country and town so as to maintain an intelligent, prosperous, progressive and contented rural population, we must give effective attention to the needs of our rural schools.

ON POULTRY AND EGGS.

At ancient feasting eggs were consumed in considerable numbers, for it is recorded that at one in the time of Richard II., no fewer than 11,000 were provided. In the reign of Edward I. 450 eggs were sold for eighteen pence. In that of Edward II. A.D. 1314, eggs and other foods being dear, the price was settled by Parliament at twenty for a penny. In A.D. 1316 Parliament abrogated their decree, and then food was to be sold at reasonable rates. The prices allowed for the household of Henry VIII. were "For eggs from Shrovetide till Michaelmas, the hundred, fourteen pence, Michaelmas to Shrovetide, the hundred twenty pence," which was evidence of their scarcity at the latter part of the year, and therefore of more value.

Over five millions pounds worth of eggs are now annually imported into England, but not one half of these are used for culinary purposes. The calico printing works use over 40,000,000 eggs a year, photographic establishments use millions of dozens, and wine clarifiers 10,000,000 dozens in the year; bookbinders, kid glove makers, and leather finishers use them in abundance, as well as other trades. The general public appear to have but little knowledge of the magnitude of the numbers wanted for practical commercial uses, apart from those of food, though in the latter respect not a few of the figures are absolutely startling; as an instance one of the London clubs alone contracts for more than 100,000 eggs a year.

Hens that are kept busy scratching a good part of the day will eat more and lay more. Layers want plenty of ground green, bone, broken shells, grit and vegetables. Albumen exists to a large extent in fresh meat and ground green bone than in any other food. The shell of the egg

is formed from bone, shells and grit. Of grains wheat, oats, barley and maize come in order. Of green foods clover, cabbage, carrots, turnips, &c.

Six large eggs will weigh about a pound. As a flesh-producer one pound of egg is equal to one pound of beef. About $\frac{1}{3}$ of the weight of an egg is solid nutriment, which is more than can be said of meat. There are no bones and tough pieces to be put away. Eggs, at average price, are among the cheapest and most nutritious articles of diet. Like milk, an egg is a complete food in itself, containing everything necessary for the perfect development of a perfect animal. It is easily digested, if not spoiled by cooking.

Fertile eggs with strong vigorous germs can only be secured from healthy well-cared-for birds. Despite the various theories and methods suggested, no one can tell which egg will hatch and which will fail till after a period of incubation. It is an impossibility to discern the sex of the prospective chick.

A fresh egg has a somewhat rough shell, while that of a stale egg is smooth. When cooked the contents of a fresh egg stick to the shell and must be removed with a spoon; but a stale egg, when boiled, can be peeled off like the skin of an orange.

Bran is an excellent food for poultry. It contains more lime than any other cheap food derived from grain, and in a more serviceable, because better digested, form than that in shells.—*Agricultural Gazette, N. S. W.*

GENERAL ITEMS.

The following is Prof. Church's analysis of the fresh kernel of the coconut: Water 46.6, albuminoids &c. 5.5, oil 35.9, sugar &c. 8.1, cellulose 2.9, mineral matter 1.0. The Report of the Agricultural Experiment Station, California, contains the following analysis of good coconut oil cake (poonac): moisture 12.87, pure ash 4.54, crude protein 20.06, crude fibre 11.50, nitrogen free extract (starch, sugar, &c.) 40.90, crude fat 10.13. Prof. Henry in his *Food and Feeding* gives a summary of experiments made by the French War Department in feeding with coconut meal, and says that the results proved that the meal was equal and even superior to the same weight of oats.

A contemporary writing about "What the Onion can do," says: To keep off disease eat onions raw, to cure spasms rub them on the spine, to cure typhoid fever bruise with a hammer and bind on the feet, to cure chills bind round waist and to the pulse, for diphtheria bind to the throat, for a burn wet with raw juice, to cure a cold boil and eat with butter, for croupy babies slice and sprinkle with butter and cover closely, and when the juice runs out give a spoonful every hour.

Prof. Koch has shown that citric and malic acids as they occur in apples, lemons, &c. are able to destroy all kinds of disease germs. We are told that cholera germs are killed in fifteen minutes by lemon or apple juice, and typhoid germs in half an hour by these acids even when diluted.

According to the *Agricultural News* (Barbados) the banana known as "Pisang maas" proves to be the same as the variety well known as "figue sucrée" or ladies' finger. This is one of the eight varieties received from Queensland for the Colombo Stock Garden. It remains to be seen how many of these are distinct from local varieties. The same contemporary says that special mention deserves to be made of the "Guindy" banana, which produces large bunches of fine flavoured fruit and is well worth growing as a dessert fruit.

The following simple method of making grafting, or budding tape is taken from the *Bulletin of Miscellaneous Information* for October, 1902, issued by the Botanical Department, Trinidad:—

"Materials:—(1) White cotton tape, $\frac{1}{2}$ inch wide;"

(2) Bees-wax	} equal parts.
(3) Ship's pitch	

Directions:—Put equal parts ($\frac{1}{2}$ lb. of each is sufficient for about 15 yards of tape) of bees-wax and ship's pitch in a small metal or earthenware vessel with a wide mouth, and heat over a fire, stirring as the two constituents melt together. Then plunge a piece of tape of convenient length into the liquid, keeping hold of one end with the finger and thumb. With the other hand hold two small pieces of wood on each side of the outer end of the tape, just in front where it is held by finger and thumb. Then pull the tape through between the two pieces of wood so as to remove extra wax and distribute it evenly over the tape. As each piece is dipped, it should be hung on a wire to dry. It will be cool and ready for use in a few minutes."

