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NATIVE AGRICULTURE IN CEYLON.



PROPOSALS for Instruction of Natives in Improved Modes of Cultivation and the Introduction of Suitable New Products by E. Elliott, late Government Agent. Southern Province.

PRECIS OF PROPOSALS.

- (1.) Separate European interests and leave them in hands of Director, Botanic Gardens and staff. §1-2.
- (2.) Continue care of native interests in Public Instruction Department. § 3, 4, 9-10,
- (3.) Natives ready to follow example and adopt new process or products, if shewn to pay (instance given). § 5.
- (4.) Duty of Government to shew the way by planting model market gardens, in villages throughout the Island, and working them by trained gardeners. § 6-7.
- (5.) These men to be ignorant of English and to be drawn from the districts to which they will return after training, and required to open gardens on certain terms of remuneration for a limited period. § 8, 13, 14, 15, 16, 17, 18.
- (6.) Training to be done at Government expense at Agricultural School, but all instruction to be given in Vernacular, and supplemented by a year's practical work on a farm on a line of rail not far from Colombo. § 9, 11.
- (7.) Produce of farm to be sold at a stall in the public market, and it is believed it would be self-supporting after first year, as all the labour is to be supplied by students. § 12.
- (8.) Seeds of all kinds to be provided at Agricultural School, and given freely to the gardeners.
- (9.) Instruction to include breeding of poultry making of butter, and ghee, diseases of cattle and castration, &c.

(10.) Instruction in Paddy to be confined to cultivation of experimental plots at the central farm, to test suitability of seeds, manures, &c. Subsequent distribution to be through Government Agents or gardeners, but no cost of cultivation to be chargeable to Government. Other proposals for encouragement of the extension of paddy cultivation.

(11.) Cost of Scheme; immediate outlay to be raised from R10,000, (present cost of Agricultural School) to R20,000 and ultimately to R30,000 exclusive of cost of providing farm and buildings.

The Commission which has recently reported on the proposed department of agriculture has undoubtedly failed to enunciate a practical scheme, and this I think is largely due to its not recognising at the very outset that what is suitable and probably required in the interests of agriculture as carried on by Europeans and other capitalists on a large scale, is not wanted for the humbler native cultivator of praedial products,

As regards what may be called European agriculture, it seems as if its requirements had been already fairly met by the recent additions of a Chemist, a Mycologist, and an Entomologist, and it may be left to Government in consultation with the Planters' Association to consider if this should be turned into a department with the Director of the Royal Botanic Gardens as the recognised head, which he now is to all practical purposes I believe.

As regards native agriculturists, the interference of these scientists is not required and is indeed to be deprecated, though their services would doubtless be available to advise in special cases, such for instance as an invasion of insects or extraordinary pests.

The object of this paper is to put forward a moderate scheme exclusively dealing with the interests of native cultivators working on a small scale:

The first fact to recognise is that native cultivators are ready to adopt improved methods and new products if they see that there is money in them. As instances of this I may recall that the native owners of small gardens freely bought hand pulpers when they found the *coffee* thus prepared fetched a higher price. In *sugar*, when a cattle mill for expressing the juice was provided at a moderate price, it was freely adopted by the cane growers in the Southern Province. *Citronella*, which was first grown by Europeans, was freely taken up, and thousands of acres in the Southern Province were cultivated with this product, and the oil extracted with the aid of steam and modern apparatus. When there was a demand for European *vegetables* in Galle for the French steamers, the agent of that line supplied seeds, and very large quantities of lettuce, chives, beet-root, tomatoes and other similar products were grown in the neighbourhood of Galle; but these have disappeared since the demand ceased.

The motto therefore for those desirous of improving and extending the scope of native agriculture should be *via per exemplum*. In the absence of the European element in most rural districts, the example should be set by Government—by the institution of model gardens—and their gradual multiplication all over the Island,—which would be more or less objects for imitation and centres for the distribution of improved seeds and new varieties. [The cultivation of paddy may be excluded from the scope of the general scheme and be dealt with separately in the mode I will presently deal with.] In fact what is required in the first instance is the improvement of the cultivation of fruits and vegetables in villages and the substitution of regular vegetable gardens for the spasmodic crops now raised in chenas. Collateral branches requiring attention also are the improvement of the breed of fowls, dairy products, treatment of cattle including castration. To provide for the necessary instructors, or supervising agency for these model gardens, it will be necessary to gradually train a number of persons drawn from the localities to be served, and as they are qualified to return them to their own neighbourhoods throughout the country, beginning with gardens at the Agencies and Assistant Agencies with at least one smaller garden in each headman's division.

The training and controlling agency, with ramifications all over the Island for extension, is already available in the Educational Department, with which the Government Agents, their assistants and headmen are closely in touch and already work amicably.

A former Director was the first to take up the question and induce Government to give some measure of support. Any retrogression is due to the appointment of a gentleman who was a schoolmaster and took small interest in the subject. The position is now filled by a Civilian who has prior to his appointment paid some attention to the question, and as his tenure of office is likely to last for some years, there is a guarantee of a continuity of administration, which justifies adhesion to the existing arrangements in preference to a new departure.

Besides retaining the Director as the controlling authority I would adhere to the Agricultural School (subject to the modifications I will detail) as the mechanism for teaching a certain amount of theoretical knowledge (during the first year) and supplementing it with a working farm of some size on a line of railway, but as close as possible to Colombo, for practical work during the second year of the course. The farm should be rather a large market garden, at which vegetables of all kinds, country as well as introduced, should be cultivated by the students themselves according to the very best method, and the training should be such as to make them good practical working gardeners, conversant with European modes of Horticulture, as well as breed-

ing of poultry, treatment of cattle (including ability to castrate). All agricultural work and attention to cattle should be done by the students, and no cooly labour allowed. A garden so worked should show fair profits, and should supply an existing demand for vegetables, green meats and good fruit in time.

The next consideration is, having your trained man, how to keep him in his village. The best safeguard for this is to look on a knowledge of English as a disqualification for admission to the Agricultural School, and to have all instruction at it conveyed in Sinhalese (Tamil can follow later after the wants of the majority in the Island have been fairly met). I would draw the first students from young vernacular schoolmasters and the most intelligent pupils in vernacular schools who have passed in the highest standard—a few from each district—and put them through a two years' course as already indicated. I would at first restrict the number of admissions to 20 a year, say for 5 years, and to induce the proper class to come up for instruction I would make it perfectly free, including cost of travelling to and from their homes, only excluding personal clothing. I believe a sum of R15 per head per mensem would cover this item. The knowledge now required on entrance and the further education given in general subjects at the school are fatal to the chances of those now trained at some cost adhering to an agricultural course: and to raise the standard would still further reduce the chances. If there is a demand for a higher course from those prepared to pay *moderately* for it, such students would be I think very few and familiar with Sinhalese colloquially, and would therefore benefit by the oral and practical instruction given, and be competent to supplement this by reading text books in English and some private tuition in the more advanced branches. To such a class Government might offer a scholarship yearly to proceed to one of the Indian Colleges for an extended course of education, and from them would be drawn the future teachers of the school.

My scheme proposes eventually to have

1. Provincial gardens at G. A. Stations.
2. District gardens at A. G. A. Stations.
3. Village gardens in Principal Headmen's Divisions
4. School gardens.

If suitable men are available I would make an immediate beginning with the 1st and 2nd class. Sites of moderate size are doubtless available or can be procured on moderate terms. Each garden should be allowed one cooly for a few months, after which the garden should be self-supporting by the sale of produce, and a regular account kept of receipts and expenditure. The gardens should be under the immediate control of the G. A.'s and A. G. A.'s of the stations. As funds accumulated improved breeds of fowls should be procured and the eggs sold or given away free (with the authority of the Agent) to villagers willing to undertake the rearing of poultry. Young cocks should also be distributed in like manner. Each gardener should be competent to castrate cattle and be required to do it free of charge. Dairies &c. might follow in time at the larger stations or where grazing is available.

As these stations are filled and the first purely vernacular gardeners trained under this system become available, one should be attached to each principal headman who should be required to find him a proper site for a garden, in which he should be expected to raise vegetables, fruits &c., in the mode he has been taught, digging up the soil, properly manuring, &c., giving information and setting an example and supplying seed to his neighbours. He should also be required to visit a certain number of schools in his neighbourhood and teach the scholars for say an hour twice a week, and induce them to start small plots round the school, the master being instructed to co-operate.

I look to this preliminary teaching to develop a taste for gardening, &c., and a useful guide to the selection of scholars for the Colombo school. The men should receive a small salary for the first year say of R15, to be reduced to R10 in the 2nd year, and R6 in the third payable half-yearly on production of a certificate to be granted by an Inspector or some other authority to be appointed by the Director that the payee is keeping up a proper garden. The produce of course he would be at liberty to sell and keep the proceeds. After a few years it would be possible to reduce the remuneration to a small grant or a more substantial prize for the best garden in a given area, &c. There would be then a margin for increasing the number without entailing a larger aggregate outlay. For certificated school-masters who have gone through the Colombo Agents, of course the Director would possibly secure re-employment as school-masters, and they should receive some additional remuneration on condition of keeping up a good garden, stock of poultry, and being ready or willing to castrate bulls free on application. I note Mr. Willis in his memo. [p. 7] speaks of the necessity of having gardens, but he connects with it a higher standard of education which is beyond all requirements, at all events at present. He also yearns for a better class of student, sons of wealthy native landowners. Such men invariably acquire a knowledge of English, are attracted to the towns, are not likely to take to a rural life and would only go to the Agricultural School for the general education he very properly deprecates.

My students would be drawn from the sort of landed population who are likely *not* to be spoiled by a temporary residence in Colombo, and are pretty sure to return to their villages.

To assist the Director in this branch and to secure an officer who will devote his whole attention to the working of the scheme, I would utilize the services of Mr. Drieberg (with suitable additional remuneration) as assistant for Agriculture and Inspector of Experimental Gardens. These he should personally visit and see how the gardens are working and give them instructions. He should, however, remain Principal of the School, but be relieved of personal tuition or lecturing, and also supervise the Model Farm visiting it very frequently.

I would suggest the D. P. I office might be housed at the Agricultural School. It would keep the Director more in touch with this branch of his duties and obviate the necessity of Mr. Drieberg's absence while attending an office in the Fort.

At the Central Farm special attention should be paid to country vegetables for the production of good seed for distribution to the rural gardens, as well as to the importation of seed of other vegetables which can be grown in the Island. There is a great demand in all parts for vegetables which is now met very imperfectly. Seeds of all kinds should also be cultivated for sale to the public at moderate rates.

Paddy Cultivation should also receive a great deal of attention at the central farm, and an area of 25 acres be kept continually under tillage, but this should be largely of an experimental nature to test suitability of new kinds of imported seed, their periods of growth, ratio of return, &c., also the value of various kinds of manure. The discovery of a plough which will turn up the soil to a sufficient depth but can be worked by the ordinary cattle is a matter that should receive attention. Other points on which research is desirable will suggest themselves to the Superintendent, and he will be in a position to give advice and information based on *practical* experience, which Mr. Drieberg is not able to do at present. The labour for this experimental cultivation will, of course, be supplied by the students, and they will thus become generally familiar with the trials, and the results: it is to be hoped they will carry away some useful ideas, and give them a trial in their villages. By way of encouragement students should be informed when

leaving that they could at any time obtain the loan of an improved plough and a gift of good seed if they see their way to utilizing them.

More expenditure in pushing the actual experimental cultivation of paddy in all villages I would not advise. Except perhaps the advantages of deeper ploughing there is little or nothing the native cultivators as a whole are not aware of, and when they do not work in the best known native methods it is due to poverty or other disability. One, for instance, is the difficulty of getting paddy and in some districts even good seed paddy is the want not in their power to rectify. When in the Batticaloa district recently heard a good deal of the paddy was not worth milling, it gave so small an outturn of rice which in the Hambantota district is as a rule 50 per cent. In such cases Government should step in and make a present of say 1,000 bushels of paddy. Again, where good seed has been introduced by some energetic Assistant Agent, it has got so hybridised as to lose its original productiveness and the knowledge where it came from is lost, or if known it is not easy to get a further supply.

As regards cattle it is worthy of consideration if Government should make advances on the security of the holdings to landowners to purchase buffaloes as is I believe done in India, repayment being spread over a number of years. There is at present I understand great scarcity of cattle all along the South-east coast of Ceylon, while there is a surplus in the western side.

Connected with this is the question of pasturage for cattle which has been much restricted since the prohibition of chenas, and is becoming serious both in the more settled districts and where cultivation is being extended in the more outlying parts.

But these are points which may be considered and dealt with apart from the scheme I have formulated:—

| <i>Estimate of Cost.</i> | |
|--|---------|
| Asst. to Director, and Inspector .. | R4,000 |
| Teachers and Instructors .. | 4,000 |
| Keep of 40 students at R200 .. | 8,000 |
| | R16,000 |
| 6 Provincial gardeners .. | 2,000 |
| 10 District do ... | 2,400 |
| 45 Village do ... | 4,400* |
| Allowance to certified teachers ... | 600 |
| Prizes of R50 each for the best-kept village gardens over 2 years in existence ... | 1,000 |
| | 10,400 |
| Contingencies .. | 26,400 |
| | 3,60 |

Total Estimated Cost of Scheme when in full working R30,000

Each village gardener should be entitled to a lease at a rental of 25 cents an acre, of two acres of suitable Crown land for the purpose of cultivation of praedial products (excluding coconuts) so long as he keeps up a proper market garden. With this inducement and after 2 years' training and 3 years' endowment, while making a start in his own village, besides eligibility for promotion as a district gardener, and the possibilities of substantial prizes for the best-kept garden, as well as others at district shows which should be held regularly—with all these encouragements, there is every hope, if not certainty, of most of these men keeping to the trade and working on the lines they have been taught. Thus in time there will be a large number of Government market gardens even in the most out-of-the-way parts of the Island more or less of an example and a source of advice and assistance, by issue of seed and otherwise, to the villagers.—E. ELLIOTT, October, 1900.

[Mr. Elliott, in the above paper, draws a distinction between Planting and Native Agriculture: the former

* 15 at R180, 15 at R120 and 15 at R60

he considers, can be served from Peradeniya; the latter by a reformed Agricultural School to be continued under the Department of Public Instruction. Our objection to this course is that it would not secure the personal interest, attention and responsibility of the Provincial and District revenue officers and their headmen, without which we are hopeless of any real permanent progress being made in the improvement of native agriculture.—*Editor, Tropical Agriculturist.*]

THE FIRST PUBLIC SALE OF GREEN TEA IN COLOMBO.

FULL PRICES REALISED.

FINE GREEN TEAS FROM A KALUTARA ESTATE.

At the public sale of tea, on 10th Oct. last an event which is certainly worth noting took place. It was the first auction at which green teas were sold in Colombo, and the result must surely be regarded as eminently satisfactory. Two estates invoices were offered—one of high-grown tea and the other of low grown—and there was, curiously enough, very little difference in the prices paid for each. The breaks were divided into Young Hyson, Hyson No. 1, and Hyson No. 2, and the following were the prices paid for the high grown invoice, sold by Messrs. Forbes & Walker:—

| LABOOKELLIE GREAT TEAS | |
|------------------------|-----------------------|
| 1,575 lbs... | Young Hyson. .52 cts. |
| 1,260 lbs.. | Hyson No. 1. .42 cts. |
| 3,920 lbs.. | Hyson No. 2. .37 cts. |

These prices must be considered good, though Labookellie, being an estate at a considerable elevation, is accustomed to get excellent prices for its teas; and no doubt, when the Superintendent has had more experience in the manufacture of green teas, he will turn out a very much better sample than even these.

The second estate offering green teas, was Arapolakanda, the property of the Eastern Produce and Estates Co., in Kalutara, and, inasmuch as the prices paid for its invoice of green teas was almost as good as that given for Labookellie, green teas, the Superintendent of the estate who made the tea has to be congratulated on the result. As the estate referred to offered an invoice of black teas in the same sale, we are able to make a very effectual comparison, of the prices realised for the one and for the other. They compare as follows:—

| ARAPOLAKANDA. | | Black Teas | |
|---------------|------------------|------------|-------------------|
| Green Teas | | | |
| lbs. | cts. | lbs. | cts. |
| 1,710 | Young Hyson. .50 | 3,780 | Broken Pekoe. .39 |
| 1,360 | Hyson No. 1. .41 | 2,400 | Pekoe . .34 |
| 852 | Hyson No. 2. .37 | 540 | Pekoe Souchong 28 |

We think our readers will agree with us that this result is one of which all of us in Ceylon can heartily congratulate ourselves. It clearly demonstrates that even leaf from Ceylon low-country estates can be made into excellent green tea, and that prices can be paid in the open market as high as, if not higher than, those commanded by black teas.

We may state that some of these teas were purchased by Mr. Tokmakoff to be sent to Russia; others we believe are destined for Canada.

We may say that the leaf of the Arapolakanda tea had a better appearance than the other, whilst its liquor was more pungent and had more of the true green tea flavour, which is the more remarkable as it is a low-country tea, and it was thought that leaf from such estates could not be made into the best green tea.—*Local "Times."*

RUBBER IN RHODESIA.

We have received an interesting little pamphlet upon the rubber industry in the British South Africa Company's territories. The writer is Mr. Philip Lytton Gell, one of the directors of the Chartered Company, and although the information at the disposal of the writer is admittedly

imperfect, he gives facts which clearly show that there is an extensive field for the development of the rubber trade in the extensive territory controlled by the Chartered Company.

In the introductory notice Mr. Gell has arrived at certain conclusions which he briefly states under eight headings, which are as follow: (1) All the rubber should contribute to the revenue; (2) all wild rubber should be regarded as a capital asset of the company; (3) immediate legislation is necessary to regulate the industry and protect it from extirpation; (4) no monopoly should be granted, although outsiders wishing to collect rubber must obtain the local licence; (5) the duty of, say, 3d per lb. should be levied upon all traded rubber; (6) all licences to be available only within the district specified; (7) a department of forestry should be established; (8) encouragement should be given to the investment of capital in the systematic cultivation of rubber.

In the course of the pamphlet the writer deals with the sources of rubber, extensive tracts of north-east and north-west Rhodesia producing natural rubber of high commercial standing, whilst it is indigenous in abundance in the southern part of the country. The native methods of extraction are, as usual, very destructive and the methods of preparation faulty, but it is believed that the various rubber species can be introduced and cultivated, and the rubber latex collected under proper management.

The chief indigenous rubber belongs to the Landolphia species, which flourishes in the Mweru districts.

Dealing with the regulations enforced in other countries, he says that in the Congo State the industry is largely worked by the Government. Concessions for extracting rubber within fixed areas and for limited periods are also granted, but the lessees are bound to plant a certain number of new trees each year, bearing a fixed proportion to the weight of rubber extracted. Amongst other restrictions the felling of rubber trees is forbidden, and for the infringement of this and other regulations, penalties of from 100f. to 10,000f. and imprisonment may be imposed, employers, directors of companies and State agents being liable for the payment of fines incurred by their servants. Export duties on rubber are fixed at 10 per cent. by treaty with France and Portugal. There is apparently an additional duty of 50 centimes per kilo. fixed in February, 1898, and a fee of £200 is charged for every licence to establish an India-rubber warehouse. Natives who hold licences to collect rubber apparently have the option of compounding for their fees by paying one-fifth of the rubber collected to the State.

In Lourenço Marques a monopoly of the production and trade in rubber for twenty-five years has been granted over the unoccupied State lands. The concessionaires pay a rent of 200,000 reis (equal to £44 7s 11d) per annum, and undertake to plant 20,000 trees in two years. They further pay a duty of 50 reis (equal to 2'65d) per kilo, for seven years; rising to 75 reis (equal to 4d) per kilo, for the remaining eighteen years. They are exempt from all other imposts. They have the option of retaining the land at the same rent at the expiration of the monopoly, which, however, does not restrain the cultivation of rubber on private property and its export by private persons.

The Mozambique Company forbids any individual to purchase rubber from natives, or to extract it through agents, without a special annual licence, extending only from February 1st to August 31st, which costs £3 per annum. 30 reis (equal to 1.6d) per kilo, must be paid before rubber can leave the district in which it is collected, and a receipt for the tax must always accompany the goods. Every person purchasing rubber or collect-

ing it must keep books showing the amount received daily, and report it once a month to the district official.

RESTRICTIONS IN BRITISH POSSESSIONS.

The system in Lagos is based upon a theory that the ownership of forests is vested in the local tribes, under their "native authorities," that is, chiefs. Within districts under the control of such "native authorities," no person may collect rubber without a licence, for which he pays £5 to the "native authorities" and 2s. for each load of rubber. No tree of less girth than 3 ft. at a distance of 3 ft. from the ground may be tapped. It may not be tapped more than once in eighteen months, and only in the manner prescribed by the "native authorities." The preservation of the protecting timber is also provided for. No tree of a girth less than 9 ft. at a point 10 ft. from the ground may be felled, and a similar tree must be planted in the nearest suitable spot within seven days. A permit must be obtained from the "native authorities" for all trees felled, and a fee of 5s a tree must be paid. This system, Mr. Gell understands, proves ineffectual.

The British Central Africa Protectorate has not yet established any adequate system for preserving the rubber industry and deriving substantial revenue from it. The protectorate does, however, forbid the destructive traffic in root-rubber and rubber obtained by boiling bark, and it levies a 5 per cent transit duty on rubber for the maintenance of roads, which produces about 1½d a lb.—*India-rubber Journal*, Sept. 17.

A report on the rubber industry of the British South Africa Company's Territories has been prepared for the company by Mr. Littleton Gell, and the following particulars extracted from it are taken from the *Board of Trade Journal*:—

It is now ascertained that extensive tracts in North-West and North-East Rhodesia produce natural rubber of high commercial value, while in Southern Rhodesia indigenous rubber is reported in abundance in the Sabi Valley and along the Zambesi. There is also good ground for believing that various foreign species of a yet more valuable character can be gradually established throughout the territory, and there are certain kinds which may be expected to thrive even in the drier climate of the Southern Rhodesia plateau.

On the other hand, the native methods of extraction are very destructive, and in the absence of protective regulations the opening of markets will not inevitably tend to the rapid extirpation of indigenous rubber trees. Further, the existing methods of preparation are faulty, and impair the market value of South African rubber.

The indigenous rubber, which (so far as official information goes) has at present been identified in the British South African territories, belongs chiefly to the class of gigantic creepers scattered amongst other growths.

Passing on to the administrative aspects of the rubber industry, the elementary principle which emerges is this—that the indigenous rubber must be regarded from the first as State property (as in the Congo, Loreng, Marques, and Mozambique territory), and should not be abandoned to private exploitation. It represents an exhaustive accumulation of natural capital, to which neither the nomadic natives nor the casual adventurer has any proprietary claim, but which should be husbanded, and, if possible, increased to sustain the immense expenses of developing a new territory. The native, who extracts it, and the trader, who exports it, must, of course, receive an adequate inducement for their services. But in the indigenous stage the rubber industry does not require any outlay on plant or large capital. It is not speculative; the settlement of the country diminishes the trader's risks. Transport is comparatively cheap for an article highly valuable in proportion to its bulk. No expensive

management is involved. Accordingly, whatever profit there may be after the native and trader has been reasonably remunerated should be retained.

The problems which present themselves may be conveniently dealt with in the following order:—

1. The measures necessary to preserve the existing sources of rubber.

2. The methods of obtaining a revenue from the industry.

3. The future development and expansion of the industry, including the suppression of detrimental methods of extraction and preparation.

4. The policy towards proposals of exploration.

The systems established for the protection of the rubber industry in other territories have been of the following types;—(a) Forests, including rubber trees, are reserved as State property; they are directly administered, and the rubber is collected by a forest department. (b) The forests are retained as State property, but private enterprise is permitted over specified areas under terminable leases and strict conditions. (c) Tracts of forest are transferred to private or joint stock ownership, and the development is left to individual action under some degree of legislative regulation. (d.) Forests are abandoned to the first comer, subject to more or less effective regulations as to methods of extracting or trading rubber; this appears to be the usual British principle outside India, and the least wise of any.

The regulations existing in other African territories afford some useful suggestions, though speaking generally, they appear to be very imperfectly enforced.

Penalties of from 100 francs to 10,000 francs and imprisonment of ten days to six months may be imposed, employers, directors of companies, and State agents being liable for the payment of fines incurred by their servants.*

There will probably be no hesitation in recommending that immediate regulations should be framed for North-West, North-East, and Southern Rhodesia for the protection of wild rubber which should embody certain well ascertained principles, *i. e.*:—(a.) A minimum age and girth should be established, below which a tree must not be tapped; the exact measurements must be adapted to different species and localities, so that legislation should only establish the principle empowering our officials to promulgate the precise regulations for each district, after reports have been received as to the nature of the rubber plants there prevailing. (b.) The intervals at which trees may be tapped should also be regulated. Subject to local modifications, it would be safe to forbid tapping the same tree, or the same area, in two successive years. (c.) A general regulation will be required that rubber may only be collected by tapping, that no tree may be cut down, and no roots grubbed up and boiled; on the other hand, to avoid unreasonable rigidity, or to deal with exceptional conditions, a local official should be empowered to modify this regulation.† (d.) A general regulation is desirable providing for the plantation of young rubber trees in forest land by persons extracting rubber, in some proportion to be fixed by the local official, and a small reward for every tree planted should be paid.‡

* Export duties on rubber are fixed at 10 per cent. by Treaty with France and Portugal. There is apparently an additional duty of 50 centimes per kilo, fixed in February, 1898, and a fee of £200 is charged for every license to establish an india-rubber warehouse. Natives who hold licenses to collect rubber, apparently have the option of compounding for their fees by paying one-fifth of the rubber collected to the State.

† Root rubber is reported in North-West Rhodesia as a special product of the country. Unless it differs from other rubbers extracted from roots the process is not to be encouraged.

‡ In Indian forest districts the systematic plantation of any trees which it is desired to establish is secured

If in special districts the extraction of root rubber is permitted, the rate of replantation must be high— not less than two to one. (e.) The forest trees which provide the indispensable shade must also be protected from destruction. (f.) Powers should be taken to forbid absolutely the extraction or sale of rubber in a district for a fixed period; as a penalty for breach of regulations, or merely as a protective matter.

As regards the future development of the industry, the important points are as follows:—(a.) The steady replanting of indigenous trees, and the preservation of the shade trees in forest areas (b.) Improved methods of extraction and preparation. (c.) The introduction of superior species in cultivated areas. (d.) The formation of a small forestry department, a member of which would have special experience of rubber.

SOME QUESTIONS ON CACAO.

SIR,—Will you kindly allow me elbow room in this column to ask—

(a) If anyone in the Island knows what Mr. Arden actually meant by "topping" cacao? Mr. Gibbon alludes to it as "very unusual."

(b) If, however, "topping" is merely what is more commonly known as "suckering" (*i. e.* ridding the tree of young shoots upwards from the stem in order to promote crop, and decrease height), is not this system of "topping" rather the rule than the exception.

(c) And what is the allusion to the "topping" of shade trees?

(d) And if Mr. Arden was "presumptuous" to comment on an "absence of light and air," why have most cacao planters exemplified the justice of the verdict by increasing the intervals between their shade trees?

(e) And is it not probable that Mr. Arden's remark on this head had as much, if not more, to do with the distance at which cacao itself has been planted in the past?

(f) And why does one gentleman talk about "topping cacao," and another about "cacao topping itself"?

(g) And why should it be supposed that "suckering" (*i. e.* forcing) a tree strengthens it?

(h) And if "suckering" strengthens a tree why was it considered "not wise to remove them all" (the "suckers"?)

(i) And if "suckering" weakens a tree why should Caraccas be considered doomed? Has it not always been "suckered" (weakened) systematically, until its health has become such that, when the canker came, it was unable to resist it? Has it, therefore, had a fair chance?

(j) And has it been satisfactorily demonstrated that Forastero is such a far more hardy variety than the "red"?

(k) And is there anyone who can say that "suckering" Forastero will not eventually reduce it to the present anæmic condition of Caraccas?

(l) And why is it planters consider Forastero a "stingy cropper" in comparison with Caraccas, when the former (a tree many sizes larger than the "red" variety), is rarely planted at greater distance than the "red"?

(m) If Forastero at 12 ft. by 12 ft. gives 2 cwt. per acre, what will Forastero at 24 ft. by 24 ft. give per acre?

(n) Until someone is in a position to answer this question from practical experience, what sort of justice is that meted out to Forastero

by paying the natives trifling rewards for sowing seeds distributed to them during the last season before they migrate from exhausted clearings to take up fresh ground. Small further payments are annually made for three or four years as a reward for weeding, &c., until the new trees can protect themselves. This system has proved effectual and cheap.

(o) And is not the complaint of "stinginess" probably owing to the fact that the free cropping Forastero varieties have been saddled with the "stinginess" of other Forastero varieties and which have no (colloquial) distinctive name? It is not possible that planters have been too "sweeping" in their statements when they have compared the cropping capacity of the highly-cultivated Caraccas with that of the numerous varieties of Forastero from time to time imported into the Island, and between which scarcely any trouble is taken to distinguish?

Well, Sir, this is a long list. The truth is when I first began asking questions I had no notion my ignorance was so great.—Yours, etc.,
POD.

MR. J. B. CARRUTHER'S ANSWERS.

FUCKERING—FRUNING—ANEMIA—VARIETY—EXPERIMENTS.

On referring 'Pod's' queries to Mr. J. B. Carruthers, he has kindly jotted down some partial answers to the questions asked, which he considers are of interest as shewing a desire to get an accurate knowledge of cacao, and as such he welcome them. He takes the queries in the alphabetical order thus;—

"PODS" QUERIES,

a. to f. Mr. Arden's remarks must be considered only in relation to the cacao estate he saw and the methods carried out there.

"Topping" probably means pruning the highest vertical branches.

g. & h.—"Suckering"—*i. e.* cutting off "suckers" is not "forcing"—it gives the impression of strengthening the tree, because the nutrition taken up by the root has less branches to support and consequently those that remain are strengthened.

i.—Pruning for fruit is only necessary when a tree produces long, unbranching shoots which shows no flower buds, suckers in cacao produce flower buds and fruit after one year's growth. Nature should not be interfered with unless an increase in the yield can be obtained.

j.—There is much evidence that Forastero is hardier. Exact experiments would, however, give a more absolutely trustworthy proof.

k.—"Anæmia" is a disease of the blood in animals with a circulatory system, and in plant life there is no analogous system and therefore no disease which has any similarity to "anæmia."

l.—Do planters consider Forastero a "stingy cropper?" The largest tree in Ceylon are red cacao (Caraccas), but they are older in most cases than the Forastero.

m.—Such an experiment would undoubtedly give knowledge of great importance to planters.

n.—No experiments of an accurate kind have been made to show the relative fruit-producing qualities of the two varieties, and all opinions are only based upon local observations often not very correctly made, and the deductions obtained not very carefully or logically worked out.—Local "Times."

RAMIE FIBRE AS A SUBSTITUTE FOR COTTON.—Mr. D. Edward Badclyffe, Regent's Park, writes that Lancashire is threatened in connection with the cotton industry with a serious loss, and he asks why this country does not profit by its lessons. When the last great famine took place during the American war Great Britain, he says, was shown the folly of relying on one country for it supplies. "We have," he adds, "a vast territory in which we could grow Ramie, which is a fibre far superior to cotton. It will grow where cotton grows, and where it will not. The possibilities of this plant are enormous. It grows wild in India and many other of our possessions. It will make anything that can be made by flax, cotton, wool, or silk. If our Colonies would turn their attention to Ramie growing, the possibility of a vast industry being crippled for the want of supplies would be a thing of the past."—*Journal of Horticulture*,

ARTICHOKES.

I have been asked to give information about Artichokes, the different kinds of which are often confused. The Jerusalem Artichoke is the first and best known. This is an entirely distinct vegetable from the globe or crown artichoke, being cultivated solely for its tuberous roots, which somewhat resemble those of the potato, while the edible portion of the crown or true artichoke is the receptacle of the unexpanded flower heads. It is somewhat unfortunate that the name of Artichoke should have been applied to both the above, and still more so that it should have been also adopted in the case of the comparatively new Chinese artichoke (so-called)—*Stachys tuberosa*, a totally distinct plant.

The true "Jerusalem" artichoke is really a species of sunflower (*Helianthus tuberosus*), a native of the American prairies, the word "Jerusalem" being merely a corruption of the Italian "girasole," or sunflower. It grows in good ground, to a height of 8 ft. or 10 ft., and, though it seldom flowers, it usually affords, under even ordinary culture, a heavy crop of useful tubers. Its nutritive value is very nearly the same as that of the potato, slightly—though very slightly—inferior; but the plant being more hardy and easily cultivated, succeeding in any odd corner or shady plot, fully compensates for this. The peculiar sooty flavour of the tubers, when cooked, though liked by some, is objected to by others. The proper time for planting the seed tubers is from November to March. The sets, consisting of the smaller but fairly well shaped tubers, should be planted in much the same manner as potatoes, that is, in furrows about three feet apart, placing them one foot asunder. Though the Jerusalem artichoke will grow freely and produce more or less good crops in poor, shallow or shady ground, yet it enjoys a fairly sunny and moderately sheltered spot, with well-worked and liberally manured soil. The tubers being perfectly hardy may be left in the ground until required for use, but it is just as well to lift and store them in a cool place in case the soil should become so hard as to prevent their being dug in the open. When selecting tubers for seed, those of moderate size and a nice, smooth shape should be chosen, as being more likely to produce tubers of the same character. There is a new, white-skinned variety which is claimed to be a great improvement on the type, but it is scarcely as prolific as the other.

2.—The Chinese Artichoke.—This is a totally distinct species, bearing a large number of knotted-looking roots of good flavour. It should be planted in drills or furrows like those for potatoes but rather closer. It is very prolific, but the roots are small.

3. The Globe, or Crown Artichoke.—This is likewise a distinct plant from the foregoing. It is a strong-growing, perennial herbaceous plant (*Cynara scolymus*), with handsome foliage, but cultivated for the sake of fleshy flower receptacles or heads, which are boiled till tender, and eaten with melted butter, toast, etc.

The plant are increased by means of division, as a rule, though seed of two or three varieties is now obtainable, and where a large stock has to be raised in a short time, this is an excellent method. When the new growth commences, any old plants may be either lifted bodily, and divided into pieces, with one, two, or three good crowns or growths apiece; or some of the outer suckers (rooted) may be separated and planted out in a properly prepared quarter. Salt and nitrate of soda are among the best of fertilisers or stimulants for this plant.—*Jamaica Agricultural Journal*.

MANUFACTURE OF COCOA.

The selected cocoa beans are first cleaned from the dust and attached particles which have come from various sources during the fermentation of the seeds.

The machines for cleaning the beans are very ingenious and effective, removing from the seed coat

every trace of foreign matter. The cleaned seeds are next roasted in the most careful manner, every precaution being taken to secure a uniform effect through the whole mass. During the roasting the seeds change colour somewhat, and become more or less modified in taste. In under-roasted seeds the flavour is not fully developed, while in over-roasted seeds the pleasant taste is likely to become greatly impaired, or it may even be wholly replaced by a bitter and harsh flavour. These relations of colour and taste to the roasting of the seeds make this portion of the manufacture one of the most delicate processes from beginning to end. By the roasting, the shell becomes more readily detachable, and its complete removal is the next step. The crushing of the seeds into small fragments is easily accomplished; and this is followed by a thorough winnowing, by which the lighter shells are carried away by themselves, leaving the clean fragments of the roasted seeds ready for further manipulation. Among the fragments can be detected minute and very tough bits of tissue. These bits are the hardened germs, or rather portions of the germs, and these are separated from the rest by an apparatus of much simplicity and efficiency. The cleaned shells are usually placed at once in packages for transportation. They are extensively used for the domestic preparation of a wholesome and very low-priced drink. This beverage contains a fair proportion of the active principle of the chocolate seeds themselves, and the flavour is suggestive of chocolate. The cleaned fragments constitute the so-called "cocoa nibs" of some foreign markets, and in this state they are used for the preparation of a simple decoction. But in this form they require to be boiled a long time for the development of flavour, and it is, therefore, better to have them treated beforehand in order to reduce the time of boiling; and this is all the more necessary, since during the long boiling a part of the more delicate aroma peculiar to chocolate seeds is apt to be dissipated. In the preparation of chocolate, the fragments are ground by a complicated mechanism until they attain the greatest degree of fineness, and constitute a perfectly homogeneous mass or paste. If it is to be a plain chocolate it goes directly into the moulds for shaping it. The moulding is a noisy but interesting operation. The chocolate cannot be pressed into moulds, because it sticks to the presser; it is, therefore, shaken in. A plastic lump of the proper weight is placed in a shallow mould. A number of these moulds are put in a wooden tray, placed upon a table, which is shaken automatically, causing the metal moulds to jump up and down in a very lively manner, and making as much clatter as a regiment of cavalry crossing a bridge. Every step of the process has to be watched with the most assiduous care. When the plastic mass has been shaken into the mould so as to be perfectly uniform in shape and size, the pans are removed to the cooling-room. If the chocolate is to be sweetened, a definite amount of the purest sugar, previously pulverized, is added before the moulding, and the whole ground and commingled. If it is to be a vanilla chocolate, the finest quality of Mexican Vanilla beans (which are superior to those gone elsewhere) are blended with the semi-fluid mass, and formed in moulds, as already described. The variations in the process are innumerable, many of them comparatively unimportant when taken singly; but to secure the best results it is important that each of these slight changes should be made at just the right time and in the right way. The manufacture of breakfast cocoa is based upon two important factors—first, the removal of a definite portion of the cocoa-oil from the roasted seeds; and secondly, increasing the miscibility of the powder secured by securing the greatest practicable degree of fineness. The method of manufacture is substantially as follows:—The ground fragments of roasted seeds are subjected to hydraulic pressure, by which a certain amount of the fat is eliminated. The pressed mass is, in the most successful process, treated mechanically in such a manner as to divide and sub-divide the minute

particle until they are capable of pressing through a sieve having several thousand meshes to the square inch. But such pulverization as this would, under ordinary circumstances, reduce the mass to a dull and unattractive powder. In the process devised by the owner of the best cocoa manufacture, this high degree of fineness is secured without any loss of brilliancy in the powder—the color being of the bright red which is not only attractive in appearance, when conjoined with the natural chocolate odour and flavour is characteristic of absolutely pure cocoa of the highest grade.—*Jamica Agricultural Journal*.

FLAX CULTURE.

The cultivation of flax for fibre purposes would doubtless yield a profitable return in many parts of this colony, and it is equally certain that on dairy farms where a large quantity of skim or separated milk is available for feeding calves and pigs the growing of flax seed for mixing with the milk would pay the farmer handsomely. The cultivation of this crop is simple and inexpensive, and for stock feeding purposes at least, it is one of the most useful products that can be raised. It is not necessary, nor is it desirable, that the soil on which flax is grown should be very rich. On the contrary, excessive luxuriance of growth is injurious, and generally results in the crop being "laid," which renders it comparatively worthless either for fibre or seed. The best soil is a sound dry, deep loam, with a clay subsoil. By good and careful cultivation, however, flax may be grown on various soil, but the class of soil just mentioned will be found to give the best results. In the preparation of the soil for the crop one of the points of greatest importance is that the land should be thoroughly cleaned of weeds, and made into a fine state of tilth of a moderate depth. The soil to a depth of three or four inches cannot be too fine. If the autumn cultivation has been carefully carried out a good harrowing in spring will generally effect perfect pulverisation of the soil. Following the last harrowing it is necessary to roll thoroughly, in order to secure an even surface and consolidate the land, which may be broken up again with a short-toothed or brush-harrow before sowing, drawn up and down in the direction in which the land had been ploughed. The seed best adapted for the generality of soils is Riga, although both Dutch and American varieties may be used with equal success in certain localities. In purchasing seed a point should be made in seeing that it is plump, shining, and heavy, and of the best brands, from a reputable merchant. It should be seen that it is free from the seeds of weeds; this will save a great amount of trouble afterwards when the crop is growing. Home grown seed is usually the most reliable, and we would, therefore, recommend every farmer to only sow each year as much foreign seed as would produce a sufficient quantity for his flax crop the following season. The produce of seed averages about 12 bushels to the acre, so that the seed saved of one statute acre would sow about six. In growing flax for fibre, it is better to sow thick than thin, as with thick sowing the stems grow tall and straight, with only one or two seed capsules at the top, and the fibre is found greatly superior in fineness and length to that produced from thinly sown, flax. The latter usually grows coarse and branchy, and produces a large quantity of seed, but very inferior quality of fibre. It is not advisable to grow flax more frequently on land than once in three or four years. It does well, as a rule, after a grain crop, but in America and the Argentine, the usual practice is to sow flax on the sod on newly broken up land. In those countries it is held that the crop is more beneficial to new land than a bare-fallow, as it materially assists in pulverising the sod, and from the shade it affords helps to retain the moisture in the subsoil. There is every reason to believe that this practice would be equally successful in the wheat-growing districts of New South Wales. It is true that flax is a somewhat exhausting crop on the fertility, but this may be more than compensated for in the better condition the soil

is left after it, compared with the pulverising effects of a bare fallow, and the system is, at any rate, worthy of a trial. The flax crop is not easily drouthed if it gets a fair start, and covers the ground fully before the dry weather sets in. Its roots penetrate much deeper than the wheat plant, and it will succeed almost anywhere with a rainfall averaging 20 inches and upwards per annum.—*Sydney Herald*.

RAIME FIBRE AS A SUBSTITUTE FOR COTTON.—Mr. D. Edward Radclyffe, Regent's Park, writes that Lancashire is threatened in connection with the cotton industry with a serious loss, and he asks why this country does not profit by its lessons. When the last great famine took place during the American war Great Britain, he says, was shown the folly of relying on one country for its supplies. "We have," he adds, "a vast territory in which we could grow Ramie, which is a fibre far superior to cotton. It will grow where cotton grows, and where it will not. The possibilities of this plant are enormous. It grows wild in India and many other of our possessions. It will make anything that can be made by flax, cotton, wool, or silk. If our Colonies would turn their attention to Ramie growing, the possibility of a vast industry being crippled for the want of supplies would be a thing of the past."—*Journal of Horticulture*.

COCOA IN THE PHILIPPINES.—The Cocoa plant grows in great abundance in the Philippine Islands, and it is stated that there is a good opening for the manufacturers of chocolate products of all kinds in the islands. The Cocoa plant in the Philippines is more like a shrub or bush, being about 10 feet in height, than the plant in South America, which averages about 25 feet in height, and forms quite a tree. The reason for the bushes not growing taller is to be found in the lack of proper cultivation, as the farmers of the islands give little attention to their farms. The large planters have as yet done little to develop the Cocoa industry, though their other crops are large and often well cultivated. The Cocoa plant grows near the protected towns, and will furnish two crops a year without cultivation. In the mountains tons of Cocoa go to waste every year. The leaves at certain periods of the year have a deep, rich, green appearance, while the flowers take on different colours and are most striking. The fruit is a large pod, oval in shape, which contains the beans from which the chocolate is manufactured. If, says an authority, modern methods of working the product were introduced, much of the waste occurring through primitive appliances could be avoided, and the profits be large.—*Journal of Horticulture*.

THE LAC INDUSTRY OF ASSAM.—A recent report of the Assistant-Director of Agriculture in Assam deals in detail with the lac industry there. Lac occurs in its natural state in various parts of the forests of Assam, as well as of Burma, but chiefly in parts of the Khasi and Garo hills, and the export in recent years has averaged 16,000 maunds, or something over 500 tons, but in some of the forests, owing to the ravages of the Kolaazar epidemic and depopulation, the production is declining. The production in Manipur is not sufficient for the local needs, and quantities of lac are sent there from the Kubo Valley of Assam. In Assam the lac is usually collected twice a year, first in May and June, and then in October and November. The first is mainly used for seed purposes, while the second forms the export. A few days after the collection, pieces of stiff lac containing living insects are tied on to the branches of the trees on which the next crop is to be grown. The usual plan is to place the lac in small bamboo baskets and tie these on the twigs of the trees. The insects soon crawl out and spread over the young branches, on which they promptly begin to feed, and secrete the resin. This is allowed to go on for about six months, when the lac is collected; but if the secretion has been defective or insufficient the insects remain undisturbed for another six months.—*Gardeners' Chronicle*.

CINCHONA CULTIVATION IN SOUTH INDIA.

We take the following extracts, on practical cultivation from the annual administration report on the Government cinchona department, Nilgiris for the year 1899-1900.

The total expenditure on factory account amounted to Rs.17,092-13-11 under the following principal heads:—

| | Rs. | A. | P. |
|--|---------|----|----|
| Purchase of 207,258 lb. bark | 67,069 | 9 | 8 |
| „ of new machinery | 4,211 | 14 | 5 |
| Cost of chemicals and cost of manufacturing and distributing alkaloids | 45,811 | 5 | 10 |
| Total .. | 117,092 | 13 | 11 |

GENERAL CONDITION—(a) Dodabetta.—Notwithstanding the exceptional dryness of the season this estate continues to look well. With the exception of a few patches where the soil is inferior, the older trees look healthy and vigorous, and the trees on the small plots of new land planted in 1897 and 1898 have made very good growth. Further experience confirms the opinion expressed in the last Administration Report that the local seed has not deteriorated, for the seedlings raised from seed taken from the estate trees and planted in new land in 1898 have come on quite as well as those raised from seed received from Jamaica. The estate was well cultivated during the year. In addition to the ordinary weeding and forking, 14,328 renovation pits were made and 3,380 yards of deep drains were dug in plots which required drainage. A damp sub-soil is well known to be a fruitful source of injury to cinchona and the beneficial effect of the deep drains was well marked; 113.35 acres of the estate were pruned and the yield of dry bark from this operation was 71,640 lb. or 632 lb. per acre. The trees had not been pruned for many years and the yield of bark from the thicker branches and from extra stems was consequently high. It is a well known fact that cinchona trees, whose stems are shaded from the direct rays of the sun, yield a higher percentage of alkaloid in their bark than trees whose stems are freely exposed; and in order to prove whether it will pay to protect the stems of old trees, a plot of 6 acres in an exposed position was selected and the stems of the trees were closely covered with grass. The trees being large, the cost of the work was high, amounting, as it did, to Rs.8-2-10 per acre; but the effect of the grassing on the appearance of the trees was most beneficial. The bark will be analysed when the trees have been under the protection of the covering for two years, and it will then be possible to show whether this mode of increasing the alkaloidal value of the bark is profitable or not. An increased yield of 941 units, when the value of the unit is one anna, would cover the cost of an annual covering of grass, but as the covering will probably last for several years, and as the quantity of bark on each acre is at least 4,000 lb., a very small increase in the richness of the bark would repay the cost of the work. An increased yield of sulphate of quinine in the bark of 50 per cent. would give 2,000 units more per acre and an increase of 25 per cent. would give 1,000 units per acre.

The total expenditure on Dodabetta for the year was Rs.5,211-10-5 or Rs.47-1-8 per acre; the crop obtained was 80,248 lb. and the cost of each pound of bark was therefore Rs.3-0-39.

(b) Nedivattam.—Although this estate suffered more from the drought than Dodabetta, still the amount of actual damage done by the failure of the rains was not large. When it is noted that out of the 151 days from the 1st of November to the 31st March there were only 5 days on which rain fell, and when it is known that the cinchona tree thrives best in a climate where the rainfall is well distributed throughout the year, it is remarkable that the old and young trees on the Nedivattam estate withstood the drought as well as

they did. The coppice plots showed no signs of being affected by the drought, but many of the oldest trees as well as younger trees standing on old ground with a south-west exposure suffered from the want of moisture and lost a good deal of their foliage. Dying trees to the number of 6,837 were cut down and yielded 33,488 lb. of bark. The estate was weeded as usual and was well dug before the dry weather; 30,500 renovation pits were made in plots 28 and 10 and were filled with weeds; 33,500 eucalyptus plants were put out in plots 22, 27 and 32 and vacancies in the preceding year's fuel plantings were supplied. A large number of these plants, however, succumbed to the drought. The total expenditure on the estate was Rs.14,189-14-1 or Rs.45-0-10 per acre. The crop obtained was 33,488 lb. and the cost of each pound of bark was therefore Rs.6-9-55.

(c) Hooker.—The old portion of this estate which consists of 145.33 acres of cinchona, 48.24 acres of fuel trees and 9.93 acres lying fallow, cannot be said to be in a satisfactory condition. It was found necessary during the year to coppice 10,588 sickly and dying trees which yielded 26,543 lb. of dry bark, and it is to be feared that this process of the elimination of the unfit will have to be repeated year by year until the old land is entirely cleared. In the Administration Report for 1896-97 it was pointed out that there were only 10.69 acres growing a first crop of cinchona, while the remaining area was growing a second crop. The trees on the 10.69 acres are looking well and their growth on the whole is very good, but the second planting on old land has never been satisfactory. This land, which was originally rather poor grass land with a bad exposure, has now been under cinchona for 31 to 34 years and it is not surprising that under these conditions the trees fail to attain their maximum growth. The total expenditure on the old Hooker estate was Rs.4,927-2-7, or Rs.25-7-3 per acre, and the cost of the crop of bark was As. 2-11-64.

The No. 1 extension of 80 acres of forest land which was planted in the southwest monsoon of 1898 has come on very well. The young plants suffered very little from the drought and their growth has been most satisfactory. The plants were only from 3 to 4 inches high when they were put out. Many of them are now over 6 feet high, and the tallest of 50 plants that have been selected for quarterly measurements was 6 feet 10 inches at the end of the year. A comparison of the growth of these plants with the measurements of plants recorded by the late Mr. McIvor in the early days of the cinchona enterprise is of particular interest as it shows that under favourable conditions the present growth of cinchona plants raised from local seed and from seed received from Jamaica is quite as vigorous as was the case with the plants and seed received direct from South America.

The No. 2 extension of 80 acres was planted during the year, and although the south-west monsoon was a failure the plants have grown well and promise to do as well as, if not better than, those on the No. 1 extension.

A commencement was made with the felling and nurseries for the No. 3 extension which will be planted during 1900-1901.

IV—MANURE.—On the Dodabetta estate 17.9 acres were manured with cattle and stable manure and 41.73 acres were treated with lime at the rate of 7½ cwt. per acre. The lime was spread over the ground and lightly forked in at a total cost per acre of Rs.18-4-5. The effect on the trees was decidedly beneficial. An experiment was made on 1 acre with a mixture of fish, superphosphate, Thomas' phosphate, sulphate of iron and potash. The total cost of the manure and its application was Rs.185-6-4. The effect so far has been a very marked improvement in the appearance and growth of the trees. The bark will be analysed after the manure has been down for two years. The plots referred to in the last Administration Report were inter-coppiced with the result that the trees manured with the mixture of bonemeal, white castor poonac, nitrate of soda and nitrate of potash gave 4.75 per

cent. sulphate of quinine and 1.18 per cent. febrifuge, while the plot treated with bone meal, white castor poonac, superphosphate and nitrate of potash gave 8.18 per cent. sulphate of quinine and 1.25 per cent. febrifuge. At Nedivattam plots 10, 14, 28 and 29 were manured with cattle manure and at Hooker the plots thus treated were Nos. 1, 2, 7, 8 and 14.

V.—NURSERIES.—At Dodabetta the measures referred to in the last Administration Report to eradicate the nematode worms which were damaging the plants in the nurseries have proved tolerably successful, but it cannot be said that the evil has been entirely remedied. At Nedivattam and Hooker the growth and condition of the plants in the nurseries have been quite satisfactory and there has been no sign of any disease. At Nedivattam succirubra seed has been put down to ensure a good supply of strong seedlings on which officials and Ledger will ultimately be grafted. Fourteen pounds of officialis seed taken from trees, some of which analysed from 9 to 10 per cent. sulphate of quinine, were received from Mr. Van Leersum, the Director of the Government Cinchona Plantations in Java. This seed has been put down in the nurseries at Nedivattam and Hooker and has germinated well. Mr. Van Leersum also forwarded a Wardian case containing 50 grafts of Ledger, officialis and hybrids on succirubra stocks, but owing to the delay caused by the landing of the case at Colombo instead of at Madras, only 15 of the plants were alive when they reached the estate, and of these 15, only four successful grafts are growing the growth in the remaining eleven being confined to the succirubra stock. Mr. Van Leersum's kindness and liberality merit the warmest acknowledgement and it is greatly to be regretted that after all the care and trouble he bestowed upon the grafts, they should have been so neglected on the voyage and then detained at Colombo instead of being landed at Madras.

CROP.—The total quantity of bark harvested on the three estates during the year was 140,279 lb. or 38,972 more than in 1898-99. The crop which consisted of 19,458 lb. red bark and 120,821 lb. crown and hybrid barks was obtained by the coppicing of sickly trees and by thinnings and prunings. On the Dodabetta estate 1,920 sickly trees were coppiced and yielded 8,608 lb. of dry bark and 113.35 acres were pruned and gave 71,640 lb. of bark or 632 lb. per acre. The trees coppiced at Nedivattam numbered 6,837 and yielded 33,488 lb. of dry bark and the number coppiced at Hooker was 10,588, the yield being 26,543 lb. A magnifolia tree at Nedivattam which had to be coppiced, because of illhealth, yielded the large total of 120 lb. of dry bark. This tree was about 34 years old and was one of the best grown trees on the estate. The amount of bark purchased from private growers was 207,258 lb., and 16,553 lb. were harvested from a plot of land in the Bikkatti village on the Kundahs. This land having reverted to Government, the Collector of the Nilgiris offered the cinchona trees that were on it to this department. The trees were accordingly coppiced and the bark was sent to the factory. The cost of harvesting and transport from the Kundahs was 6.24 pies per lb. of dry bark and the expenditure incurred was charged to the Dodabetta estate. In estimating the cost of the year's crop, the sum expended on the harvesting and transport of the Bikkatti bark, viz., Rs. 538, has been deducted from the total spent on Head office and old plantations. The result, viz., Rs. 48,941-2-9, represents the cost of the 140,279 lb. of estate bark or As. 5-6-98 per lb. From statement No. 7 it will be seen that at the commencement of the year the stock of bark amounted to 286,579 lb. and at the close of the year there was a balance of 305,822 lb.

FACTORY.—The total quantity of bark worked up during the year was 344,312 lb. consisting of 318,881 lb. crown and hybrid barks and 25,431 lb. red bark, and the alkaloids extracted amount to 14,803 lb. consisting of 10,188 lb. sulphate of quinine and 4,615 lb. febrifuge. The output was thus less than in 1898-99, but it was considered sufficient to make about 10,000 lb. of quinine during the year under review, whereas during the

preceding year an effort was made to show how much quinine could be made in the factory in one year with the present machinery. Unless the demand for quinine increase largely an output of 10,000 lb. of quinine annually will be quite sufficient to meet all requirements. The boilers which had worked well for years, broke down in June and their condition was reported on by the Inspector of Steam Boilers in July. The smaller boiler was reported to be worn out and not worth repairing and the larger boiler was repaired in accordance with the Inspector's directions. Sanction was given in G. O., No. 2885, Revenue, dated 11th August 1899, for the purchase of a new boiler which will be put up during the current year, and in G. O., No. 626, Revenue, dated 18th September 1899, a new disintegrator, a centrifugal machine and new boiling and crystallizing pans were sanctioned. The disintegrator which arrived at the end of the past financial year will be put up at once and the other machinery will be installed during the current year. The quantity of bark purchased from private growers during the year was 207,258 lb. and the price paid was Rs. 67,069-9-8, or As. 5-2-13 per pound against As. 3-2-9 per pound paid in 1898-99. The quality of the purchased bark was about the same in the two years and the higher price per pound paid during the year under review was due to the rise in the price of bark in the London market.

The statement given above which includes all factory and manufacturing charges as well as the actual cost of all the bark used does not include the item of Rs. 4,211-14-5 for new machinery and plant, as this is not a legitimate charge against the factory for the year. This item appears in the stock statement as an addition to the value of stock, and it is intended in future to write off 10 per cent. of the value of plant and machinery and debit it to the factory. This has not been done in the present instance as the new machinery has not been erected and the cost of the existing stock of old machinery has been debited in full in former years, so that there is no necessity to write off any sum for its depreciation. The following table shows the cost of the 14,803 lb. of alkaloids manufactured during the year, compared with the cost of the 19,841 lb. of alkaloids made in the preceding year:—

| | 1899-1900. | | | | | | | | |
|---|-------------------------|-------|-----------|-------|------------------------------|-------|---|----|---|
| | Crown and hybrid barks. | | Red bark. | | Crown, hybrid and red barks. | | | | |
| | RS. | A. P. | RS. | A. P. | RS. | A. P. | | | |
| Cost of each pound of alkaloid in the bark. | 6 | 14 | 6 | 9 | 3 | 2 | 7 | 1 | 1 |
| Cost of manufacture etc., per pound..... | 2 | 8 | 3 | 1 | 9 | 0 | 2 | 7 | 2 |
| Total cost per pound.... | 9 | 6 | 9 | 10 | 12 | 2 | 9 | 8 | 3 |
| | 1898-99. | | | | | | | | |
| | RS. | A. P. | RS. | A. P. | RS. | A. P. | | | |
| Cost of each pound of alkaloid in the bark. | 4 | 4 | 2 | 8 | 1 | 5 | 5 | 7 | 1 |
| Cost of manufacture etc., per pound..... | 2 | 7 | 11 | 1 | 4 | 0 | 2 | 4 | 6 |
| Total cost per pound... | 7 | 6 | 1 | 9 | 5 | 5 | 7 | 11 | 7 |

It will be seen from the above that the increased cost of the alkaloids made during the year under review was chiefly due to the higher cost of the bark that was used. The cost of manufacture and distribution per pound of alkaloid extracted from all the bark used was Rs. 7-2 against Rs. 4-6 in the preceding year. The increase of As. 2-8 per lb. is due to the fact that a larger proportion of quinine-yielding barks was worked up during the year. The proportions of quinine barks and red barks used were 92.7 per cent. and 7.3 per cent., respectively, against 81 per cent. and 19 per cent. in the preceding year. The cost of the manufacture of the alkaloids

from the red barks was As. 5 per lb. higher than in the preceding year. The explanation is that a much smaller quantity of red bark was worked up during the year, and the cost of the labour was proportionately higher. The crown and hybrid barks averaged 3.19 per cent. sulphate of quinine and 1.11 per cent. febrifuge against 3.37 per cent. sulphate of quinine and 1.01 per cent. febrifuge in the preceding year and the red barks averaged 4.19 per cent. febrifuge against 3.94 per cent. the year before. The percentage of total alkaloids from all the barks worked up was 4.299 per cent. against 4.257 in 1893-1899.

The total cost of the alkaloids from the quinine barks including packing and distribution was R1,29,390-3-9 or R9-6-9 per lb., but as the febrifuge from the crown barks is a bye-product in the manufacture of quinine, it may be considered that the 10,188 lb. of quinine cost R1,29,390-3-9 or R12-11-2 per lb. and the 4,615 lb. of febrifuge from the crowns and red barks cost R11,493-8-7 or R2-7-10 per lb. These valuations have been adopted in the stock statement (No. 11).

The following table gives the outturn of quinine and febrifuge since the commencement of manufacture at Nedivattam :—

| | Outturn of alkaloids. | | | | | |
|------------|-------------------------|------------|-------------|----------------------|------------|------------------|
| | Crown and hybrid barks. | Red barks. | Total bark. | Sulphate of quinine. | Febrifuge. | Total alkaloids. |
| | LB. | LB. | LB. | LB. | LB. | LB. |
| 1889-90.. | 6,650 | 8,600 | 15,250 | 234 | 357 | 591 |
| 1890-91... | 96,200 | .. | 96,200 | 2,923 | 1,050 | 3,973 |
| 1891-92... | 122,500 | 22,000 | 144,500 | 4,425 | 3,174 | 7,599 |
| 1892-93.. | 157,771 | 13,946 | 171,717 | 4,933 | 3,139 | 8,072 |
| 1893-94.. | 52,600 | 122,400 | 175,000 | 2,000 | 5,775 | 7,775 |
| 1894-95.. | 152,800 | 43,800 | 196,600 | 4,770 | 1,756 | 6,526 |
| 1895-96.. | 136,000 | 97,800 | 233,800 | 3,600 | 2,284 | 5,884 |
| 1896-97.. | 237,000 | 1,100 | 238,100 | 7,891 | 3,350 | 11,241 |
| 1897-98... | 125,934 | 114,650 | 240,584 | 5,092 | 6,339 | 11,431 |
| 1898-99.. | 373,967 | 87,750 | 461,717 | 12,603 | 7,238 | 19,841 |
| 1899-1900 | 313,881 | 25,431 | 344,312 | 10,183 | 4,615 | 14,803 |

Quinine.—At the close of last year the stock on hand was 11,591½ lb. and during the year under review 10,188 lb. were manufactured, making a total of 21,779½ lb. The issues during the year amounted to 7,378½ lb. and there remained a balance in store at the end of the year of 14,400 14-16 lb. The amount of quinine issued exceeded the total of any previous year, and the increase, as compared with last year, is due to the fact that, under the orders of the Government of India quinine is supplied by this department to all provinces, except Bengal Punjab and Assam. The number of hospitals and dispensaries supplied direct with quinine was 650 against 396 last year, and the number of 5-grain powders sent out was 1,127,785 against 1,018,532 in 1898-99.

Febrifuge.—At the close of last year the stock on hand was 11,274½ lb. The quantity manufactured during the year was 4,615, making a total of 15,889-8. The issues were 2,676½, leaving a balance in store of 13,213½ lb.

| ISSUES OF QUININE AND FEBRIFUGE SINCE 1889-90 | | | |
|---|----------|------------|---------|
| | Quinine. | Febrifuge. | Total. |
| | LB. | LB. | LB. |
| 1889-90 . | 234 | 7 | 241 |
| 1890-91.. | 1,256 | 200 | 1,556 |
| 1891-92.. | 3,344 | 3,017 | 6,361 |
| 1892-93.. | 3,204 | 2,603 | 5,812 |
| 1893-94.. | 2,536 | 3,513 | 6,049 |
| 1894-95.. | 3,631 | 3,956 | 7,587 |
| 1895-96.. | 5,644 | 2,666 | 8,310 |
| 1896-97.. | 5,903½ | 3,709½ | 9,613½ |
| 1897-98.. | 6,336½ | 1,955½ | 8,292 |
| 1898-99.. | 4,629½ | 1,623½ | 6,253½ |
| 1899-1900 | 7,378½ | 2,676½ | 10,054½ |

MISCELLANEOUS.—(a) Issues of quinine packets to Collectors.—During the year 400 packets of 102 5-grain

powders were issued to Collectors for sale, and the amount realized by the sale of powders by Revenue officials was R764-12-0

(b) Sale of quinine at Post offices.—It was noted in the last Administration report that, owing to the raising of the price of the powders from 2 pies to 3 pies, there had been a falling off in the sales at post offices. During the year under review, however, the number of packets sold was 5,501 and the number sent out as permanent advances was 936'44. The corresponding figures for 1898-99 were 4,766'14 and 279'48 and it is expected that the return to the original price of 2 pies per 5-grain powder during 1900-1901 will result in a further increase in the sales. A special report on this subject and on the sales by Revenue officials will be submitted to Government on the 1st September.

(c) Deputation of the Director to Java.—In accordance with G.O., No. 1394, Revenue, dated 17th April 1899 the Director visited Java in May 1899 and on his return journey paid a visit to the Bengal Government Cinchona Plantations near Darjeeling. A special report on Cinchona in Java was submitted to Government and was reviewed in G.O., No. 608, Revenue, of the 8th September. The success which has been obtained by the Java Cinchona planters was shown to be due to the care taken to grow the richest possible bark. The climatic conditions in Java are undoubtedly more favourable than in India; but, on the other hand, the Dutch planter is more heavily taxed than the planter in this country. If the principal of selection based on analysis is followed, and if cinchona are grown on suitable soil, and well cultivated, the cinchona industry in Southern India might be revived with a very good prospect of success.

(d) Subordinate Staff.—Messrs. H. V. Ryan and E. Collins, the Superintendents of the Dodabetta and Nedivattam estates and Mr. D. Campbell, the Manager, of the Head office, have done very good work during the year. The work of the office has been largely increased, owing to quinine being supplied to other provinces including Native States, and as there has been no increase in the establishment, the work has at times been very heavy.

(Signed) W M. STANDEN, Director,

STATEMENT showing the Receipts and Expenditure of the Government Cinchona Plantations, Nilgiris, for 1899-1900.

| Classification. | Receipts. | | Actuals up to the end of the year. | |
|--------------------------------------|------------------|--------------------|------------------------------------|-------|
| | Budget estimate. | Received estimate. | RS. | A. P. |
| Sale of 7,277½ lb. quinine..... | 68,000 | 98,000 | 1,26,104 | 14 6 |
| Sale of 2,778 lb. febrifuge | 30,000 | 20,000 | 27,868 | 0 0 |
| Sale of 545½ lb. cinchona bark | 450 | 450 | 185 | 15 3 |
| Sale of 12,10-16 lb. seed | .. | ... | 50 | 8 0 |
| Sale of 171 lb. jalap | 550 | .. | 171 | 0 0 |
| Miscellaneous.. | 1,000 | 1,550 | 2,090 | 12 1 |
| Total..... | 1,00,000 | 1,20,000 | 1,56,471 | 1 10 |

TANNING IN INDIA.

The Indian Mechanic says: At the present time tanning might almost be said to rank among the decadent industries of India, although it is but a few years since the prosperity of Indian tanners became quasi-proverbial. The enormous export trade in tanned skins and hides that was done by Madras a few years ago, was a trade that yielded large profits. Now, however, not only are profits reduced

but in many instances tanners have incurred heavy losses, output has been reduced, and the whole trade has lost ground. Not only this. Some 10 years ago factories were opened in Calcutta for the purpose of drying skins and hides, and the dried articles began to be largely exported to the United States of America, where they underwent the tanning processes. The reason for this was not merely that American tanning produced better leather, but also that it was both more expeditious and cheaper. More recently a "pickling" process has been resorted to in Madras in place of tanning; and pickled skins are now being exported in lieu of tanned skins. Not that shipments of the latter have been stopped entirely. The pickled article has only partially taken the place of the tanned, but unless some considerable improvements are made in the process of tanning resorted to in Southern India, it appears probable that every year will see an increased proportion of the skins and hides of the country exported in an untanned state, so that they may undergo in America or England the cheaper and more expeditious processes of tanning than are in vogue there.

Circumstances such as those briefly alluded to, lend additional interest to any practical suggestions for the improvement of local tanning or for the introduction of new tanning agents. We are led, therefore, to call attention to the latest number of the *Agricultural Ledger* (No. 9 of 1899) wherein the merits of Tari or Teri pods as a tanning agent are discussed. Hitherto Tari appears to have been regarded chiefly as a dye-producer, but in the publication under notice a report on an analysis of the pods by Professor Wyndham R. Dunstan, M.A., F.R.S., Director of the Scientific Department, Imperial Institute, London, calls attention to the valuable properties of the plant as a tanning agent. In some localities in India, the Tari pods are already used for tanning purposes, but the properties of the plant do not appear to be generally-known, and its cultivation is perhaps not as extended as it should be. Professor Dunstan, after distinguishing between *Cesalpinia digyna* (Tari or Teri) and *Cesalpinia coriaria* (Divi-divi) remarks upon the analysis of the pod cases of the former. The pods, it may be remarked, hold two thick-shelled peas which contain oil, but very little tanning matter. The seeds are removed, the pod-case is then ground alone. It is easily powdered, and from the powder water readily dissolves the tanning constituents, furnishing a liquid which is of a light or dark brown colour, according to its strength. Professor Dunstan recently analysed three samples of Divi-divi pods, with the result that the poorest showed 19.73 per cent. of tanning matter, the best 32.79 per cent., the average about 30 per cent. When he came to analyse the powdered pod-cases of the Teri, he arrived at a percentage of over 50 per cent. of tanning matter, and in one instance (a sample from Assam) the percentage was nearly 60. Commenting on this, Professor Dunstan remarks that is clear that the tanning value of Teri is greater than that of the South American Divi-divi. Moreover, in the case of Divi-divi the usual plan is to prepare for the use of the tanner and "extract" of the material, but the pod-cases of the Teri are so rich in tanning that the material could be used direct by the tanner without the previous preparation of an extract, "which, as is well-known, is a disadvantageous process, since it always leads to a considerable enhancement in colour." With the view of obtaining a practical opinion as to the tanning value of this Teri powder, a sample was furnished to a well-known tanning expert, who reports that he is much impressed with the results obtained. They compare very favourably with those contained by the best Divi-divi, whilst the aqueous liquor from *C. digyna* did not appear to undergo the injurious fermentation that is the difficulty in the use of *C. coriaria*. Professor Dunstan gives in tabular form the results of the analysis of three specimens of the powdered pod-cases of *C. digyna*, derived from Burma and Assam (though he errone-

ously refers to one of the Burma samples as from Bombay). The table is as follows:—

| | | CESALPINIA DIGYNA. | | | | | |
|------------------------|------------|--------------------|--------------------|---|--------------------------------|------------------------------|---------------|
| L. I. No. | Serial No. | Whence received. | Moisture per cent. | Tanning matter in material dried at 110 per cent. | Total soluble matter per cent. | Non-tanning matter per cent. | Ash per cent. |
| <i>Pegu Circle.</i> | | | | | | | |
| 6,921 | 6,253 | Bombay... | 11.07 | 53.82 | 61.95 | 14.08 | 3.28 |
| <i>Eastern Circle.</i> | | | | | | | |
| 6,372 | 4,887 | Burma... | 10.93 | 53.86 | 62.83 | 14.86 | 3.76 |
| 9,293 | 10,795 | Assam..... | 11.40 | 59.89 | 65.60 | 12.73 | 1.84 |

The sample from Assam is the richest in tannin. No sample was sent from Madras, and we are not aware to what extent, if any, the plant is available in the Southern Presidency.

Mr. David Hooper, in an introduction to Professor Dunstan's report in the *Agricultural Ledger*, briefly sketches the history of Teri-pods, but makes no allusion to it as growing in Madras. The earliest samples tested were from Chittagong, where the plant was growing wild. Mr. John Tail, of Kilderpore, tanned a skin exclusively with the pods, and the process of tanning extended over four days. He remarked:—"The leather I conceive to be of a very superior quality, possessing not only an equality in softness with that tanned with Divi-divi (*Cesalpinia coriaria*), but surpassing it in colour and appearance, and is consequently capable of being used far more extensively for tanning purposes, especially when a bright colour is required, than the Divi-divi." Some years ago, Messrs. Cammiade Brothers, of Madras, wrote to the Reporter on Economic Products, Calcutta:—"The pods of *Cesalpinia digyna* are said to yield leather as white as snow. If that report is correct, this tannin ought to cut out all others in Madras, provided it can be grown cheaply." Mr. Evans, Chemist, of the Tanners' Laboratory, Bristol, has reported upon the pods:—"They yield about 33 per cent. of tannic acid, which is in some measure like that of the babul (*Acacia arabica*) pods, which gives a cream-coloured precipitate; but this unites with gelatine in the form of a precipitate as white as driven snow, and its reactions with other chemicals give divers colours, which will make it equally attractive to the dyer. In saying this much, we can say with satisfaction as a chemist that it is almost perfect; what may be its behaviour in the tannery remains to be proved."

Enough has been said to show that the merits of Teri as a tanning agent are considerable. As to the plant itself, a report from Prome describes it as a thorny scandent shrub growing on low ground and near streams in forest without bamboo. From Toun-goo we learn that the tree is never found in country that is in the least hilly, nor in country that is swampy. Its habitat *par excellence* is a level ground, either near the banks of streams or on waste land near villages, deserted village sites being favourite spots. Another report describes the leaves as, generally speaking, bearing a very close resemblance to those of the tamarind tree, while the pods are smaller, and the tree itself is seldom higher than 10 feet. The pods when ripe are roasted, and the seeds then eaten, principally by the younger portion of the population. If a large quantity be eaten in this way, it has an intoxicating effect.

It would be interesting to know if this plant grows wild in any parts of Southern India, and we trust that our present remarks will direct sufficient attention to the subject to elicit some information on this point. There is little room for doubt that the local tanning industry must gradually die out unless some special agent such as the above can be produced locally.—*The Leather Trades' Review*,

BONE MEAL.

We are constantly being asked by our readers whether we consider bone meal (or bone dust) to be a good manure; whether it should be used in a fine or coarse state, and whether it is good for this or that crop. It appears to us that a few words of explanation are necessary. To begin with, bone meal as a fertiliser scarcely has an equal; mixed with saltpetre, cowdung, castor-cake, or linseed-cake it has been found to produce very heavy out-turns when used for field crops. For coffee it has been found to give excellent results, either alone or when mixed with other manures. In the case of tea also it has been found to give very satisfactory results. To give our readers an idea of the value of bone meal compared with other manures in common use, we reproduce below analysis of ten samples of manures chemically analysed by Dr. J. W. Leather, Agricultural Chemist to the Government of India:—

| Manures. | Moisture. | Organic matter. | Sand. | Nitrogen. | Phosphoric acid. |
|--|-----------|-----------------|-----------|-----------|------------------|
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| Poudrett .. | 34.01 | 8.18 | 48.27 | 0.44 | 1.15 |
| Bone dust .. | 7.90 | 27.51 | 5.06 | 4.69 | 23.49 |
| Cowdung (Bazar) | 43.26 | 18.86 | 31.77 | 0.53 | 0.29 |
| Dung, litter and urine | 62.15 | 17.92 | 15.82 | 0.59 | 0.38 |
| Dung alone .. | 80.06 | 10.94 | 7.51 | 0.36 | 0.29 |
| Litter alone .. | 46.68 | 26.28 | 20.57 | 0.84 | 0.37 |
| Dung alone .. | 78.45 | 10.06 | 9.91 | 0.30 | 0.19 |
| Urine-earth from cattle getting concentrated food | 16.73 | 10.11 | 65.29 | 0.44 | 0.23 |
| Urine-earth from cattle getting no concentrated food | 11.63 | 8.73 | 68.39 | 0.33 | 0.20 |
| Sheepdung .. | 50.01 | 16.26 | 26.02 | 0.87 | 0.53 |

From the above it will be seen that bone dust had the smallest percentage of moisture and sand, and the largest percentage of organic matter, nitrogen and phosphoric acid; the two last named are the two most important elements of plant-food. Potash and lime are also important constituents of plants. Of the former, bone meal has a trace, and of the latter 28 per cent., against 0.28 per cent. in cowdung. Taking all the foregoing circumstances into consideration, it will be readily understood that bone meal is a very valuable manure.

So far we have only discussed the question from the planters and agriculturists, point of view. In the garden it has been found to be of immense value, not only for flowering plants in pots and in the open bed or border, but in the kitchen and fruit garden as well. We have seen some remarkable results obtained from the use of bone meal for roses, aroids, ferns, and even annuals, such as heartsease, stock, etc. We have seen it used in combination with Ichthemic guano and cowdung for flowering plants, and with linseed-cake and saltpetre for cabbages, cauliflower, turnip, knol-khol, etc.; also for vines, peaches, plums, etc., in combination with linseed-cake. It has been given as a surface dressing to the orange tribe with great benefit. Pomeloes, especially, derive great benefit from its use. There is an idea prevalent that it takes a long time before bone meal can be absorbed by plants. Chemically this is no doubt quite correct; in practice the results obtained in the garden would seem to negative this theory. We have seen bone meal applied to Cannas, which were in a very poor condition. Two months after those very plants were over five feet high, and in robust growth, having sent up dozens of suckers. No other manure of any kind was applied. This would go to prove that the action of bone meal is more rapid than is generally believed. There is one point on which some misconception exists. It is considered by some that a coarse grist is useful for farm crops. Our own experience is that the finer the meal the more readily is it

assimilated by the roots of plants. Therefore in order to derive immediate benefit from this fertiliser it should always be used in the shape of fine powder, whether for field crops, garden or pot culture. To those who intend exhibiting at the next flower show, whether flower, fruit or vegetables, we strongly recommend the use of bone meal.—*Indian Gardening and Planter.*

FRUIT CULTIVATION IN CEYLON

THE EXPERIMENTS WITH ORANGE GROWING IN UVA.

Under the first heading above, our London correspondent, in the portion of his letter published yesterday, makes reference to the scheme contemplated by Mr. A. J. Pearson, of Messrs. Brown and Co. some years ago, for starting orange-groves in Uva; and says that he does not think the scheme ever got beyond a newspaper article. One of our representatives, who saw Mr. Pearson yesterday, learns that the chief difficulty the latter experienced in starting the scheme on a large scale was his inability to secure a suitable piece of land. Owing to this, and not having sufficient time at his disposal, Mr. Pearson has been unable to carry on the scheme as vigorously as he could have wished. At the same time he has by no means lost interest in the subject, and, as a matter of fact, gets regularly every year from Australia a fairly large number of trees for friends and others. Last year, for example, he imported about a thousand grafted orange and lemon trees. These have been planted in all parts of the island and are doing particularly well. On the Uva side they seem to thrive the best on account of the dry climate which prevails during the fruiting season, and at Hatton also they do well; but the weather, there is generally inclined to be wet at the time when the fruit is ripening. It would be impossible Mr. Pearson explained, to get accurate results of the experiments for a year or two, but many of the trees planted three years ago are now bearing fruit, and on a small scale, the scheme has been most successful. He thinks there are great possibilities for the cultivation of oranges and lemons in Ceylon if suitable land could be obtained.

Mr. Pearson is also of opinion that many of the deciduous sub-tropical fruits could be grown well in certain parts of the Island, such as the fig, peach, apricot, nectarine, persimmon, Japanese plum, &c. He states that he has seen splendid Peach trees at elevations of 4,000 ft. and over, but the fruit on them indicates them to be worthless mongrel seedlings, and there seems no reason why the very best varieties of grafted or budded trees should not do just as well. The deplorable habit of growing from seed is answerable for the bad quality of fruit that is general in the island, and if people would only realise, when planting fruit trees, that when they plant a seedling tree, or grow from a seed, the chances of obtaining fruit of decent quality are about 10 to one against, they would probably be at more pains to secure plants they could depend on. Then, in addition to the uncertainty as to the quality of the fruit, it has to be borne in mind that seedling trees take about eight years to come into bearing, whereas a healthy grafted plant with proper cultivation may begin to shew fruit in two years from planting, and should certainly do so in three years.

The orange industry in Jamaica has grown considerably of late years. That Island has no advantages over Ceylon as regards climate for citrus cultivation nor transport facilities, and it seems strange that an industry which is looked on as one of great importance in other parts of the world should be here so entirely neglected.

QUEENSLAND ARROWROOT.

With reference to the prices of arrowroot in Great Britain, which appear in British price lists as much higher than can be obtained by the growers and manufactures of Queensland who export the article, we wish to draw attention to the fact that Queens-

land arrowroot, under the provisions of the Food and Drugs Act, cannot be sold in Great Britain as arrowroot, and this is a matter of great importance to the growers here. The authorities in England, with whom the administration of the Act lies, have decided that the article made here and sent into the English market is not genuine arrowroot, because it is made from *Canna edulis* and not from *Maranta arundinacea*. Much correspondence has passed on the subject between the Department of Agriculture here and the Acting Agent-general for the colony in England, Mr. Chas. S. Dicken, who particularly interested himself in the matter, and placed himself in communication with Mr. Chamberlain, with the result that arrowroot made in this colony from the *Canna edulis*, can be sold in Great Britain only when labelled "Queensland Arrowroot." The Hon. A. J. Thynne, when Minister for Agriculture, advised growers not only so to designate the manufactured article, but to add the words "Prepared from *Canna edulis*." So the matter stands; and when arrowroot is quoted in British price lists, it should be understood that in every case the standard arrowroots of St. Vincent, Natal, and Bermuda are referred to.

Those prices were given in a letter from the Agent-General to the Minister for Agriculture, so far back as 1896, as follows:—

| | |
|--------------------|---------------|
| Bermuda | 2s 2d per lb. |
| Natal | 6½d " |
| St. Vincent (1) .. | 2½ " |
| St. Vincent (2) .. | 1½d " |

The Army and Navy Stores supplied samples of the kinds with their prices, viz:—

| | |
|-----------------------|----------------|
| Bermuda | 2s 6½d per lb. |
| Bermuda (kind) .. | 1s 1d " |
| Natal (finest) .. | 9½d " |
| St. Vincent | 5½d " |
| St. Vincent (fine) .. | 6½d " |

The reason for the wide difference in value was the limited supply of Bermuda. There is no sample or price given for Queensland arrowroot for the reasons stated.

"Strictly speaking," says the Assistant Secretary of Inland Revenue, London, in a report on the subject to the Under Secretary of State, "the term 'arrowroot,' without prefix or qualification, should be restricted to the starch derived from plants of the genus *Maranta*, the most important member of which is *Maranta arundinacea*, a native of the West Indies, and which furnishes most of the genuine West Indian arrowroot. The *Maranta* starch is perfectly distinct in its physical character and properties, and is readily identified under the microscope. A purchaser simply asking for arrowroot would presumably, by use and wont, expect to be supplied with *Maranta* starch.

Tous-les-mois, or Queensland arrowroot, the product of the *Canna edulis*, is quite a different starch, and its physical properties and appearance are distinct from those of *Maranta* starch."

We are informed by Messrs. Lahey Bros. that the price of the Queensland article has varied much in price, sometimes falling to 1½d per lb. or £16 per ton, with freight at ½d per lb, sometimes reaching as much as 4d per lb, or over £38 per ton. The average price in Brisbane, the Messrs. Lahey stated to range from £12 to £20, or, say, an average of £15 per ton.—*Queensland Agricultural Journal*.

HONEY PRODUCTION IN PALESTINE.

The American Consul in Jerusalem, in a recent report gives an interesting account of the rear of bees and the production of honey in Palestine, which has always been famous for its honey, although the methods in vogue were until lately very crude. The development of the industry by the application of modern methods of late years is due to a family named Baldensperger, which emigrated from Switzerland in 1849 and settled at Artas, seven miles north of Jerusalem, near the famous pools of Solomon. The father

was always interested in bees and kept some in the native hives, which are long terra-cotta jars, and he aroused in his five sons an enthusiasm in the industry which has led to considerable results. In 1880 they really commenced the work under an American teacher, and soon adopted the plan of carrying the bees about from place to place for the best food. Thus from Ramleh they had the hives taken on women's heads 12 miles to Yafa, where the orange-blossoms were plentiful, so that in April there was an abundant harvest of this kind of honey, while at other times it was obtained from cactus and acacia blossoms. From another apiary and in other places harvests were obtained from lemon blossoms and from wild thyme. In 1884 the 50 hives at Yafa alone yielded 6,000 lb. of honey in less than a month. The Turkish officials soon cast their eyes on the industry as a source of taxation, and at first charged about 5d. per hive, but shortly after enormously increased the amount payable by counting every door, window, and hole through which the bees could be seen at work as hives, so that 150 hives counted as 2,000. After much litigation the Baldenspergers were found to owe the authorities £100 on account of a single apiary. This they refused to pay, whereupon the houses were sold by auction in Jerusalem at 5s. each, but when the officials came to deliver the hives to the purchaser, as they were bound to do, it was found that the bottom boards of the hives were unhooked, and the bees swarmed out to attack their distributors. A compromise had to be made and the bees remained with their original owners. Then the local sheikhs demanded toll whenever an apiary was moved near their villages, otherwise the hives were stolen, fire or water being used to kill the bees. Indeed, now, about a tenth of the honey has to be given away as blackmail. Occasionally even camel-loads of hives on their way from one feeding-ground to another are stolen by the Beduins, so that the industry is beset by many obstacles and calls for patience, tact, and perseverance. A colony is about 35,000 to 50,000 bees, and in distributing these colonies great care is taken not to overstock any special locality. The Baldenspergers do a considerable business to exporting queen bees, and when their enterprise was threatened by excessive taxation, they sold a large number of their hives to natives, whom they had trained, and to the Jewish colony in the plain of Sharon, so that there are now 700 hives at work in the country in addition to their own colonies. Queen bees exported by them have sold for as much as £3 each in America. All the honey produced finds a good market in Europe.—*English paper*.

LECTURE ON ORANGE CULTURE:

BY HON. J. T. PALACHE.

I will proceed to point out what is to my mind the best method of establishing a grove. Select a well drained piece of ground, let the size be according to your means, clear it of all noxious vegetation, then line it in 20 feet square. It is best to begin with to get plants of good varieties from a nursery. Afterwards, as you extend your cultivation, I will point out how you can supply yourself with your own huddled plants. Dig the holes four feet in circumference and two feet deep—then put your plants in, being careful to see that they have been carefully taken up with all the fibrous roots, and in planting lay these carefully out on some loose soil so as to enable the roots to begin to take up the nutriment from the earth at the earliest possible period. If the weather is dry cut back all the leaf branches, if wet you can leave them on, and if the plants have been carefully lifted and planted they will grow without any stoppage. If the weather is very dry, water for about a week every day, after that every other day, until you are satisfied that the plants have fairly started. Then proceed to cultivate the spaces between with catch

crops—beans, corn, cassava, potatoes, yams, etc., taking care always to keep round each plant clear so as to prevent crowding. The citrus plant cannot stand crowding or overshadowing as it immediately under such circumstances develops disease and blight. Keep the soil for about four feet round the plant well forked, so as to let in light and air, and thus procure the best advantages of sunshine and showers.

Having started your grove—set to work to get a nursery. Prepare a seed bed by ploughing a nice level piece of land free from stones. Open trenches about one inch deep and one foot apart. Get Seville orange or hog shaddock seed and drop them in the trenches about one inch apart, and cover lightly. And when the seeds begin to grow be careful to keep the land round about well stirred and free from weeds. It is well to steep your seeds the night before you plant out in a solution of bitter-wood, to prevent them being eaten by any mice and other pests. When these plants are about eight months old they will be fit to put out in the nursery. Prepare the nursery land carefully. Plough deeply and then harrow it off. A portion of your grove in which you have not planted catch crops will do for this purpose and will effect a great economy, as whilst you are cultivating your nursery stock, you are also cultivating and improving your grove trees. Line off in rows two feet apart and drill out the plants six inches apart, and as they grow, stire the land round about well and keep the weeds down so as to give your plants all the advantages to be derived from the soil. Twelve months after the time of planting out from the nursery the plants will be ready to be budded. And if your grove trees have got on well you will get plenty of bud-wood from them, by cutting back some of the superfluous shoots which they have put out. And I think I will best serve the purpose by giving you a practical lesson in budding—all the materials for which I have at hand. After the bud has been in 14 days—if you see it still green and beginning to close round the edges, you may be certain it has taken. Cut back the stock about six to nine inches from the bud. Those that have not taken, you leave to rebud another day. It is advisable not to cut the top quite off but half through and bend over the head, so as not to get an over-flow of sap to the bud and endanger its existence by repletion. When the bud has grown about a foot, and has hardened up, remove the top altogether and give the bud shoot the benefit of the entire flow of sap, it will then be able to utilize it all. When the bud is about three months old, with the aid of a sharp strong scissors, clip the head of the stock quite close to the apex of the bud, and this gradually heals over making for the plant one straight trunk, and you soon lose sight of the point where the bud was put in. It will surprise you how quickly these buds grow and how soon they outstrip seedlings. This grape fruit which you see here was only budded last November. And an important advantage not to be lost sight of in budding is, that it is the only method of propagating the citrus family to ensure getting the original variety you wish, as owing to the ease with which the blossoms of this family are fertilized by bees and other insects, seedlings are always furtive and producing all sorts of hybrids, most of which are useless for any purpose. This shaddock is from a tree budded August gone, three years, from the far-famed Cinnamon Hill Shaddock, and it has come perfectly true to the original in shape and quality. Here also are Grape fruit budded from the Wiltou Grape Fruit which in flavour, shape and quality, are the exact counterpart of the fruit from the parent tree. Here also are Navel Oranges, the bud of which came by book parcel post from the Riverside Groves in distant California, and not one of the trees from which these fruit were gathered are yet four years old—some of them barely three. I think these are examples which sufficiently prove that propa-

gation by budding is the best to adopt and vastly superior to all others. The next question that should occupy the citrus growers attention is, what are the best varieties to grow. I am quite certain that of oranges there is no finer variety than the ordinary Jamaica Orange; and with cultivation, selection and propagation by budding, it will in time hold its own with any variety in the world; but in the meantime as our best market is in America, we have to consider the taste and prejudices of the consumers—hence it is well to calculate the varieties most highly thought of in America. Another very important desideratum is to have such varieties that come in at different periods of the season. To have a crop coming gradually to maturity and extending over the whole season, the following varieties will be found to meet these requisites to a great extent:—Boones Early—the earliest in cultivation in Florida, ripens in September, and I feel certain from what I see on my trees, this variety will be still earlier in Jamaica. The two next earliest are Centennial and Parson Brown—the Centennial is a very prolific bearer with a fine shaped fruit, follows close on Boones Early. The Parson Brown is a very fine Orange indeed, large and well shaped and a heavy bearer. For mid-crop, the Jaffa, Washington Navel, Pine Apple and the blood varieties, such as Ruby Blood, Jaffa, Blood and Maltese Blood are the best. The Washington Navel is the favourite Orange in California and the most generally grown there. This Orange I have discovered growing naturally here, and I have the word of a gentleman who has eaten this fruit in the Riverside Groves, that our Jamaica Navel is as good in all respects as its valued relative in California. Now here is the native Orange to propagate and cultivate. We in Jamaica think too little of these things, and the following facts will illustrate what I mean. Thirty years ago the Washington Department of Agriculture sent to Bahia in South America, and got 10 trees of this variety, when they arrived in Washington only two were alive—when planted, only one grew; and it is from this one tree that the thousands of acre were planted in California now yielding million of dollars to their fortunate owners. Twenty-five years ago Captain Rivett brought from Bahia two trees of this variety Orange and planted them at Petersfield, in St. Andrew—both grew, and up to two years ago they were the only two trees known in the Island. The Jaffa and Pine Apple are very vigorous growers in our Island climate and bid fair to make large compact trees capable of producing heavy crops of fruit, and I notice in the Parson Brown and Jaffa, an almost entire absence of attacks of insects and disease of all sorts which is quite remarkable, and for these reasons I would recommend these varieties for cultivation above all others. The late varieties—Hart's Tardiff, King's and Californian Joppa, complete a list which I think, will enable the grove owner to have Oranges from September to June of the following year, without the great loss from over-ripe fruit which would naturally be the case if only the early varieties were planted—or the long waiting, if only the late varieties were cultivated. The Joppa is a comparatively new variety. It is quite thornless and bears a seedless fruit, and it is said that the fruit will remain on the trees perfectly sound until June. Of the fancy varieties the Daisy Tangerine and the Satsuma are the best to grow, as they have a tough, leathery skin, which makes them keep well and good travellers. The Satsuma has only recently been introduced from Japan, and it is said that its keeping and travelling qualities are so good, whilst preserving the colour and qualities of Tangerine that it will soon take the place of all other fancy varieties. Another variety of the citrus family that is much valued in the Northern markets are Lemons, and the varieties best for cultivation here are Genoa and Villa Franca. The mode of culture and propagation is the same as oranges, but much greater care is required in the gathering, airing, and packing of the fruit. The above varieties grow here

with great vigor; and from the fact that I am now gathering fruit from trees not yet three years old, I feel confident in recommending the culture of Lemons to you as likely to add at no distant date, a valuable quota to our fruit exports. Yet another variety of valuable citrus family is the Pomelo or Grape Fruit. Americans have developed a great taste for this fruit, and when it gets better known in Europe it may have a great future, and be a source of wealth to this community; for no where else can better Grape Fruit be grown; and the rapidity with which this fruit grows and begins to bear is very encouraging. Some of our native varieties are excellent, whilst there are a great many bad and rubbishy hybrids that it will be useless to waste time and space to cultivate. Of the imported varieties Royal Pomelo, Triumph Walters and March Seedless are the best; whilst of natives, the Wilton and the Windsor are the best that can be procured, although there are no doubt, several other good varieties in the country. But whatever you do, select a variety of proved good quality. It will always pay to grow the best. The cultivation and propagation are the same as for oranges. The greatest troubles that the orange grower has to contend with are insect pests and disease. But the grove owner should bear in mind that his best weapon against these enemies is careful and constant good cultivation. Bear in mind always that insects and disease will always attack the sickly and weakly plants: whilst the well cultivated, vigorous growing plant will have within itself power to resist and throw off the attacks of its enemies, the weakly illcultivated plant will easily succumb. It pays therefore to keep out weeds and ply the cultivator regularly through your groves, if for no other reason than to keep your plants in vigorous growth, so that they may be able to resist the encroachments of their natural enemies. Time will not permit me to give you an elaborate list of Latin and Greek names of the insects that are enemies to citrus cultivation, but the coloured plate which I have here will show you which are your friends and which are your enemies, for by that wonderful provision of a beneficial providence one set of insects prey on the other, so as to preserve the balance of nature. There is however one active little enemy to combat against; an enemy whose name is legion, and who if allowed to follow out its own plans will nip off the embryo leaves of the plants the moment they appear above the ground. I refer to those very industrious creatures whom the primers hold up to us as an example to emulate, but it could be wished that their proverbial industry was more tempered with judgment in consideration for struggling humanity. I mean ants, of course. They evidently regard your citrus leaves as special dainties, and must be taught to keep their distance. An application of air slaked lime or hard wood ashes on the seedling bed and a planting of strong solution of bitterwood on the larger trees, will damp their ardour. Another enemy is the rust mite which attacks and destroys the fruit and exhausts the oil cells and renders the orange unmarketable. Here is an orange attacked therewith. A solution of one pound whale oil soap to five gallons of water, and applied with a brush to the affected parts of a tree just before the blooming season, is an effective remedy. Sulphur is also a good thing to spray with for this insect. The scale insect is another dangerous enemy, and I have here a limb with some scale on it. The Laybird is its greatest enemy, but if no Ladybirds are in your grove a solution of lime, kerosene oil and water is a very effective remedy. And here is one of the most deadly enemies to citrus cultivation, the beetle, we know as Fidler. It feeds in the leaves of the trees, then deposits its eggs at the root of the trees, and in time produces the larvæ which feeds on the bark of the roots, and as the roots are barked the whole tree ere long feels the loss of its necessary nutrition, and twig after twig, branch after branch, dies back, often puzzling the

owner to determine the trouble. So soon as you notice the dying back begin, search carefully round the root of the tree, and you will find numbers of larvæ, very like "Mackaka" worm but smaller with a hard black pointed head. Deal out death to every one and apply about half lb. of sulphate of ammonia and this will drive them away. Prune the trees, carefully back, removing all dead or dying branches. Prune the roots also cutting away the barked roots to give those left alive a chance to recover vigour. Wage perpetual war against Mr. Fidler wherever you see him—let death be his certain lot and thus keep down a dangerous pest.—*Journal of the Jamaica Agricultural Society.*

TEA CIRCULAR ON TEA REFUSE TEA WASTE AND DAMAGED TEA FROM MESSRS. BARLOW AND CO. 37, STRAND, CALCUTTA.

DEAR SIRS,—A considerable quantity of the above occurs on all factories from various causes, and is swept out of the tea house and thrown among the bushes or on the ash-heap. Hitherto there has been nothing else to do with it. We have, however, lately learned that, though useless for human consumption, it has a certain value for other purposes. We recommend you, therefore, to have all the following collected and put into good old rice bags and sent down to us in these bags, when we will dispose of it for you to the best advantage—

Tea Fluff.—This is fairly abundant in every part of the sifting room, and should be regularly cleared off the walls, roofs, beams, etc.

Tea Refuse.—This includes all pickings during sifting. Tea blown into odd corners from the dryers, teas accidentally left in the corners or under bins, etc., etc., till soft and unfit for mixing with sound and marketable teas.

Tea Sweepings.—This includes all tea house sweepings after the work is done, freed of dirt and dusty earth or sand as far as possible.

Damaged Tea.—Any tea rendered unfit for mixing with sound and marketable tea, from any cause whatever, such as water, fire, or smoke, should be collected and put separately into bags. Any sunk tea, or tea otherwise damaged by water, should be redried as soon as possible.

It is however, to be practically noted that any such damaged tea is to be kept entirely separate, and not mixed with the above, till you have received instructions as to what is to be done with it.

Such tea should not be thrown away, as it is of some value.

Tea Dust.—Not fit for human consumption on account of the earthy dust mixed with it, should be sent down in bags.

We believe it is the practice with some concerns to sell the above refuse locally. This is a most objectionable practice, as it frequently gets into the hands of natives in Calcutta, and possibly out of India, and is sold as tea much to the detriment of the reputation of Indian teas. The practice is, therefore, most harmful, apart from all sanitary considerations. We trust you will do your best to stop such traffic.

We give our absolute guarantee that none of the supplies of the above sent to us will be used for human consumption in any way whatever.

N.B.—Tea stalks by themselves are useless and should not be sent down, as we are advised at present, but any normal mixture of stalks with the above refuse will not effect the sale.

Please advise us about what quantity of the above you will have available from now to the end of the present season. On hearing from you, instructions will be sent to you for forwarding it to Calcutta. We are, Dear Sirs, yours faithfully, *Per Pro Barlow and Co., H. W. SUTCLIFFE.—Indian Gardening.*

COFFEE IN DAYS OF OLD IN CEYLON.

(By a Coffee Planter of the "Forties".)

Dublin, Sept. 4.

I read the *Overland Observer* and find allusions therein to things that draw me back to the good old times when in full vigour I roamed over the hills looking after coolies, engaged in holing, lining, and planting. My first experience was on "Alpittykande," the property of Robert Craig and "Mahaleecumbura," the property of Postmaster-General Lee and Mr. Saunders of the Customs. In those days when forest lands could be got at 5s the acre, many of the Civil Servants invested and some made money.

My object in writing this note was on seeing

"ALPITTYKANDE"

mentioned, in a late issue of the *Observer*. I well recollect when I traced a path from the Monument and had it widened out to run "pack bullocks," for I did not like my men to be beasts of burden. Subsequently the track was extended to Gampola, and as this track succeeded well, a deputation of the Superintendents waited on me from the other side of the main road, asking me to trace a path to their estates. These were the first private roads in the Kaduganawa district, and to show their value "Alpittykande," Mr. Craig's property, sold for £12,000, Messrs. Lee and Saunders were offered £35,000 by the same purchaser, but refused and subsequently lost in the disastrous years 1845-1846 and 1847, when I gave a bushel of parchment for a bushel inferior rice.

Well, to return to

COFFEE

which was ruined by hoe and scraper, I must bear record to the only practical Planter I ever met in Ceylon (George Crosbie). After he had planted "Bowhill," near Nawalapitiya, he never allowed hoe or scraper to be used by any of the weeding gangs: instant dismissal was the punishment of any infringement. The consequence of his wise rule was a growth of moss all over the planted portion, and in seasons when shorthanded he had the berry picked from under the trees and cleaned at his store, such coffee realising 5s per cwt. more than parchment cleaned at Colombo. After his death new-fangled ideas were introduced, hoe and scraper came into requisition and soon the soil which "G C" tried to secure for the nourishment of the coffee tree was running off as pea-soup to enrich lowlying paddy fields; the trees roots exposed and gradual decay. For ten years the average of Bowhill was 10 cwt. 1 qr. 15 lb. per acre; after the new change it dropped off to 9 cwt. 7 qr. 3 lb. and 3 cwt. per acre and eventually like all estates similarly treated, became worthless. Poverty brought disease which like any other plague extends and lays hold of good and bad. In this case, however, there was no remedy, for as coffee is a surface feeder and the soil which should be strictly conserved was wasted. The soil on Ceylon hills is light, and never can be replaced by any artificial manure, and to keep cattle is unproductive, as I know by experience. I never saw a coolie drop his basket of manure beside a tree that had to be holed to receive it, but I said there goes 3s.

How far

TEA

will pay I have no opinion to offer as I never was engaged in its culture. It is a shrub that will grow from Pidurutalagalla to the Fort of Galle, and

from what little experience I gleaned from a relative modern machinery has not added to the flavour of tea. I recollect the small plot Mr. Grant had on the road from Nuwara Eliya to Kandy which was cured by *hand labour*, and certainly *none* of the machine-cured tea can at all come up to it in flavour. Mr. G. always sold his at three rupees a lb. and I would give that amount in preference to 1s of the present stuff sold under the name of Tea. The Beauyls of Dublin have still a small quantity of tea, part of a cargo that they had from China about 50 years ago. On State days they regale friends (they belong to the Society of Friends) and no greater treat could be offered. This particular tea was *hand-cured*.

R.

CEYLON PLANTERS' RUBBER SYNDICATE, LD.

This is the title of a proposed Company of which the memorandum and articles of Association appeared in a recent *Gazette*. The object is to acquire lands in the Malay Peninsula or elsewhere for the purpose of producing rubber, tea, coffee, cinchona, cocoa, cardamoms, rhea, rami, plants, trees, etc., and the nominal capital is R90,000 divided into 180 shares of R500 each. The signatories are:—A R Wilson-Wood, Kotagala; W H Aitken, Dikoya; Wm. P Halliley, Nanuoya; P J Gaisford, Talawakele; Prior S Palmer, Dumbula; Ernest Hamilton, Dolosbage; and Harry Whitham, Dolosbage.

EXPERIMENTAL TEA CULTIVATION IN SOUTH CAROLINA.

In the last report of the British Consul at Charleston a section is devoted to describing the results of experiments in tea growing in the State. At Summerville the experiments began about ten years ago. At the beginning they were conducted on a small scale, but they have been gradually increased, until now over 50 acres have been planted with tea. When the plants arrive at full bearing the yield should be at least 10,000 lb. of high-grade tea annually, and this, it is supposed, will suffice to show conclusively whether tea may be profitably grown under existing local conditions of climate, soil, &c. The problem of providing cheap labour for gathering the leaf was solved by training a band of negro children. The South Fraser tea garden, containing a little over two acres, has done very well so far. The bushes were raised from seed planted in 1892, produced from a celebrated garden near Hang-chau. This tea is not exported from China, as it costs about 6s 6d per lb. at Hang-chau. The Summerville garden is in very good condition, the unsuccessful plants amounting to about 4 per cent only, and visitors acquainted with Oriental gardens have expressed surprise at its luxuriant and uniform growth, comparing favourably with similar gardens in the East. The bushes are thick, somewhat low in growth, and globular in form, the leaf, as a rule, being rather small and quite tender, and adapted for the manufacture of either green or black tea. The soil is a clay loam, with a stiff, dry subsoil; it has been heavily enriched every spring with a high-grade fertilizer at the rate of 600 lb. to the acre, and the yield of dry tea last year reached 500 lb. per acre, while few gardens in China yield over 200 lb. The 1898 crop amounted to 3,000 lb. in all, and was sold at a profit of about 25 per cent. The black tea produced there has a distinctly characteristic flavour, and, like some of the choicer Oriental teas, its liquor has more

strength than the colour indicates. The severe cold weather of last winter appears to have conclusively tested tea culture in South Carolina, so far as climate is concerned. The unusually cold weather did not materially diminish the crop, the percentage of plants apparently injured was small, and of those killed still smaller. The production is necessarily dear, owing to the comparatively high price of labour, and this difficulty must be met by greater productiveness, substitution of machinery for hand labour in the factory, and by the cultivation and manufacture of those qualities of tea which, from inherent chemical causes, cannot be transported from the East without losing their delicacy of flavour. One essential to greater productiveness is abundance of the richest plant food, natural or artificial. High-class teas in the East are dried at low temperatures in order to preserve those volatile principles that give them delicacy and flavour. They do not retain their best qualities for any length of time, and cannot for this reason be advantageously shipped abroad. Herein may be found the most profitable field for tea experiment in America, as there can be no competition from abroad in the higher grades if it can be demonstrated that their successful cultivation is possible. It has been suggested that probably the best chance for success in this direction will lie in the development of selections of long Pekoe tips for the manufacture of Mandarin tea such as is made in China.—*London Times*, Sept. 3.

PUMPKINS AS A FODDER.

Writing to the *Auckland News*, a farmer says: "My experience with the pumpkin is, all the animals that I have, including the cats, relish it; cooked or uncooked, every part, seeds and all, disappear quickly. For a number of years I have used various foods for dairy purposes—potatoes, turnips of several kinds, mangolds, also green maize. The root crops are costly to produce; too great a percentage of water in them. The mangold gives well-flavoured milk and butter when used or fed with good grass hay. The best results I obtained was from the pumpkin with grass hay and prairie-grass. Whatever the experience of others may be, my opinion is that the three above-mentioned foods are superior to all others for dairying or fattening purposes. The pumpkin is highly nutritious, the prairie grass is far superior to any of the other grasses as hay, or used in the green state. The pumpkin is easy of cultivation, clean to handle, no cost of digging as in root crops. Should anyone elect to use the three foods, and after fair trial they find them more suitable and profitable foods, their advice and knowledge would be very acceptable. The most convenient method to produce the pumpkin and prairie-grass would be to grow both in one suitable paddock—say three acres—one acre pumpkins, and two acres grass. When pumpkins are taken off, prepare for grass; break up one acre of grass, and use for pumpkins, or, in other words, use in rotation. A stack of good meadow hay as a standby is very desirable. The result will be, with a good shelter shed, good milk and butter, and rich manure."

REID'S BREAKER OR TEA LEAF EQUALISING MACHINE.

AN IMPORTANT IMPROVEMENT.

A machine that has been before the public for a number of years, and one that has proved its merits and usefulness by the large number of sales, is the Self-Feeding Tea Breaking Machine, introduced by Mr. George Reid, of the Meleng Tea Estate.

An improvement has recently been made in this machine. The hopper arrangement and the fluted roller have been done away with, and a large rocking tray is substituted. It was found

at times when the tea was carelessly fed into the hopper, that more dust was made than was desirable, and moreover, foreign substances, such as nails, pieces of bamboo, &c., which in the best regulated tea-houses do sometimes manage to find their way into the tea bulk, were not easily detected. The rocking tray, above alluded to, presents a large surface, on which a whole basketful of tea may be emptied, and spread out, the tea being gradually moved towards the "Breaker" by the vibration of the tray, and any foreign substances can be easily detected and removed. Moreover, no possible breakage, or rubbing, of the tea can take place, until it comes in contact with the knives, or cutting teeth, in the interior of the machine.

This tray is moved by a small eccentric on each side of the projecting driving spindle, and is balanced by weights; it works noiselessly, and a most satisfactory report upon it has been received from Assam, where the new attachment has been thoroughly tested.—*H. and C. Mail*, Sept. 14.

BOGUS TEA.—During the past year 226 samples of tea, representing 3,322 packages when tested at the Government laboratories, were found to contain exhausted leaves, or to be mixed with sand or other illegal substances and were consequently refused admission for home consumption. Of these 3,322 packages 2,274 were exported, presumably as being good enough for foreigners, and 1,048 packages were destroyed. It would be interesting to learn more about this tea, and to discover where it comes from and where it goes to, that is the 2,274 exported packages. We trust they are not described by the name of Indian or Ceylon in some foreign country where the knowledge of tea is very limited.

WHEN CHINA WAKES UP.—Indian and Ceylon planters are often told that one of these days China will rouse herself and become a formidable competitor in the attempt to control the tea markets of the world. In this connection it may be noted that in the Geographical Section of the British Association an address was delivered on Tuesday by Mr. G. Chisholm, upon some consequences that may be anticipated from the development of the resources of the Chinese Empire by modern methods. He assumed that its development was about to progress. Referring to tea and silk he said that: "In the silk trade China had felt constrained, by the example of Japan, to discard primitive hand methods of manufacture, while in the tea trade the severe as well as continuously progressive competition of Ceylon and India had taught the Chinese a salutary lesson, and induced them to make experiments with leaf-rolling machinery, the product of which was found to yield high prices in London." Mr. Chisholm claims that the development of China was bound to have world-wide effects, on a scale of extraordinary magnitude. Among the consequences that might be anticipated from this opening up were:—(1) A rise in prices in China, especially in the industrial regions; (2) the creation of a demand for food stuffs not likely to be supplied by China itself, a demand which in itself would be one of the most powerful causes contributing to maintain the rise in prices; (3) the imparting of a great stimulus to the food-producing regions, most favourably situated for meeting this demand, more particularly Manchuria, Siberia and Western America and probably the Pacific States of North America to a greater extent than Canada; (4) perhaps the most important of all would be the creation of a tendency to a gradual but prolonged rise in wheat and other grain prices all the world over, reversing the process that has been going on since about 1870.—*H. and C. Mail*, Sept. 14.

TEA MACHINERY AND TEA FACTORIES:

—MR. J. A. WILLIS TAYLOR ON THE SUBJECT.

A planter, upon whose knowledge of all that concerns tea and tea gardens we can thoroughly rely, writes us as follows:—"I see that some of the Indian papers refer to this book as one of 'exceptional interest,' but I fear that anyone practically acquainted with tea planting who reads this treatise with the idea of discovering new ideas or enlarging his knowledge of the subject with which it professes to treat, will be disappointed. I am under the impression that the author has never been upon a tea plantation or seen a tea bush, and this is obviously a drawback when writing about the cultivation and preparation of tea for the market. He tells us that the chemistry of tea is a subject upon which he has barely treated, but with the cultivation of the plant and the process of manufacture or preparation of the leaf he has been forced to deal to a certain extent, in order to be enabled to describe intelligibly the various machines and apparatus employed.

"In his reference to cultivation and manufacture he gives the ideas of recent writers, and there are liberal quotations from the views of Mr. Christison and Mr. Crole, which are duly acknowledged. I fail to see the relevancy of the description given of the various kinds of steam ploughs, steam draining, and ditching machines, and the different systems of steam cultivation, as there is no attempt to solve the problem how they could be profitably employed on tea gardens. While admitting that it is not altogether impossible that level grass land might be prepared for planting, and that steam ploughs in this connection might prove useful, I do not see, nor does Mr. Wallis Taylor explain, how such operations could be profitably carried on, even if the steam cultivator could be moved about and kept constantly employed upon grass land extensions. The idea, if it is suggested, that these cultivators could be used upon forest clearings, planted gardens, or on hill-side gardens, is a somewhat remarkable one. As a preliminary to his account of tea machinery he describes, the author devotes some space to bridges, portable railways, steam and electric traction tramways, oil engines, refrigerating machines, &c., and here, no doubt, as an engineer, he is quite at home, but I cannot see the point of that which is written so far as its application to tea, or tea making or manufacture is concerned. In describing the various machinery used in the manufacture of tea, Mr. Wallis Taylor treats of some thirty-seven tea-driers, including machines that, so far as I am aware, never came into actual use, and others that are obsolete. Even in dealing with such a well-known maker as Mr. Jackson, whose dryers are named, no drawing is given of any but the Britannia, which has been superseded by an improved invention by the same maker. The chapters on Tea Machinery are apparently compiled from the Patentees' Catalogues, with the addition of some illustrations drawn from the Patent Office. A study of the complete catalogues of the few firms who now manufacture tea machinery would therefore be much more to the purpose from a practical point of view than this elaborate volume.

"In regard to tea chests, a list of woods from which they are made is given, but from the 36 different kinds named the 'Toon,' decidedly the best, is omitted, while the reference to patent chests

is altogether inadequate and incomplete. The book is well illustrated, is got up nicely and contains useful memoranda on various engineering and mechanical points, but I cannot discover that the volume, the net price of which, I believe, is 25s., throws any new light on tea manufacture or tea machinery.—*Home and Colonial Mail*, Sept 14.

THE (CEYLON) PLUMBAGO COMPANY.

The first ordinary meeting of the Plumbago Company, Ltd., was held on Sept. 12 at the offices, 57½d, Old Broad-street, E.C., Mr. D C Rutherford presiding.

The Chairman having expressed his regret at the absence of Mr. Pymon (the Chairman of the company), said the shareholders were aware that was only the statutory meeting, and as there was no business to transact it would only be necessary for him to take up their time for a few minutes. The company was registered on 16th May last, and the working capital amounting to £10,000, was fully subscribed by the signatories to the memorandum and articles of association, and four shillings per share had been called up. On 22nd May Mr. Alpine Wodehouse-Pearce was appointed managing director of the company and he sailed for Ceylon on the 13th June, and since his arrival there, he had been and still was inspecting the properties in which the company was interested, and his reports were generally of a satisfactory character, especially so in regard to the Talgawella Estate. He (the Chairman) regretted that there had been considerable delay in the shipment of the necessary mining machinery on account of the engineering firms being so fully occupied, but the orders were now completed and the last shipment would be made on 15th inst. Mr. William Shedlock was engaged as engineer to the company, and he sailed for Ceylon on 23rd August, and upon his arrival he will set to work to erect the machinery upon the property selected by Mr. Pearce as quickly as possible.

The proceedings then terminated with a vote of thanks to the Chairman.—*Financial Times*, Sept. 13.

[To prevent mistakes we may point out the gentleman who presided was not H. K. Rutherford who has nothing to do with the Company.—*Ed. T.A.*]

PLANTING AND SPORT IN TRAVANCORE

ELEPHANTS GALORE—A BIG SNAKE.

An ex-Ceylon planter writes under date 21st Sept. :—

"I think you will be interested to know that I shot a cobra at the Kaduakarum bungalow last December, 1899, which measured 10 feet 1 inch : no snake yaru as I have the skin.

"I resigned charge of T— estate to take up work here as a manager of three estates. These estates have been abandoned for a long time, so that I have a lot of work before me. The labour is plentiful as all the coolies going to and from Peermaad have to pass through Placart through which the main east road runs. Rice, of course, is the same and I can buy it from R3'50 to R4 per bushel. Wild animals are abundant, as are also red deer, elk or sambur, bison and elephants. I saw no less than 33 elephants in a flock yesterday, about 800 yards away from my plackers, and I believe

there were up to 30 of them, some of which had not come round the hill when they were disturbed.

"I will give you acreages, &c., later on as I have some tea to recover from jungle. The total in land is 1,258.98 acres."

ANOTHER SCIENTIST FOR PERADENIYA, CEYLON.

Mr. A G Tansley, who studied botany at Cambridge, and there knew Messrs. Willis, Carruthers and Gardiner, and other of the younger scientists who have recently visited Ceylon, arrived on Sept. 30th, by the ss. "Oceana,"—says our evening contemporary—to join Dr. Lang, who has been in this island two months, engaged in botanical investigations. They will continue at Peradeniya together, until November or December, and then will start for the Malay States. Mr. Tansley, who will stay with Mr. Carruthers while at Peradeniya, will, during his six months in this part of the world, more especially study the lower forms of plant life. In August last, shortly before starting, he met at Cambridge Mr. J Stanley Gardiner, who recently conducted an exhaustive research in the Indian Ocean atolls. [Mr. Tansley is, we believe, an old pupil of Dulwich College—a school which is constantly sending up scholars who attain distinction in the sister Universities.—Ed. T.A.]

RUBBER INDUSTRY IN MANICA.

The "Manica Mining Journal" is complaining of the destructive way in which the rubber industry is exploited by Indians in Manica. Until quite recently (it says) the wealth of the country in india-rubber was known only to Indians, who traded with the natives at considerable profit to themselves. The Indian stores buy yearly about 12 tons of india-rubber, of a value of nearly £4,000. On that sum they have something like 60 per cent. profit, or a net return of £2,400. The complaint is not that these Indian traders should make handsome profits on their transactions, but that in the making of them one of the most important natural products of the country is being ruined. The natives bleed the lianes very carelessly, in many cases killing them, in order to lessen the difficulty of their task. To mitigate, if not to remove, this evil, our Manica contemporary suggests that the Mozambique Company should charge a yearly licence of £100 or more per stone to all india-rubber buyers, and, further, that the working of the lianes should only be permitted to the concessionaires who bind themselves when the season is over and the crop gathered to plant again a certain number of new trees, and strictly forbid any working to the natives. The Mozambique Company has already granted one concession under these conditions, and it is, no doubt, the intention to impose them in future contracts.—*India-Rubber Journal*, Sept. 17.

THE GRAPHITE INDUSTRY OF BAVARIA.

In a report on the economical condition of Bavaria, Mr. Harford, of our Legation at Munich, says that graphite is one of the most valuable minerals found in Bavaria, and like the lithographic stone, represent almost a monopoly for the country, as the only formidable competitor in the supply of natural graphite is Ceylon. The production in Ceylon has, however, decreased in the last six years from 30,000 tons to 12,000 to 15,000 tons annually, causing a great rise in prices, as the deficit could not be made good from other sources. The price of Ceylon graphite ranges from £50 to £75 per ton. In Bavaria the graphite deposits are found near Passau, and are inferior to the Cey-

lon graphite, as, while the latter is nearly pure, the former has about 60 to 75 per cent of earthy substances mixed with it. The Passau graphite however, can be purified by a very simple and inexpensive process, and a substance produced that is quite equal to the Ceylon graphite. Unfortunately this process is little used, as the deposits are spread amongst a number of small proprietors, who work on a small scale in the cheapest manner possible; the result is that there is waste of raw material, of which it is said that nearly 90 per cent is absolutely thrown away owing to the unscientific system of working which must lead to the premature exhaustion of the deposits. In 1898 there were 49 graphite works in Bavaria, employing only 216 men, which produced 4,593 tons of graphite, worth £19,583.—*London Times*, Sept. 10.

THE PRECIOUS STONE CUTTING INDUSTRY OF BIRKENFELD.

The cutting and polishing of precious and semi-precious stones forms the chief industry of the little principality of Birkenfeld, up among the hills of the Nahe River in Oldenburg, and gives employment to over 5,000 persons. Although an improved factory system is gradually superseding the laborious methods of former times, there are, nevertheless, plenty of the old polishing and cutting works, which bear evidence to the lives sacrificed to this industry. The United States Consul at Mainz says that in the early days of the trade, agate quarries existed in the adjacent hills, and this stone was cut and polished by a very laborious method, which is still practised, although the agate quarries have long been exhausted, and the raw material—as well as amethyst, jasper, opal, topaz, &c.—has been imported (since about 1831) chiefly from Brazil, whence it is shipped to Birkenfeld, to be cut, shaped, and polished for the jewellery trade. The usual method employed in cutting and polishing these stones is as follows:—In a rude hut by a stream, which furnishes the power, four large grindstones about 4 feet in diameter are so fixed that their axes are only about one foot above the floor, into which a slit is cut, so that part of the grindstone is below its level. The lowest portion passes through the water, thus keeping the stones constantly wet. The operator has a bench or block of wood, about 18 inches high, hollowed out to receive his chest and body. On the bench he lies at full length, and with his fingers holds the small piece of opal, amethyst, or other stone which is to be cut, against the grindstone slightly above the level of the floor: in this position the men lie from morning to night, day after day. Consumption usually carries them off at an early age, but other men are found to follow this vocation, as the earnings are comparatively high. The operator usually owns his grindstone, or at least half of one. This represents an investment of about £20, and a skilled lapidary can earn from £3 to £5 per week. He does not usually cut and polish stones on his own account, but generally contracts with manufacturing jewellers, who supply him with the stones in the rough to cut and polish at a certain price per gramme (gramme = 15.4 grains). As the stones, even in the rough, represent quite an outlay of money, the honesty of the workman must be greatly relied upon, for nobody can say in advance how many grains of finished stones a certain piece of opal, amethyst, or the like may yield. Besides these semi-precious stones, precious stones such as diamonds, &c., are also cut and polished there, but this is an entirely different branch of the industry, and is chiefly carried on in

factories with modern machinery. Another branch of the industry in the district of Birkenfeld is the cutting of cameos. Pearls are also polished, drilled, and cut, and shipped in large quantities to all countries.—*Journal of the Society of Arts*, Sept. 14th.

FRUIT-CULTURE FOR NORTH CEYLON.

It is quite the thing to talk and write about new industries for Jaffna or for Ceylon, but much of what is written is impracticable, and hardly worthy of serious consideration. The Northern railway is now assured, and with communication with the metropolis, it behoves Jaffna to be wide awake to its own interests or others will be coming in and starting new enterprises and taking away the profits that really ought to belong to Jaffna. We should like to call attention to a matter of minor importance believing that the time has come when enterprising men should bestir themselves. We refer to the setting out of such fruit trees as will grow here readily, and the fruit of which will be in demand even more than at present when railway communication has been established.

THE ORANGE

For example, might be more extensively cultivated. Why should not men who have a little capital, invest it in planting out two or three acres in orange trees of approved varieties. Colombo now gets shipments of oranges from Italy and Australia, but let our sweet juicy oranges once be brought upon the market and in spite of some defects, they will supplant those imported from other countries. As it is, no one person has more than a few trees. We should like to see a number of small gardens—say two or three acres each—started in localities where these fruit will do well. If good healthy trees are set out this year they will begin to bear in three or four years; and as the orange tree seems to be short-lived, new gardens should be planted every two years or so. Better also to graft on the good varieties, so as to be sure of your fruit. The oranges from Copay and vicinity are thought to be especially nice; they are sweet and juicy and have a thin outer skin or rind. And the experiment might be tried of grafting on scions of the Sicily, Florida and California navel oranges. The soil should be thoroughly prepared and the trees watered regularly and also properly pruned in order to insure the best results. Along with the orange could be raised limes which are already in demand.

There is another fruit which might be more extensively raised, and that is

THE GRAPE.

There seem to be two varieties, one more solid and less juicy than the other. The very sour grapes that one gets hold of so often, no doubt belong to one of these varieties, but the vine has not received proper treatment or the fruit has been gathered too early thus accounting for the acidity. The grape is grown principally in another locality of the peninsula in the vicinity of Pandeterripoo, and we believe the cultivation could be largely increased if some men of enterprise and a little capital would take it up. There are other varieties that possibly might do well though it would be well to consult some authority before investing. The vine needs careful treatment, and its enemies are numerous. As to

THE PINEAPPLE

it does not seem at all likely that the Jaffna variety will ever be in much demand when we have such luscious varieties of this fruit grown in Badulla, Matale and other localities in the hilly country of the island. But what about

GRAFTED MANOOS?

Would they not always be in demand? At present there are few, comparatively speaking, of grafted trees in the country. The fruit brings a higher price in the market than the ordinary kinds, and there should be a good demand for it when the railway is

opened. Every year there is a greater demand for young grafted trees we are told, and in time there should be no lack of good fruit.

Other fruits might be mentioned, but at least a beginning might be made with these. The attention of our people needs to be called to the changes that are bound to take place when Jaffna is no longer isolated.

Our Assistant Government Agent, Mr. Leake, has started a class in Agriculture, but whether Horticulture is included or not, we cannot say. It might be well for some of our prominent men to turn their attention to this branch of farming.—*Jaffna "Morning Star,"* Sept 27.

THE PROPOSED ZOOLOGICAL GARDEN FOR COLOMBO.

SITE SELECTED.

The geographical position of Colombo makes it eminently fitted as a centre at which might be organised one of the very best Zoological Gardens in the East. An attempt to carry this out is about to be made by a syndicate of Colombo gentlemen, and from what we can gather, there is every promise of the undertaking proving a huge success.

In an interview recently, Mr. John Hagenbeck, whose very wide experience in the organisation of Zoological and Botanical gardens in various parts of the world will be available in connection with the starting and carrying on of the Colombo "Zoo," stated that the site for the Garden had been selected in the Cinnamon Gardens

CLOSE BY THE HAVELOCK RACE COURSE.

The last novelties, the newest buildings, and the best possible arrangements will be introduced, and with this object in view Mr. Hagenbeck has been travelling all over the Continent and has got together a collection of sketches which will be of great value to him in making the gardens up-to-date and smart. The first object of the gardens will be the education of the children, to show them what animals exist and where they come from. There will, at the same time, be something for the scientific to see and learn.

A band-stand is to be built, the Military and Volunteer bands will be engaged, and in the course of time moonlight fêtes and concerts will be organized. There will be "fashionable days" for the more opulent visitors, and there will be days when a lower charge for admission will be made. Another feature is to be a restaurant, run, probably, by one of the local hotel managers, and it is hoped that the "Thirty Committee" may be able to see their way to establish a Tea Kiosk.

COLLECTION OF CEYLON ANIMALS TO BE MADE FIRST.

In the first instance a collection of Ceylon animals will be got together, and then Mr. Hagenbeck will obtain specimens from the four corners of the earth. He hopes, and we think he may confidently expect, to get help from the residents of Ceylon, European and native. Mr. Hagenbeck, in consequence of his business connections in various parts of the world, contemplates no difficulty whatever in getting together a varied and valuable collection of animals, and firmly believes that the Zoological Garden is to be the future attraction of Colombo. Amongst other attractions will be a pleasure garden for the use of children, with swings, "merry-go-

rounds, performing animals and other forms of amusement. Elephant rides will, of course, be a prominent source of fun. It will be the endeavour of Mr. Hagenbeck, in designing the plan of the Zoo, to give as much space and freedom to the animals as possible. The cages for both birds and beasts will enclose as many trees as is necessary, and the surroundings will be as near nature as practicable. In all, the grounds will cover about 20 or more acres.

THE MODE OF ADVERTISING.

With regard to advertising the Colombo Zoo and making it as widely known as possible, large boards will be fixed in prominent positions at the jetty, notices will be placed in the hotels and at various points of vantage in our thoroughfares. Another mode of advertisement will be the distribution of small hand bills, or cards, to the passengers, the American style of advertising being followed as closely as possible.

The Zoo is to be opened each day of the week, including Sunday—on which day, of course, concerts will not be held—and the time of closing will be 6 p.m. or 6:30 p.m. A good portion of the revenue is expected to be derived from the charges for the elephant, dromedary and camel rides. Help has been promised from the Zoological Garden proprietors in India, who offer to send animals at cost price. All gifts of specimens to the Zoo will be acknowledged in the papers the same as they are in London.

"We hope to make an actual start with the laying out of the grounds next month, and as soon as the buildings are ready we can very quickly get the animals housed, remarked Mr. Hagenbeck. The site has to be surveyed in order that the places for the ponds may be fixed upon and that the necessary levelling may be done. "It may be," said Mr. Hagenbeck "that the gardens will be ready by the time the troops come back from China." The directorate will be composed of about half-a-dozen well-known European and native residents of Colombo.

Season and family tickets will be issued, but the charge for admission has not yet been settled.

The idea is to incorporate a botanical section with the Zoo, and in this connection, it is hoped that some help may be given from those in authority at Peradeniya Gardens.

We have every belief that under the experienced and able guidance of Mr. Hagenbeck the scheme will turn out a success in every sense.

TROPICAL AFRICAN RESOURCES.

(Before the British Association.)

Mr. Edward Heawood, in the course of a paper dealing with the commercial resources of tropical Africa, said that at least 70 per cent. of the total trade of Africa fell to the countries of the extreme north and south, leaving the whole of tropical Africa, with an area of some nine millions of square miles, a total trade of at most £30,000,000, of which nearly £7,000,000 belonged to the small islands of Mauritius and Reunion. Among historical reasons for the smallness of the existing trade were the attraction exercised during the age of great discoveries by America and the East and the consequent neglect of Africa, the political condition of the African peoples, and the effects of the slave trade; geographical causes were found in the massive form of the continent and consequent absence of natural means of communication and the unhealthiness of the coast lands. That many of these causes were

not necessarily permanent was shown by a comparison with Brazil, which afforded a close parallel with tropical Africa in many respects. This showed that, given natural resources capable of supporting an increased export trade, the commercial future of tropical Africa need not be hopeless. The resources of a new country might be classed as exhaustible, principally minerals, and permanent, chiefly animal and vegetable products, the second group being more important. They might be again subdivided into jungle products, which, though not necessarily exhaustible, were likely to suffer diminution, and cultivated products. The former might, under cultivation, be transferred to the latter subgroup, which was the most important of all. In Brazil, for instance, the vast preponderance of the exports was made up by the four products coffee, sugar, tobacco and cotton. Rubber and timber, at present jungle products, and cacao, made up the seven principal resources of Brazil. In tropical Africa, jungle products, principally rubber and palm-oil and kernels (total annual value over £1,000,000), were at present those on which the export trade mainly depended. A period of development of plantation products had, however, set in, and coffee, cacao, cotton, tea, &c., had been grown with success in various parts. The chief difficulties to be encountered arose from the want of means of transport and the scarcity of labour; but these were now in a fair way to be overcome. The modern tendency for each country to depend for tropical produce largely on its own colonies must favour the commercial development of Africa, while the comparatively low population of Africa per square mile rendered it probable that it would in the future play an important part in providing a food supply for the more thickly peopled continents.—*London Times*, Sept. 12.

DEVELOPMENT OF CHINA.

(Before the British Association.)

Mr. G. G. Chisholm had a very instructive paper on "Some Consequences that may be Anticipated from the Development of the Resources of China by Modern Methods." He said that the subject, which was one of enormous magnitude and deserved a careful study, would engage the attention of the world at large for a long time to come. He assumed that the development of China was about to begin. There were political and economical causes which must force on this development in spite of the opposition of some sections of the people. The chief political cause was that the Chinese had themselves been compelled to resort to the methods of Europe and America in self-defence. One railway, at least, was constructed by them for purposes of defence, and they were also compelled to have arsenals in different parts of the country. There were economic causes. So long as China desired to sell a pound of silk or of tea she must compete with other countries, and the competition of Japan had compelled the Chinese silk producers to adopt some of the modern methods. In the case of tea competition came not so much from Japan as from India and Ceylon. That competition, however, had also been continuous and progressive, and the Chinese had lately been compelled to make experiments with the leaf-rolling machinery used in India and Ceylon. Having learnt their lesson from this competition, they had established cotton mills with the most modern machinery in several places, and these were kept working night and day, including even the most sacred Chinese holiday. Attempts had also been made to establish the iron industry. All these causes tended to introduce modern methods of transport into China. In his belief the objection of the Chinese to these improvements had been much exaggerated. Although, no doubt, the governing classes were hostile to them, the great bulk of the people were inclined to welcome them. What, then, would be the consequences of this development when it came about? First, there would be

a rise of prices in China, especially in the industrial regions. The peculiarity of the position of China was this—that it was the one region in the world with all the means for industrial development on a gigantic scale that remained to be opened up. So far China had been a country of phenomenally low prices owing to the fact that the means of communication were so bad that outlying parts were practically cut off from one another, and the cost of transport being so great, there was no outside market for the disposal of produce. The country was enormously rich in coal, iron ore, and cheap and efficient labour. Three provinces were especially richly endowed—namely, Hunan, Szu-chuan, and Shan-si. The last-named gave the most promise of immediate development because of its remarkable mineral richness and its proximity to navigable waters. A district in the mountainous regions of this province was so rich in minerals that it was estimated that a railway would pay although in some parts it would cost as much as £16,000 a mile. A second consequence that might be anticipated from the development of China was the creation of a demand for foodstuffs not likely to be supplied by China itself—a demand which in itself would be one of the powerful causes contributing to maintain the rise in prices. A third consequence would be the imparting of a great stimulus to all the food-producing regions most favourably situated for meeting the demands of China, more particularly Manchuria, Siberia, and Western North America, probably the Pacific States of North America to a greater extent than Canada. But perhaps the most important consequence of all was that the result of China coming into the world's market as a country demanding foodstuffs would be the creation of a tendency to a gradual but prolonged rise in the price of wheat and other grains all the world over, reversing the process that had been going on since about 1870 as the consequence of the successive opening up of new countries. If this last-mentioned consequence of the development of China came into operation it would have an effect of very great magnitude, very wide-reaching in space, very far-reaching in time, very diverse, and very complex.

BIG GAME IN AFRICA.

(To the Editor of the Daily Graphic.)

SIR,—So-called "sportsmen" have been so ruthless in the destruction of big game in Africa that, at the present day, large tracts of country which formerly abounded in hartebeestes, antelopes, koodoo, eland, &c., are now desert wastes so far as livestock is concerned. In the *Daily Graphic* of August 10th I saw a paragraph dealing with this subject with quotations from a Consular report made by Mr. Commissioner Sharp. What led me to write this was a chance glance at an advertisement in a Cape newspaper, the "Wynberg Times," and advertisement which proves that big game is already becoming scarce in South Africa. It is as follows:—

ANIMALS WANTED.—I will give £150 each for Mountain Zebras; £100 each for ordinary Zebras, going in harness; £100 each Blue Hartebeestes; £500 a pair Young Hippopotami; £10 a pair Wart Hogs; £50 a pair Cape Hunting Dogs; £20 a pair Kaffir Cranes. Large Antelopes, Brown or Tortiseshell Hyenas, £40 per pair, Koodoo, Eland, or other large Antelopes high prices landed Southampton. Persons having friends up-country please communicate, &c., &c.

If something is not done many varieties of interesting animals will shortly become extinct.—Yours faithfully,

"A TRUE SPORTSMAN."

CEYLON TEA PLANTING.

REPORT BY THE NEW INDIAN EXPERT.

Mr. Harold H Mann, who passed through Ceylon on his way to take up a post in India, has now issued a report on what he saw and gathered here. The following are references to it in the *I.P.G.*:—

The appendix to the report contains a short report from Mr. Harold H Mann on his visit to Ceylon when *en route* to India. Mr. Mann's remarks afford most interesting reading. The Committee of the Indian Tea Association desired that he would visit Ceylon on his way out to this country and the object of his visit was laid down in the following terms:—"You will take advantage of the opportunity to make yourself acquainted with the tea gardens in Ceylon, and to learn what you can as to the scientific methods and treatment of the plant which have been found of service, *especially in increasing the yield per acre* and in maintaining the health and vigour of the bushes. (The italics are ours.) Surely the sentence in italics was inserted by a mistake. With over-production staring us in the face, and thousands of new acres coming into bearing, what shall we do if we increase our yield per acre? Ceylon has already over-reached herself in this direction, and done an injury not only to herself but to us also in flooding the London market with cheap teas. If Mr. Mann's mission to India is to teach us how to increase our yield per acre, planters may well exclaim—"Save us from our friends." To increase our yield per acre in the same way as Ceylon has done, would, under present circumstances, simply spell ruin to us. It is to be hoped that Mr. Mann has disabused himself of the idea that Indian planters want him to teach them how to increase their yield per acre. Mr. Mann clearly points out in his report the vast difference that exists in planting condition between the island and ourselves, he emphasizes the entire difference in the method of culture and treatment of the plant in Indian and Ceylon tea gardens. In India, while the plucking of the leaf and the manufacture of tea from it is confined to the nine mouths of the year,—April to December—(Mr. Mann says six months), in Ceylon it is continuous. This, of course, has an enormous influence on the culture generally, on the manuring, and on the treatment of the pests and blights affecting the plant. Pruning is done, within limits, when most convenient, and not necessarily at any particular season. Except in the low districts, an annual pruning even is not necessary, and on some of the higher estates it is the custom to allow three or even four years to elapse between the pruning without harmful effect. Passing over Mr. Mann's remarks as to the nature of the soil in Ceylon we will briefly notice what he has had to say regarding manuring. In the island a great deal of careful and systematic attentions has been paid to this matter, with the result that it is now almost considered essential to manure all except the richest land. He states that in Ceylon it is universally recognized that

MANURING SHOULD BE DONE.

The differences of opinion on the subject are only concerned with the amount and kind of manure which it will pay to apply. According to Mr. Mann the best authorities are in accord that the foundation of the manuring should be the burial of the green prunings, preferably

with lime or basic slag. Some danger has been anticipated from the encouragement given to fungoid pests by this means, but up to the present the danger has been found to be illusory, especially since lime and basic slag have been buried with them. It seems essential, however, writes Mr. Mann, that the prunings should be (1) buried green, (2) *completely* buried, (3) buried with some "blight destroyer" such as lime or basic slag. Of these two "blight destroyers," basic slag is usually preferred as it also affords a means of applying phosphoric acid and the lower oxide of iron at the same time as the lime. Mr Mann has been assured that in almost every case where the trials continued for a sufficiently long time, this burial of the prunings had been a distinct success. On one estate he was shown prunings, buried six months before, filled with the feeding roots of the tea plant, while the prunings themselves had a pleasant "leaf mould" smell. As to the further manuring of the tea plant opinions are divided, says Mr. Mann, as to whether a more or less "forcing" mixture should be applied; as to whether the manuring should be for quantity or quality, and as to whether the manures should be forked in round the tree or buried in the holes where the prunings had previously been put. Opinion seems, however, to be tending in favour of not attaching too much importance to a large immediate increase of yield by means of a "forcing" manure, the final result of which *may* be to wear out the bush, but rather to try and obtain a moderate increase of yield at once, at the same time build up the bush for future seasons.

The manures Mr. Mann found chiefly in use were cattle manure, rape cake, castor cake, dried blood, sulphate of ammonia and nitrate of potash, superphosphate, basic slag, bones and potash manures. Castor cake was in much favour, but manures containing very much sulphate of ammonia or nitrate of potash were not recommended by the best authorities.

Mr. Mann states that although green manuring—say, with a leguminous weed such as *crocolaria striata*—had been strongly recommended, he was not able to find an estate, in the course of his tour, where it had been tried. Green manuring with the ordinary weed growth of the land is not used in Ceylon, for on practically all estates hand weeding is adopted and all weeds kept down. Mr. Mann was astonished at the general freedom of gardens from insect pests and fungous blights, after what he had previously heard.

THE HARD WOODS OF PARAGUAY.

Quebracho is one of the most profitable woods in Paraguay. It yields an extract used for tanning leather. The forests of Paraguay are said to be full of it, and among other trees in the unexplored territory west and north-west of Paraguay are the following:—Virapuita, virara, lapacho (very heavy, and a fine hard wood much in request in Buenos Ayres), jacaranda, palo santo (which derives a fragrant odour from its resin, and from which a fine extract is made), and curupay, which is excellent for building purposes, and whose bark contains tannic acid. The United States Consul at Ascension says that quebracho and the other woods named are found in the west and north of Paraguay. In the south-eastern part, 360 miles along the Alto

Parana, stretches a forest full of the most precious hard woods as follows:—Incienso, with an extract used as incense in the churches; curupay and lapacho, the last more abundant than in the north; urudai, timbo, iviraro, piteribi, quayavi, &c. Cedar grows widely, the trees are about 80 feet high and 12 feet or 15 feet in circumference. The bark is used for tanning. A league of land in Paraguay containing cedar costs about £200.—*Journal of the Society of Arts*, Sept. 14.

PLANTING NOTES.

FOREST CONSERVANCY.—The very pith of Mr. Broun's Report for 1899 is in the following:—

RE-ORGANIZATION OF THE DEPARTMENT.—During the year under report the Department has made a new start and a vigorous one. The proposals of the Forest Re-organization Committee having been approved of by Government, no time was lost in carrying them into effect. Fellings, instead of being made, as hitherto, here, there, and everywhere, were concentrated in specified localities according to market centres, trees were stamped for sale, and enumerations of growing stock were made to ascertain the potential capabilities of our forests. At the same time demarcation lines were cut, round proclaimed reserves, 10 feet broad, round other forests 6 feet broad, and compartment lines were cleared, the total length of lines cleared and re-opened aggregating to about 1,084 miles. Notwithstanding the expenditure on these works, the surplus revenue of the Department increased very considerably, as can be seen by reference to Chapter V., and, generally speaking, the Department can congratulate itself on the progress made.

THE ESPARTO GRASS TRADE.—The *Journal* of the Board of Trade publishes reports from our consular officers in Tunis and Algeria on the causes of the diminished supplies of esparto grass. From Tunis it is reported that the low prices in England do not make it worth the while of the Arabs to pluck the grass and take it down from the mountains to the coast. Several years ago the price on the English market was £12 per ton, while recently it has been only about £3. When the barley crops are good it is much more profitable for the Arabs to attend to them than to collect esparto, and even when the latter is collected on the mountains the Arabs sometimes leave it there rather than run the risk of loss in carrying it to the coast. Political troubles or military movements have had nothing to do with the supply of esparto. The acting Consul-General at Algiers says that the esparto business is mostly confined to two areas, in one of which labour could not be got to pluck the grass because of the barley harvest and the great fall in prices in recent years, while in the second, or Oran, area, political troubles and the military situation in Southern Algeria, as well as the excellent barley harvest, have had their effect on esparto. Much labour was required for military transport, and numbers of camels died, so that the means of carriage were diminished to a large extent. In addition, the esparto fields in part of Algeria are being exhausted by continual plucking, and the arrangements for transport to and payment in Great Britain are unsatisfactory, as there is no regular communication and the practice is to pay in England according to weight and quality there. The Acting Consul-General strongly recommends English buyers to have an agent at the port of loading to look after their interests and make all necessary arrangements for them. Competition amongst buyers at Oran is said to be so keen that prices are being paid in the interior which are higher than the market value in Great Britain.—*London Times* September 14,

SOLDIER SETTLERS IN SOUTH AFRICA

TO THE EDITOR OF THE (LONDON) "TIMES."

Sir,—My experience relates exclusively to the Transvaal, and is not obtained from any hearsay or *en passant* information, but is the result of a 13 years' residence as farmer and landowner.

The first consideration on the subject of soldier settlers is—What parts of the country offer the best prospects, and what is the present price? Mr. Dicey, in the *Fortnightly*, states that "there are millions of acres of land throughout the veldt which could be had almost for a song." I know of no part, going round the southern to the western districts from Standerton to Zeerust, where a farm of 10,000 or 12,000 acres could be bought for less than £4,000 even any of those where the natural supply of water is limited to the irrigation of ten or 12 acres of land. A relative of Oom Paul has a farm near Standerton, suitable for horse-breeding, for which he refused an offer of £10,000. A farm in the Waterberg or Zoutpansberg districts could no doubt be bought at a much lower figure. Fourteen years ago there was a public sale by auction in Pretoria of a number of farms in those districts, the reserve price being £60, but not one of them was sold. No Boer would think of buying a farm in those unhealthy districts to reside there; they are also too far from Johannesburg, which is the only market in the Transvaal. I cannot endorse Colonel Stopford's opinion in the *Nineteenth Century* magazine that £500 would be sufficient to stock a farm for cattle breeding, as a means of livelihood for soldiers settlers. Thirteen years ago I bought good cows for £4 or £5, oxen for £7 or £6, but since the rinderpest they are difficult to get at three times the amount, and it would take three years before any income could be derived from the capital invested. The Rustenburg district, which is justly called the Garden of the Transvaal, is the most suitable part for soldier settlers; it is near the market, and anything will grow there from a potato to a banana. My own case offers the best argument in the matter. I was utterly unacquainted with farming when I bought my property, consisting of about ten acres of irrigable land, having one day's water per week; the dwelling-house was separated from the land about 200 yards, and there was no water, no garden, not even a tree near it. I made a large dam and a water furrow, 600 yards long from the brook above (about eight or ten days' labour). I planted in the early autumn about 300 fruit trees—viz, orange, lemon, peach, apricot, apple, pear, plum, cherry, and fig. The peach and apricot trees were three years old and bore fruit the next season, to the great surprise of my neighbours the Boers, who told me it was the wrong time of the year to plant and they would all die. Not less surprised were they at my success in goat and pig breeding. Their goats were continually sick, and they lost hundreds in two years. I commenced with 17 and in three years' time I had 60, besides those I sold and killed. They would not believe me when I told them that during the rainy season they should provide sheltered kraals for them. However, when they found that my goats increased, they followed my example, and there is much less mortality amongst them now. It was the same with horses. I never lost one in ten years. I did not mention that the purchase of the ten acres of waterland, which is called an *erf*, includes

the right of cutting wood for home consumption and grazing for cattle over the whole farm of 8,000 acres; in fact, the whole farm is the joint property of ten owners, and we can, if mutually agreed, sell any portion of it, which we did last year, measuring out ten *erfen*, some of which were sold for £150.

There is suitable land enough for five times the present agricultural population; it is simply a question of water, and as soon as the war is over one of the first considerations engaging the attention of the Government should be the construction of dams, without which the contemplated soldier settlements will be a complete failure. No Boer would object to pay for the water; it would increase the value of his property at least 50 per cent., and the money invested by the Government would bring in good returns. I think the Government will encounter fewer difficulties in obtaining land than in providing settlers with the necessary number of oxen for ploughing and transport purposes, unless the oxen and mules now used for war purpose were instead of being sold, apportioned to the settlers.

There is little doubt that if roads are made, new markets created, and money spent on its development the Transvaal will offer a widely different future—an almost boundless field for the employment of industrial and agricultural immigrants; and to any man with a large family and a capital utterly disproportionate to the position in life to which they were born and in which he hopes to place them I confidently say—Go to the Transvaal, to its wider fields, its freedom from pretence and expense, its sunshine and pure, exhilarating air. There is not a happier being in the whole world than a Boer with his ten acres of waterland, a span of oxen, and a wagon; his only trouble is when his neighbour's pigs get into his garden and he has to shoot them. Steenkfontein, Zwaartuggens. G. S.

TOMATOES AND COLD ASHES

Coal ashes are generally conceded to be deficient of manurial constituents—at least of ammonia. According to "Johnson's Gardeners' Dictionary," however, coal ashes contain carbon, silica, alumina sulphate of lime, iron and potash, carbonate of lime, and oxide of iron, and are said to be a good manure for grass, Peas and Potatoes. Thus the assimilation of some if not all of these constituents is likewise beneficial to the Tomato, and probably in a marked degree. The relation of a case in point may go far to prove this. It was experienced by my brother when resident at Rhode Island, New York. Having no further use for a brick built pit, used for plunging half-hardy plants in pots in during the winter, it occurred to him to add more furnace ashes to the pit, and plant Tomatoes therein. A shovelful of fresh cow manure was the only additional stimulant added, merely placing it beneath each plant, returning the ashes to each hole, and then placing a plant on the spot, and when the plants became fully established the hose was freely applied during the summer, resulting in a heavy crop of fruit of fine size and quality; some of the plants extended to eighteen feet in length, year after year in the self same ashes, much to the astonishment of the neighbouring gardeners. Moreover, the "spot" or "sleepy" disease never made its appearance. I must state that the long deep pit was filled up the depth of five feet within eighteen inches from the top, thus leaving space of wintering bedding stock and a single Tomato plant was allotted to each sash space. Whilst, of course, the sashes were not required for the Tomatoes,

tees during the summer and autumn seasons, but long laths were laid over the pit to train the plants on. The cow manure, of course, afforded a stimulant for the young plants. I have seen the advantage of coal ashes for Tomatoes mentioned in the *Journal of Horticulture* by, I think, Mr. Iggulden, and the testimony I give may tend to increase their use.

Were another case in point needed to prove the efficacy of coal ashes, I may instance that by an amateur grower of Zonal Pelargoniums, and whose success was remarkable with plants grown in 4-inch pots. The plants were grown in pure turfy loam, with perhaps a little leaf mould added; but nothing in the shape of manure was given afterwards, simply pure water. The roots, however, in due course penetrated through the bottom of the pots, and then completely permeated the layer of coal ashes, spread over the staging up which the plants were arranged.—W G—*Journal of Horticulture and Cottage Gardener* Sept. 6.

INDIAN COMPANIES.

A very reliable London authority has favoured us with the following comparative statement showing the falling-off in profits per mature acre of tea in a number of the Indian Tea Companies during the past nine years. We have added the third column, and totals showing the actual decrease:—

| Companies. | Profits per acre. | | | | Decrease. | | | | |
|------------------|-------------------|----|-------|----|-----------|----|----------|----|----|
| | 1890. | | 1899. | | £. s. d. | | £. s. d. | | |
| Assam | 2 | 12 | 8 | 1 | 15 | 9 | 0 | 16 | 11 |
| Assam Frontier | 10 | 3 | 4 | 5 | 13 | 9 | 4 | 9 | 7 |
| Altareekhat | 3 | 17 | 3 | 1 | 17 | 4 | 1 | 14 | 11 |
| Borakai | 3 | 12 | 6 | 1 | 7 | 0 | 2 | 5 | 6 |
| Brahmapotra | 11 | 11 | 6 | 4 | 8 | 0 | 7 | 3 | 6 |
| British Indian | 3 | 13 | 6 | 3 | 4 | 8 | 0 | 8 | 10 |
| Darjeeling | 3 | 8 | 2 | 2 | 13 | 9 | 0 | 14 | 5 |
| Dejoo | 4 | 4 | 1 | 3 | 9 | 0 | 0 | 15 | 1 |
| Doears | 5 | 10 | 7 | 3 | 6 | 0 | 2 | 4 | 7 |
| DoomDooma | 10 | 13 | 8 | 9 | 6 | 0 | 1 | 7 | 8 |
| Indian of Cachar | 9 | 18 | 3 | 4 | 1 | 0 | 5 | 17 | 3 |
| Jhanzie | 4 | 0 | 11 | 1 | 8 | 9 | 2 | 12 | 2 |
| Jokai | 6 | 16 | 1 | 3 | 7 | 4 | 3 | 8 | 9 |
| Jorehant | 2 | 6 | 0 | 1 | 17 | 5 | 0 | 8 | 7 |
| Lebong | 4 | 6 | 3 | 3 | 18 | 3 | 0 | 8 | 0 |
| Majuli | 3 | 8 | 1 | 1 | 18 | 9 | 1 | 9 | 4 |
| Moabund | 9 | 13 | 2 | 2 | 3 | 6 | 7 | 9 | 8 |
| Scottish Assam | 6 | 2 | 11 | 1 | 8 | 7 | 4 | 14 | 4 |
| Total | 109 | 18 | 11 | 61 | 4 | 10 | 48 | 14 | 1 |

Or a total decrease of about 45 per cent!

THE MANTIS AT THE ZOO.—The multi-coloured locust, which was sent home from South Africa by one of the C.I.V.'s, has unfortunately succumbed in the Insect House of the Zoo, but its place has been taken by a specimen of that curious insect known as the Mantis, which has also been brought from the Transvaal. These insects, of which there are several varieties, have, in consequence of the grotesque attitudes which they adopt, given rise to no end of superstitious ideas, Mouffet stating, in regard to the Praying Mantis, so named from the prayerful position of the fore-legs, that "so divine a creature is this esteemed that, if a child ask the way to such a place, she will stretch out one of her feet, and show him the right way, and seldom or never misses." Like the mole cricket, these insects are very voracious and cannibalistic, and if kept together will fight to the death. One variety, of a beautiful green colour, is held in much veneration by certain African tribes, and another resembles fragments of withered stalks.—*Daily Graphic*, Sept. 8.

ANTI-TANNIC TEA INFUSER.

An informal meeting of the shareholders of the Anti-Tannic Tea Infuser Syndicate, Ltd., was held yesterday at 98-99, High Holborn.—The Chairman (Mr. F. S. D. Scott) explained that he had called the shareholders together on account of certain articles which had appeared in a London newspaper. He contended that the concern had been absolutely undermined by Mr. Marshall, who was the patentee and manager of the syndicate, and in support of his contention he read extracts from various letters written by that gentleman while he was in the employ of the syndicate.—Mr. Marshall admitted that he was the author of the letters, and stated amid much laughter that his suggestion that the correspondence should be burnt was made because he did not desire that the letters should be kept in existence. After a lengthy discussion it was resolved that an ordinary general meeting of the syndicate should be called at as early a date as possible for the presentation of the report and accounts, and for the appointment of directors.—Mr. Ashworth and Mr. Sampson were nominated as directors on the understanding that in the meantime they should investigate matters and report to the ordinary meeting.—*Financial Times*.

MR. JACKSON'S TEA MACHINERY.

A NEW PATENT CLIP-ACTION TEA BREAKER AND EQUALISER.

We noticed a short time since the catalogue of Mr. Jackson's tea-preparing machinery, manufactured by Messrs. Marshall and Co., Limited, of Gainsborough, who, by the way, at the Paris Exhibition have just been awarded the Grand Prix in Class 35 for portable, vertical, horizontal, and compound engines, steam road-rollers, and thrashing machines and the gold medal in Class 19 for coupled compound engine with Marshall's patent trip-gear. Since the publication of the catalogue of tea machinery, Mr. Jackson has introduced a patent clip-action tea breaking and equalising machines, for which he claims special excellence, the points of advantage being the following:—

Simplicity and low first cost for great amount of work performed. Small space occupied, and small power required. No discolouring of teas.

Evenness of samples produced and freedom from dust. Safety device for stopping machine automatically when an obstruction gets in between cutting rollers. A very important feature.

It is also claimed that there are no sharp edges to get gulled, and no wire mesh to get torn or knocked out of pitch. Positive feeding action of rollers and no complicated feeding apparatus.

This machine is, we believe, the outcome of a series of careful experiments to ascertain the right class of cutting edges necessary for an all round apparatus suitable for treating both unsorted tea as it comes from the drier; also for reducing and equalising large Pekoe, Souchong and Congou.

We understand that recent reports from users confirm the suitability of the machine for a variety of work without in any way having to adjust or change the cutting rollers.

The machine is of high-class construction, Messrs. Marshall's name being a guarantee of this. The wearing parts are few, and the wheel gearing is cut from the solid cast iron by special tools so as to ensure smoothness of running, and to avoid noise.

The cutting rollers are made up of discs of special iron; the teeth can be sharpened as they wear, or turned round on the shafts, so as to present a fresh cutting edge to the material when necessary.

A safety trip device has been introduced of a very simple nature, which is arranged to stop the machine when any foreign substance gets between the cutting rollers, and in the interim *no unbroken tea can escape*; the *driving pulley* in the meantime *runs loose on its axis* until the obstruction is removed and the machine re-started. It is claimed for this machine, the cost of which is £31, that it is capable of breaking and equalising 1,200 lb. of tea per hour, if run at the standard speed given, making a *smaller percentage of dust than any machine in the market and without in the least giving the tea a grey or dull appearance.*

A machine doing one third less work than the above-mentioned can be mounted and worked in connection with Mr. Jackson's new balanced sifter to equalise the tea prior to sorting.

The power required is stated to be nominal.

The driving pulley is 9 in. diameter, with $2\frac{1}{2}$ in. face, and the speed is 280 revolutions per minute; the driving belt required is 2 in. wide, which can be supplied at the option of the purchaser.

We understand that the superintendent of the Doora Tea Company, Limited, testifies to the excellent work done by this machine at the Bhogot-pore factory.—*H. & C. Mail*, Sept. 21.

THE INDIAN TEA INDUSTRY.

DEFECTS AND HOW TO REMEDY THEM.

"COUNSELS OF PERFECTION."

Mr. J. B. Leslie-Rogers is writing a series of papers in the *Pioneer*, a good idea of which can be obtained from the following extracts:—

To begin with directors and all such controlling agents—men in the above capacity should be chosen for purely business reasons and not because they happen to have a considerable number of shares in the concern, nor because they happen to be conveniently handy. Money and brains do not necessarily go together and shares in a concern by no means imply that the holder is *au fait* with the requirements of that particular industry. Two qualifications are absolutely necessary in all controlling agents, be they proprietors or members of a

BOARD OF DIRECTORS.

They must have a special business aptitude and training, and they must have a personal knowledge of tea generally; and if among the shareholders men can be found with a combination of the above qualities, they should be unhesitatingly elected to the Board, regardless of how many shares they possess. But as is very often the case, while purely businessmen are available, there is no one with the requisite knowledge of tea production. All experience goes to prove that in such cases it would be infinitely wiser not to elect the full complement of directors from among the shareholders, but to have at least one place on the Board filled by an outsider who is a tea expert: the latter to attend all meetings and have the full powers and usual fees of the ordinary shareholding directors. Some professional opinion is absolutely necessary on every Board, as it is the only way directors can logically presume to direct a professional planter. In cases where any great and exceptional changes are contemplated in the working of an estate,—first the manager's opinion should be invited and it should carry considerable weight with the Board. Too often the manager is altogether ignored, to the detriment of the investors' interests. If further opinions are desirable, they should be obtained from leading planters from the

same district, and in extraordinary cases even from experts in other districts in India. All such information should be adequately remunerated on the same principle as opinions are paid for in the medical and legal professions. Every director should be required to visit his plantation at least once during the first year of his election, and make himself personally acquainted with the manager and assistants, and the conditions under which they have to work: the manager being granted sumptuary allowances for all such business visits. The failure of either of these essential duties should immediately disqualify a director from holding any further office on the Board.

Proprietors who have a penchant for directing and controlling their own estates, might, with considerable advantage to themselves, follow somewhat similar lines. It is the height of folly, if not presumption, for any one who is not himself a trained planter to dictate to one who is. In most cases it would be advisable for proprietors to leave the conduct of affairs to the discretion of their managers; and if further professional or technical information is required it should be obtained from duly qualified men, and paid for as above recommended. But in all cases it should be remembered that

THE MANAGER

is the real *deus ex machina*, and his opinions should carry the greatest weight in all matters appertaining to his estate. Directors and proprietors are often too prone to excessive interference: they forget that their duty is not to despatch dictatory and arbitrary orders on every little detail of work, but only to lay down broad guiding principles for each year, within which the manager should have every possible latitude to use his own discretion and professional knowledge. The less interference in actual executive work the better, as tea cultivation and manufacture cannot reasonably be carried on by fixed rules and regulations like an ink slinging Government department. The success of a plantation, or in fact any business, depends almost entirely on the personal ability, experience, and foresight of the man in actual charge: being on the spot he is the best individual to judge what should or should not be done in the ever-varying conditions on a plantation; and his work should be judged more by results than by methods. To reduce a manager to a mechanical non-entity who merely carries out orders, often emanating from incompetent sources, is to kill all initiative responsibility and desire for improvements. No tea estate can remain stationary: it must either progress or deteriorate according to the management it is subjected to. To enable it to go onwards and be up-to-date it must have at its head the best professional talent that money or other inducements can procure. Once such a man is secured, he should be given a stake in the shape of shares, commission, bonuses, etc., and his pay should be liberal, with a prospective pension at the end of a certain number of years. It cannot be doubted that it would be to the owners and shareholders' interest to make the manager feel by generous and sympathetic treatment, that he had in future a settled and comfortable home. No man can be expected to put forth his whole heart and energy into his work if he has the constant dread before him of being suddenly turned out of his post at the caprice or cussedness of his proprietors or directors. Therefore to put the matter in a few words, it is essential for efficient and profitable management,

that the manager should be a man of ability and progressive tendencies; that his appointment should be made congenial as well as permanent; and that in his executive work he should be made practically independent of all outside interference. To enable owners to assume this desirable attitude towards their manager, it is of course necessary to presume that only capable men are appointed to such responsible posts. But unfortunately such is not always the case; and consequently retired business men and pensioned Government officials, who have no experience of tea, and are past all active work, besides

NE'ER-DO-WHEELS OF ALL SORTS

and failures from every walk in life, are pitchforked promiscuously into tea, regardless of the fact that heterogeneous individuals who have proved themselves incompetent before are not likely to shine brilliantly in their newly adopted profession. By the above denunciation, I do not mean to imply that there are no good men in tea. There are many planters who would hold their own in any profession in the world, and for practical all-round men would be hard to beat anywhere. But unfortunately this class is not sufficiently numerous to leaven the mass, and give it a tendency towards progress, while the inertia caused by what may be designated the bad bargains is so great that it constitutes a very serious and tangible drag on the profession. It is no wonder then that after over half a century of tea cultivation the industry is still worked on wholly unscientific and hap-hazard principles. The craze for economy, based generally on false premises, has also done much towards deterring good men from joining the profession. A penny-wise and pound-foolish policy is nowadays much in vogue. Salaries are reduced, commissions and petty allowances cut down, and often totally abolished; and old hands dismissed and cheap substitutes appointed in positions of responsibility for which the absence of all personal and mental qualifications wholly unfit them. This false economy has been carried to such lengths that instances are known where native garden clerks have actually been shoved into their former superior's appointments! A certain proportion of salary may thus be saved, and the clerical office work may be done to perfection—but at what a cost to the estate in other respects! Who that has seen such an instance of purblind policy, can honestly say, that degeneration, disorganisation, discredit and ultimate pecuniary loss, are not the concomitants of such an irredeemably foolish system of management. There is a wise native proverb which aptly illustrates the position. The saying is that "a load carrying donkey cannot hope to vie with the fleet-footed Arab," and the inference is obvious in business matters as well as in the animal kingdom.

An ideal planter would be a very paragon of perfection, as he is expected to know almost anything under the sun: an agriculturist, an organiser of labour and commander of men, a doctor, a lawyer, a trader, a merchant, an engineer, and a combination of half a dozen other learned professions. But without wasting our time seeking for such a compendium of knowledge, let me describe what are the qualifications absolutely necessary in a manager if a plantation is to be a real success. He must be a man of education and ability who can command obedience and general respect. He must possess great powers of organisa-

tion and be fearless of responsibility. He should have a thorough all-round knowledge, both theoretical and practical of his duties. And, lastly, what is perhaps most important of all, he must have progressive tendencies and scientific proclivities, and be well informed and up-to-date in all matters appertaining to his profession. Such a man is worth almost any salary for what goes towards his enhanced emoluments is recouped a dozen times over by increased efficiency and more profitable results. To enable such a manager to put forth his whole ability and energy in his work, he must be allowed a great deal of latitude and must not have arbitrary restrictions imposed on his time or methods of management. You must, for instance, necessarily reduce his compulsory office work to a minimum, so as to give him the greatest freedom of action in his far more important duties. To harass and worry him with petty correspondence and useless accounts is to deprive him of the faculty of clear thought, without which no real improvements or consecutive progress can be made. It would be sufficient, for instance, if he were required to submit his accounts but once a month, accompanied by a short explanatory report for that period. Then at the end of the year he would forward an epitome of the twelve months' accounts, with a general report for the whole season. All forwarding of daily and weekly reports and accounts should be unhesitatingly abolished, as such finikin clerical work has the inevitable tendency to reduce the head of an estate to the position of a mere mechanical automaton with atrophied mental faculties, unfit for responsibility or advancement of any kind.

A special allowance of one or two hundred rupees a year should be embodied in the annual budget of expenditure for subscriptions towards

TECHNICAL AND SCIENTIFIC PAPERS,

journals, books, etc., published in England, America and India; and a small library dealing with all professional subjects, connected however remotely with tea, should be maintained in every factory. Such adjuncts to self-improvement are at present conspicuous by their absence almost everywhere. Like the British officer of pre-Transvaal days, the average planter, it is to be regretted, is still inclined to think it derogatory to be seen studying his profession from an intellectual point of view. Besides the above technical literature, at least two daily Indian papers should be allowed, to enable the manager to keep himself informed of all political, commercial, and social movements which may have any bearing on the tea industry. I have known many instances of thousands being made by quick-witted planters, who have gleaned a bit of information from a daily paper, which has enabled them to secure large contracts, or important new markets, or otherwise change their working plans, before the non-reading individual was even aware that any new move was necessary. All local Planters' Associations should make it a point to have frequent general meetings for the discussion of any information that members may acquire from the above technical sources; and the Indian Planters' Association at Calcutta might be induced to offer an annual prize or medal for the best essay by a planter on some professional subject chosen each year. The same idea might also be followed with advantage by our various tea journals in their own interests, as well as

that of the industry generally. My purposes in making the above suggestions is to induce planters to read more, study more, and think a little more; and thus create a greater interchange of ideas, which would eventually bring about some cohesion and community of interest, and result in raising tea-planting into what it ought to be, viz., a thoroughly organised and up-to-date scientific profession.

There have been many suggestions of late about starting an

EXPERIMENTAL TEA GARDEN

somewhere near Calcutta. The idea is sound, and ought to be encouraged. It eminently claims the support of the Imperial Government, which should, in my opinion, start such a garden as an economic branch of the Calcutta Botanical Gardens. But besides the above, I would strongly urge some modified form of experimental garden in each planting district, maintained by the planters themselves. In large districts where funds are available, a whole garden, of, say, a couple of hundred acres or so, might be appropriated for this special purpose, with a selected man in charge, devoted entirely to experimental work alone. In smaller districts, where a whole garden could not be afforded, there should be no difficulty in setting aside a few acres in one or more gardens for such a purpose. I am sure enthusiastic managers would be found, who would freely give their services, provided they were guaranteed against actual loss, while working out the prescribed experiments for the community; and there is no reason why Government should not be expected to support such local experimental gardens with annual grants of money from Imperial or provincial funds. To get the greatest benefit from the above scheme, it would be necessary that the official experts in the Calcutta Central garden should not only be in constant communication with the experimental district gardens, but that they should also be at liberty to make personal tours through all these districts from time to time, for purposes of comparison and mutual consultations. The advantages that would accrue to the tea industry by a series of experiments under such varied conditions of soil, climate, and management, would be simply incalculable; and it is to be hoped therefore that planters throughout India will heartily support the scheme, which promises to be so fruitful of good results.

Another suggestion, which I trust will receive due consideration, is the growing of:

AUXILIARY CROPS IN CONJUNCTION WITH TEA.

Every plantation has bits of waste land which though unsuited to tea, are quite capable of producing other profitable commodities. Here again the experimental gardens would prove extremely useful in ascertaining the best products to take up. For instance, fruits, vegetables, medicinal plants, herbs, roots, fibres, tobacco, nuts, seed crops, and even good timber might all be grown with advantage. There is also the well known fact that all leguminous plants such as peas, beans, etc., and all pod-bearing trees, are actually of direct benefit to the tea bush and should therefore be grown in among the bushes, for the green manure and nitrogen they supply the soil. Besides crops, why should not mule and pony breeding be carried out in suitable localities. There is a valuable and ready market for all such animals in the army and Government departments; and the Indian Govern-

ment, I am informed, would very materially support any planter who aided them in this direction. Unfortunately planters as a body have not as yet educated themselves up to thoroughly realising the great agricultural and commercial advantages of these extra aids to tea cultivation. Inexperienced and unbusiness-like proprietors and directors are also much to blame in this matter, as without their active and sympathetic co-operation it cannot be expected that managers will break new ground, and risk their own interests. This short-sighted policy has gone so far that in many instances managers have received explicit injunctions not to attempt the cultivation or production of anything else but tea on their estates. Under such arbitrary restrictions, of course, it is impossible to expect experimental work or up-to-date go-aheadness of any kind. In every tea district there are peculiarities of climate and soil that lend themselves specially to some particular production. As soon as this suitable plant or animal is recognised it should be taken up without hesitation by planters as an "auxiliary," to supplement the financial "shortcomings of the standard tea crop." When tea seasons are bad and prices low such "auxiliaries" will often of themselves tide a garden over its financial and other difficulties. Relief and aid from this direction would be far more satisfactory than burdening the garden with further calls on shareholders and local banks. As a matter of sensible precaution we should not place all our eggs in one basket: when one lot comes to grief, we should still have others to fall back on; and he is a wise man who foresees this possibility before the crash comes.

A FARMER'S EVERY-DAY LIFE.

NO. III.

(By *Cosmopolite*.)

It does not often happen that old sayings, with regard to the weather, are verified, but this year, we have had an instance thereof in connection with St. Swithin's day, about which the old saw has it that, if it rains on that day, it will do so for every day for the following six weeks. This year it did rain on St. Swithin's day, and it continued to do so every day until the six weeks had run their course, when it suddenly cleared up, fine, dry hard weather set in, allowing us to complete the hay harvest successfully, and maturing the crops so quickly that now, in every direction, oats and barley stooks are to be seen, whilst the whirr of the reapers and binders can be heard all over the land. This is the first time during the past twenty years that the prophecy with regard to St. Swithin's day has proved correct, so I consider it much more of a fluke than a moral certainty, and any one putting his trust in the old saying would be apt to find that he had backed the wrong horse. However, as things are going now, we farmers have forgotten already the weary troubles in connection with hay-making, and are cheered by the prospect of a dry season for harvesting the other crops. In this district the crop is

AN EXCEPTIONALLY GOOD ONE,

but, owing to the late wet weather and heavy down-pours of rain, a great quantity has been lodged and twisted, so that it will be quite impossible to reap much of it

with binders, and I hear of many instances in which the farmer has decided not to use his binder at all, but has engaged extra hands; and this he finds will be cheaper than purchasing twine for the binder, that commodity having gone up terribly in price owing to the war in Manila. In Britain, binders have not yet proved themselves such an unqualified success as they have in our Colonies, and this is owing partly to the fact that our crops are heavier and longer in the straw than the colonial crops, and so the binder is unable to clear itself; another drawback to binders is the fact that great downpours of rain occur often during our harvesting which make the ground so soft that heavy machines sink deep and are a terrible drag on horses. When a farmer takes to a binder, he tries to work with fewer hands, and then when he commences leading his crop and a fine day comes, he regrets the absence of these few hands which would have enabled him to work more carts and get through the work more expeditiously. In the Colonies several weeks of perfect weather can be depended upon at harvest time, so the farmers there are not compelled to hurry themselves as we are, when a fine day comes to pass.

I have frequently mentioned my want of faith in

ARTIFICIAL MANURES,

especially when bulky manure can be obtained, and I had my views supported in a remarkable manner the other day. I was travelling by train, and in the carriage with me there were several farmers and their better halves. Two of these agriculturists started a heated argument on the qualities of several artificials that they had been using, and whilst pretending to read my newspaper, I listened with rapt attention to the discussion. At last, with a view to settling their difference of opinion, one of the farmers turning to a very old gentleman, who was sitting next to me, said:—"What is your opinion, Hilly, about these manures; you have been a long time farming and must know something about them?" The old man mumbled away for a little, and then delivered himself of this opinion:—"I am 91 years of age, and have lived on a farm all my life; and during that time I have known artificial manures do a great deal of good to the merchants who sold them, but I never knew a farmer, who bought any of them, who was benefited one scrap by them," and I softly said to myself, "encore," whilst the two disputants simply seemed to totter in their intellects when they heard the sage's opinion.

Referring to railway travelling reminds me that the animated

HOLIDAY SEASON

has been characterised by the usual break-downs of the railway service in Aberdeershire, and much inconvenience have the farmers been put to, when going to sales or markets, by the uncertainty of the hours of arrival of the trains. Platforms are given up to a crowd of excited excursionists, pushing, rushing and tumbling as if they

were all in the physical training of all footballers. You pay for a first-class ticket and are becomingly grateful if you get accommodation in a third-class carriage of antique design, built in the days when these were made after the similitude of cattle trucks. You are hustled and hustled, and have your coat nearly torn off your back, and, when you appeal to any one of the railway people for protection, they reply that you should be thankful if they carry you without loss of life or limb. The poet sings about "every door being thronged with suitors," and I think he must have had the doors of the carriages on our local railway in his mind's eye, when he thus unburdened himself. So much annoyance and inconvenience has the bad management, on our lines, caused the farmers, that most of them have again taken to the family gig and *shull*, or learned to ride the fiery, untamed bicycle.

For some years back I have observed that females, born on any farm, are superior to males, whether these be the off-spring of the horse, the cow, the sheep or man himself. I have asked other farmers their views on the subject, but farmers are not very observant, and so, in no single case have I received any information. I have, however, taken the trouble to observe

THE STOCK ON OTHER FARMS,

and am quite convinced that there is something in it after all, one of my neighbours, for instance, having always been more successful in the breeding of males than females. If this is anything more than a coincidence, it must have some foundation in the soil of the farm, and the food grown thereon. In my own case it has been somewhat remarkable. Ewes, bred by me, have for long maintained their position at the top price of the sale ring; but rams, of identically the same breeding, have failed to make their mark. Mares, bred on the farm, have proved exceptionally good, whilst horses have run to leg and become weedy. Cows, bred by me, have been, without exception, dandies; but bulls I have never bred to please myself. Even my own laborers' families tend in the same direction, and having been long in my service their children have mostly all been born on the ground, and the girls are strong, robust, healthy lassies, whilst the boys run too much to weeds, have a sort of white-black-fellow look about them with no calves to their legs. The neighbour I have referred to must have had a similar experience, although he had never taken the trouble to think about it, for, although his steers for years were in the first flight at Smithfield cattle show, and his young bulls fetched the top prices at the county bull sales, he never yet bred a cow that was any thing of a credit to him. My readers may be inclined to fancy that I have discovered a mare's nest—well, perhaps I have. I only give facts and leave others to try to refute them. As another instance of my farm being more suitable for females than males, let me mention that I purchased, about three months ago, a number of cattle of both sexes; these have since been fattened and sold off the grass, the heifers having added

about 1 to 1½ cwt. to their weight when purchased, but the steers not having added an ounce, in spite of their improved condition and appearance. "Facts are things that winna ding."

POULTRY BREEDING IN BELGIUM.

The "poulet de Bruxelles" has a very widespread reputation not only among gourmets, but among all who have had the good fortune to travel upon the Continent and partake of it. The difference in quality between the fowl above mentioned and one of the same age and size of the ordinary variety is shown by the fact that the first is sold in nearly all the markets in Belgium at double the price of the other. For example, a young poulet de Bruxelles which would be considered about the size sufficient for a meal for two persons is sold for about 4s., whereas one of the ordinary variety can be purchased for between 1s 8d and 2s 6d. The excellence of the fowl seems to depend, as far as can be ascertained, on the careful manner in which the sitting hen is treated, the cleanliness observed about her, as well as the careful feeding of the young chicken until sufficiently developed for eating purposes. The United States Consul-General at Antwerp says that whether or not the methods pursued in Belgium differ from those followed by careful breeders in other countries it is impossible to say. The choice of eggs for setting purposes is considered a matter of great importance, and the freshest obtainable are almost invariably used. The best breeders seldom take eggs older than eight days for raising the best quality. Care is taken that the eggs given to one hen should be of the same age. The eggs when collected are kept at a very even and medium temperature until given to the hen, and are turned daily. This is done to prevent the yolk, which is lighter than the white of the eggs, from adhering to the top of the shell. The eggs chosen for the purpose above mentioned are also of an average size, those above medium being rejected, as they often contain double yolks. Eggs received from a distance, and consequently exposed to more or less shaking, are allowed to stand a day or two before being put under the hen. Great care is also taken that the eggs should be perfectly clean. The nest is prepared of straw or cut hay, perfectly clean, dry, and odourless. As a rule,

THE SITTING HENS

are placed in corners where the greatest quiet is obtainable, and are not exposed to great light. When so situated they are not disturbed for any other purpose than the placing before them of their daily supply of food and water. As the hen leaves the nest at least once a day to search for food to take exercise, etc., care is taken to place her food and water within reach of the nest, in order that the time that she is off the eggs may be materially shortened. When the young bird is hatched it retains in its body part of the yolk of the egg from which it was produced, which suffices to nourish it for the first twenty-four hours, during which period only warmth is required, which is furnished either by the mother hen or must be afforded by a warm cloth, in case of the necessity of awaiting the hatching of the rest of the brood. The food first given can be varied, but must be made up of ingredients containing large quantities of nitrogen, as this is required for the formation of the tissues. It is necessary, in fact, that the food should be composed of matter resembling in character an egg, together with milk. It is customary to mix with the food eggs, milk, and the blood of earth-worms,

field-worms, and that of a commoner variety of fish; also to introduce, for the formation of bone, certain quantities of phosphate of lime, found in grain and flour. In the early days flour is generally given on account of the facility of its digestion, grain being substituted as the birds begin to gain strength. Wheat-flour is generally used. The grain given is wheat, rice, millet, buckwheat, and Indian corn, raw or cooked. Cooked potatoes are also often given as a change of diet. It is customary to vary the grain diet as much as possible, and to administer it mixed. The food ordinarily employed is made up as follows. Hard-boiled eggs and wheat flour are mixed in milk, a little water being added. To this paste is added a small onion finely cut up, together with lettuce when green food is scarce. The mixture is usually quite stiff, as food which is too moist is considered harmful for the young brood. After the first few days a small quantity of whole grain is mixed into the paste, but if rapid development is desired, the simple paste should be continued alone. Great care is taken to keep the young brood in a dry, warm locality, which precaution, together with the proper food, prevents inflammation of the intestines, and similar troubles. As a rule the birds are cooped up on wet days, and allowed to run about as much as possible only in fine sunny weather. In winter a more generous diet is given to enable them to withstand the cold. The daily ration of grain for the fowls is from 2½ to 4 ounces.—*Journal of the Society of Arts*, Sept. 14.

PLANTING IN HAWAII.

ONE OF THE NEW PLANTATIONS.

A recent ride through the Oloa and Puna districts of Hawaii shows rapid changes, which a few years ago would have been deemed impossible. The clearing off of stones, shrubbery and forest trees, which formerly gave the impression that the land was a swampy jungle of little value for farming or cane growing, is a task that cannot be accomplished in a day. Sugar cane will grow in almost any part of Oloa, without irrigation, and apparently with less labor expended on it during growth than in most other districts of Hawaii. The company has already cleared off a large area, some of which has been planted with cane, so that at this date perhaps 2,500 acres are growing, not in one tract, but in irregular fields. Some of this will be used for seed and for replanting, where fields require it. Cane grows here very rapidly and rank—both good qualities in a new plantation, where rapid progress meets many drawbacks. The company has a heavy task before it in putting the land in good shape and condition including roads, which are too often hard to keep in good repair. Still, with a powerful mill, abundance of labor, and the best varieties of cane adapted to the various elevations, which can only be learned by trial, Oloa will eventually prove a bonanza to those interested in it.—*Planters' Monthly* for August.

BRITISH CENTRAL AFRICA.

THE NEED FOR A RAILWAY.

The small community of Europeans who reside in the British Central Africa Protectorate, and to whose enterprise is due the remarkable prosperity of that outlying part of the Queen's dominions, have for several years been appealing to the Home Government (says a writer in the *Scotsman*) to help them with the construction of a railway. The railway has been surveyed some time ago. It is to connect the lower Shire River with Blantyre in the Shire Highlands, and then go on to Lake Nyasa. The traffic along this

great trade route has of recent years become very considerable, and as yet no better means has been found for its transport than the primitive one of human carriers—men and women. Last year the export of coffee alone amounted to one thousand tons, while the imports, at a very moderate estimate, exceeded 3,000 tons. All this material has been carried on the heads and shoulders of native men and women, with the exception of what is carried on ox or mule wagons—this being a very small proportion indeed. As the manager of the largest of the Transport Companies in the country (the African Lakes Corporation, Limited,) said at a meeting of the Central African Chamber of Agriculture and Commerce:—"In the present state of the country tenga-tenga (*i.e.*, carriers with loads on their heads) is the only method which is practicable. Bullock transport is twice as costly. Traction engines would cost double as much. . . . There were not the cattle in the country to perform the transport work, and from his corporation's past experience cattle brought from the south had always proved costly in the extreme by reason of deaths and other causes." It appears, then, that—though something might be done by improving the roads and using lighter traction engines than have yet been tried—for all practical purposes the alternative lies between human labour and the railway.

The arguments in favour of the railway have been frequently stated. The reasons advanced are briefly these:—(1) That the transport has become so enormous that the majority of the available labourers in the country are occupied carrying loads, while the coffee industry is suffering seriously for want of labour. Many plantations were nearly ruined last year for want of labourers to hoe them, and in consequence of this the output of coffee is expected this year to be only 700 tons, instead of advancing, as it should have done, on the 1,000 tons of last year. (2) That—large as the number of carriers employed is—there is during several months of each year an almost complete block in the transport. This year the block has continued beyond the usual time, and threatens to become a permanent condition of things. The inconvenience to the planters, missionaries, and others of having their goods lying at the river waiting, it may be, many months for carriers is evident. (3) That it is inhuman to load native carriers with such heavy transport. The road from the lower shire river. Blantyre rises 3,000 feet in less than thirty miles, and up this steep incline practically the whole of the 3,000 tons of imports, including such things as kitchen ranges, steamer's boilers and plates, and sections of iron barges, has to be carried by sheer human strength.

QUININE AUCTION IN BATAVIA.

The American Vice-Consul at Batavia reports as follows on the third Java quinine-auction of June 27th last, held at the Merchants' Exchange:—This sale has been considered fairly successful, and the limits were mostly all realised. Beginning with P. N. II., packed in cases of 22·68 kilos. (50 lb), limited in lots at 21fl. per kilo, some 4,173·12 kilos (9,200 lb) were sold at 21·05fl. per kilo, thus exceeding the limit. Offers were then made at 20·95fl., which were at first refused, upon which the limit was lowered, and seven lots were sold at 20·75fl. per kilo. This action brought forth a protest from the first purchasers, who had brought at the limit of

21fl. The limit of 21fl. was again asked, but lots 211 to 300 were not sold, as the bids did not reach the limit. P. N. II., packing at purchaser's option, 4 lots were sold at 21fl. per kilo, but there was very little demand for this unpacked article.

P. N. III., was all sold at fair prices. Two hundred and sixteen kilos (476 lb) were sold at 25·40fl and 25·45fl per kilo, and 24 kilos (52·9 lb) at 25fl per kilo; the limit for these lots being 25fl. The limit of 21fl for P. N. II. is equivalent to the unit price of 0·083fl (3·5c) for the bark in Amsterdam.—*Chemist and Druggist*, Sept. 22.

PLANTING NOTES.

LOCAL PRODUCTS IN THE HOME MARKET.—Coffee futures look tired for the present, and no decided feature. Sugar and quinine should be purchased. Cotton (American crop) may be 9½ to 11¼ millions. Coals are expected to be lower later on.—*London Cor.*, Sept. 14.

NEW TEA MACHINERY.—Mr. Jackson is again to the front as an inventor and on page 322 will be given a description of a patent clip-action tea breaker and equaliser which he has just brought out, and details of its advantages.

PRESERVATION OF THE NEW ZEALAND SNIPE.—It is urged by Sir James Hector that every effort should be made to preserve the New Zealand snipe which was becoming very rare indeed. This bird, he says, is one of the smartest game birds that could be got. It retained all the characteristics of the English snipe, flew away in a zigzag manner, was difficult to shoot and afforded capital sport.—*Auckland News*, Sept. 7.

BANANA AND PLANTAIN.—Considerable confusion seems to exist regarding the identity of these two fruits, yet the case is quite clear. *Musa sapientum* gives us the banana, while the fruit of *M. paradisaica* (or as it is now generally regarded *M. sapientum* var. *paradisaica*) is known as the plantain. The majority of the large "bananas" which reach our markets from Cuba are, says *American Gardening*, the yield of this latter plant, and hence are really plantains. The true banana, which, by the bye, has a number of varietal forms differing in size, colour and quality, has been pushed out by the larger fruit of the plantation, though the quality of this is decidedly inferior to that of the best bananas. It is the old story of size *versus* quality. The plantain is 7-14 inches in length, produced 40-80 to the bunch, in form cylindrical, acutish and of a yellow colour: the flesh is firm and not specially sweet, and writers of authority on tropical fruits say it is not very good unless cooked. The true type of banana is 3-4 inches in length, 1½-2 inches in diameter, about 50 fruits to a bunch. The fruit is rounded above, narrowed to a sessile base and bright yellow in colour. So far good, our distinctions are pretty well marked, but there arises a new complication in what is known as the Jamaica banana or Martinique variety, which is perhaps the one chiefly imported to this country. It is much like the plantain, but smaller, 7-8 inches long and it has excellent shipping qualities. The plant is regarded as a sub-variety of *paradisaica*, hence we are confronted with this relationship: The plantain is a variety of banana, and a variety of the plantain again is a banana! [Banana and Plantain are, in our opinion, synonymous terms.—*Ed. I.G.A.P.*] [In the East, but not in the West, *Indies*.—*Ed. T.A.*]

NOTES FROM THE SEYCHELLES.

ARRIVAL OF KING PREMPEH OF ASHANTI.

It was in the forenoon of 11th September that the B.I. ss. "Dwarka" arrived at Mahi with King Prempeh of Ashanti, and King Asibi of Cocofai. Prempeh was accompanied by three of his wives, his mother and one or two brothers and about 40 followers. All sent from the Gold Coast to be interned in Mahé, and I suppose kept from further mischief. The usual apathetic view of life which prevails among the Creole and native population of the island was somewhat exercised by this

ADVENT OF ROYALTY,

to dwell with them and they gathered to some extent on the pier to see them land, but it was decided to take them in boats to the house which the Government had assigned for their residence near the Coast about four miles from the township. The landing of their Majesties was therefore very unpretentious and it was nearly dusk before it was accomplished. The house rented by the Government for their accommodation is a plain, but rather nicely situated building having about ten acres of ground round it, with flower garden and fruit trees. The party was accompanied by a Wesleyan parson or teacher, also black, to act as interpreter. I had an opportunity of seeing Prempeh the day before I left, as he then, with the chiefs of his following, paid a visit to the Administrator at Government House. Owing to his arriving too soon, he was taken to the verandah of a little house where there was a merry-go-round, the wooden horses of which appeared to excite his curiosity as something novel. He was sitting there, an attendant holding a large purple umbrella over him, whether he walks or whether he sits. I understand this umbrella is always held over him. Prempeh seems about 30 years' old and for an African is fairly good looking, although his features give one the impression of violent passions subdued by circumstances. His lips are not over thick, his teeth are fine, regular and very white, and he has good eyes and nose. His dress is similar to the toga of the old Roman—right arm entirely bare with a loose white robe striped with colors, one end of which is thrown over the left shoulder. A green ribbon circlet of an inch wide with patches of gold on it is his only head-gear. His walk is slow and not without a certain dignity. Two stools were borne by attendants, but I understand he sat on chairs at Government House, which he did not like. His Honor in uniform receiving him outside in the grounds.

As regards matters generally in the Seychelles the visit of

THE "ECLIPSE" AND "POMONE"

in July helped to make social life lively for a week or so. We had also a visit from an Italian man-of-war, and the English yacht "Victoria," chartered by the Prince de Broglie was there for some time, owing to the illness of the Prince.

The last four months have been very dry the rainfall for that period being only 10 in. as against an average for eight years of 21. However, it seems to have suited the

VANILLA VINES,

as rarely has there been seen such a promise of flowers as was everywhere apparent when I left. They were then commencing to come out abundantly and the total product of beans next year is variously estimated at from 50,000 to 70,000 kilos. Several good plantations have been purchased by Englishmen, new arrivals within the last year or two. Liberian coffee is flourishing abundantly, but as the price is so low, (20 to 25 cents alb.) that it does not pay for the cost of preparation, and several planters are not taking the trouble to gather the berries.

The B.I. Co. have, owing to the demand on their resources of steamers, thrown up their contract for the line between Bombay and Zanzibar calling at Seychelles. This does not suit the producers of coconut oil which will now have to find an outlet in and via Mauritius.

It is much to be regretted that while one can get from Colombo to Mahé in seven days, the only way of getting back thereto is by the long round via Mauritius.—*Cor.*

CEYLON TEA IN PARIS.

MR. R. V. WEBSTER TO THE FRONT.

Mr. Jas. Westland has returned with a very high opinion of the extremely good work done by Mr. R. Valentine Webster at the Paris Exhibition, in Paris generally, and indeed throughout the world, on behalf of Ceylon tea. Mr. Webster has not only two central dépôts in Paris, but 20 Restaurants within and 52 outside the Exposition, besides 63 hotels and 256 Thè-Cafés in the French metropolis all taking Mr. Webster's Ceylon tea. In Switzerland he has also a large number of agencies and customers. Mr. Webster advertises freely in Paris by means of the motor cars, as well as in other novel and attractive forms. He has illustrated pamphlets and circulars in French and his sample packets now before us are got up with much taste and just in the way to attract French and other Continental customers. Mr. Webster has sold as much as nearly 1,000 francs worth of tea in his Exposition stand in one day. Lipton's agent, although in a better position, did not seem to be doing so much.—Mr. and Miss Westland spent sixteen days in France on the way out.

INDIAN TEA ASSOCIATION.

FIRE INSURANCE—TEA PESTS—TEA IN TRAVANCORE.

Calcutta, 25th Sept. 1900.

The Nagaisuree Tea Company, Limited.—Considered file of replies to the Committee's Circular No. 45 of 13th August, in which the views of members of the Association were invited upon the rates fixed in the Fire Insurance Tariff on Tea Garden Buildings, which was introduced by the Calcutta Fire Insurance Agents' Association in 1896. The principal items in this Tariff respecting which complaints had formerly been made were: (1) The additional rate of 2 annas per cent charged if the engine and boiler are inside the building, or in any building communicating therewith, except by double fireproof doors. (2) The additional rate of 4 annas per cent charged if fans are used. (3) The excessive rates fixed for withering and fermenting houses. (4) The excessive rates fixed for carpenters' shops. From the replies received it appeared to the Committee that the general opinion of members was favourable to the reduction of these rates

being pressed for. But a number of other suggestions had also been made; and it was decided to submit the replies, for report, to a Sub-Committee consisting of Mr. A. Tocher and Mr. R. Magor, who had been previously asked to take up the matter.

Considered file of papers regarding a proposed visit of Dr. Geo. Watt, C.I.E., the Reporter on Economic Products to the Government of India, to the Darjeeling Tea District. Dr. Watt had informed the Committee that he was engaged on the preparation of a new edition of his book on "The Pests and Blights of the Tea Plant;" and as he had not hitherto visited the Darjeeling Tea District, he was desirous of seeing some of the chief estates there before republishing the book. He proposed to spend six weeks in the district, leaving Calcutta on the 8th October; and he asked that a tour extending over that period should be arranged for him. The Committee had been in communication with the President of the Darjeeling Planters' Association on the subject; and had been informed that arrangement were being made for Dr. Watt to visit a number of gardens, the names of which, and further particulars would be furnished as soon as possible. This information was to be conveyed to Dr. Watt. It had been arranged that Mr. Mann should accompany Dr. Watt throughout at least a portion of the tour.

Considered letter, dated 17th September, from the Honorary Secretary, Central Travancore Planters' Association, regarding the figures of tea production for Travancore given in the return of the Director-General of Statistics entitled "Statistics of Tea production in India." It was suggested that Mr. O'Connor be asked to give detailed figures from the various districts in Travancore, viz, Central Travancore, South Travancore, and Kanan Devan. By so doing it was thought it would be possible to ascertain from which of the three districts the returns had been received which made the statistics for the whole area appear in the statement as 13,657,103lb. of uncured leaf and 8,775,789lb. of manufactured tea. It was added in the letter that these figures were manifestly inaccurate; and the assistance of this Association was asked in the matter. The committee decided to draw the attention of the Director-General of Statistics to the figures which appeared to them to be clearly inaccurate.—*Indian Gardening and Planting*, Oct. 4.

INDIAN AND CEYLON TEA.

It is a fortunate circumstance that as the production of tea in our gardens in India Ceylon increases, so also does the demand grow—fortunate, that is, for the producer of the leaf. In Great Britain the "cup which cheers" is becoming ever more popular, while on the continent of Europe, in Australasia and elsewhere the demand is steadily increasing. China as a producer of tea is now very far behind, although it is noteworthy that during 1899-1900 the imports from China into this country were higher by more than 8½ million pounds than in 1898-9, when 34 million pounds were imported.

The continuous progress made by British tea is especially remarkable in countries which, a few years ago, did not know what the British grown tea was. A striking example of this is afforded by America, where in 1894 the consumption was 4,723,000 lb. In 1896 the quantity had more than doubled, and stood at 9,474,000 lb. while last year no less than 17,226,000 lb. of Indian and Ceylon tea were required.

British planters can fairly be proud of this fact. It is due to their activity and foresight that the American market has been established. An extensive system of advertising was adopted, and the praises of British tea sung loudly and incessantly in the years of our friends across the Herring Pond, and, as it was found that the tea fully bore out the good things which were said about it, a demand for it became felt, which is now growing in the manner indicated by the eloquent figures we have quoted. A circular issued early in the present year by a New York house drew an interesting parallel between the condition of the East Indian tea trade in Great Britain was thirty years ago and

that in America at the present time. We reproduce the figures quoted:—

| Gt. Britain. | Lb. used | America | Lb. used |
|--------------|------------|----------|------------|
| 1866 ... | 4,584,000 | 1894 ... | 4,723,000 |
| 1867 ... | 6,360,000 | 1895 ... | 7,792,000 |
| 1868 ... | 7,746,000 | 1896 ... | 9,474,000 |
| 1869 ... | 10,715,000 | 1897 ... | 11,362,000 |
| 1870 ... | 13,500,000 | 1898 ... | 13,609,000 |
| 1871 ... | 13,956,000 | 1899 ... | 17,226,000 |

From these figures one obvious deduction may be drawn. It is that if the teas are pushed in America as they have been of recent years, the parallel between the two countries' tea history will continue to exist, and all the leaf which is likely to be produced in India and Ceylon will find a ready market with Anglo-Saxon buyers. The advertisement expenses are met by a system of levying a "tax" upon tea growers, which in India is 4 annas per acre of cultivation, and ½ anna per maund of tea manufactured, but the Tea Associations of India and Ceylon, which work together amicably in their siege of the world's tea markets. While we are dealing with America, it is well that we should note the demand existing there for green tea, to which British planters are paying earnest attention. Experiments have not been altogether successful hitherto, but efforts in this direction are not being relaxed.

On the continent of Europe, British tea is also making headway. The opportunity afforded by the Paris Exhibition is being made the most of in the Tea Court, which is under the supervision of a gentleman experienced in exhibition work. British tea in cup is offered to all and sundry, while tastefully prepared samples are distributed gratis to visitors to the Court. Ceylon tea especially is making rapid headway in France, although it will have a hard and long fight to out China. The Freuchman has not yet learned to love tea as a beverage; he looks upon it more as a medicine. The Tea Court at the Exhibition will doubtless go far to disabuse his mind of this idea. China provides a very large proportion of the tea consumed in Russia, Germany, Austria and Belgium, but in these countries also, in spite of many difficulties and prejudice India and Ceylon are going ahead. Mr. J. E. M. Harrington has been commissioned by the Indian Tea Association (London) to tour through Europe with a view to learning what steps can be taken to facilitate the supply and increase the consumption of the tea in which the Association is interested. Mr. Harrington's report will be awaited with much interest.

At home the consumption continues to increase, although not by any means in the same ratio as the production in India and Ceylon. It is with a view to the absorption of this surplus production that such strenuous efforts are being made to foster the demand in other countries, the only alternative being much lower prices in London, to the delight of house-keepers and the dismay of producers. We reproduce a comparative statement of deliveries of tea in the United Kingdom for home consumption only. The table is taken from the report of the Indian Tea Association (London).

| | 1895-96 | 1896-97 | 1897-98 | 1898-99 | 1899-1900 |
|--|-------------|-------------|-------------|-------------|-------------|
| | lb. | lb. | lb. | lb. | lb. |
| Ceylon, Indian | 121,000,000 | 123,750,000 | 127,500,000 | 138,615,197 | 145,520,457 |
| | 76,000,000 | 83,500,000 | 87,000,000 | 80,162,167 | 92,105,165 |
| | 197,000,000 | 207,250,000 | 214,500,000 | 218,777,364 | 237,625,622 |
| Total for China and Season, other teas | 26,000,000 | 24,000,000 | 20,500,000 | 21,569,953 | 22,857,606 |
| | 223,000,000 | 231,250,000 | 235,000,000 | 240,347,317 | 260,483,228 |

The above totals do not, of course, represent im

ports into the United Kingdom, which in 1899-1900 amounted in all to 309,895,353 lb. of which 59,323,590 lb. were re-exported.

A severe blow to the tea industry has been struck by the imposition of an extra tax of twopence per pound as a result of the operations against the Boers. The man in the street believes that he is paying the additional tax. He is certainly paying more for his tea, while the prices obtained by the producer are lower. The troubles in China have helped to keep the price up, it is true, but it is also true that tea is unduly taxed. Coffee, which is in strong competition with the fragrant leaf, and is of about equal value, if the impost be deducted in each case, bears a tax of only three-half pence per pound, and cocoa only one penny.

In spite of this, however, and in the face of high rates of freight and exchange, the one pound draft and heavy warehouse charges, the sale of tea goes on increasing, and the great bulk of the increase is supplied by our great dependency and its neighbour, Ceylon. The keen, active, pushing planter will not waste time in groaning over the hardness of his lot, but will go on seeking new continents to conquer, and by the excellence of his tea and the pushfulness of his agents, will find markets for his product which will take as much of the leaf as he is able to raise.—*Investors' Guardian*, Sept. 22.

THE COOL PROCESS OF TEA MANUFACTURE.

To the Editor, *Indian Planters' Gazette*.

DEAR SIR,—My patent cool-oxidizer is the result of special study and practical experience, extending over some years, and although it might be considered by some a bold statement, I maintain that my cool-oxidiser will never be beaten by any other method. I have data of the proper speed the air should move over the Mal, so that it can take the necessary oxygen in just its proper quantities. I take it that the method of covering up the mal with cloths is still in vogue, and that this idea originated in the endeavour to keep out the light; *it is wrong* the Mal has no earthly chance of oxidising under cloths, and only undergoes *putrid fermentation*, as distinct a process from oxidation as chalk from cheese. I can prove that there are, as your planter correspondent says, *two distinct processes*—one oxidation, the right one, and the other what I have designated above as putrid fermentation.

Facilitate oxygenation, encourage it by giving the Mal oxygen through moving air; but move the air, at the proper speed; have under control the moisture of the air supplying the Mal. Temperature 75° to 80° Fahr.; neither above nor below. Your readers may try "prolongation of the process by total absence of draught," and "refrigeration" if they choose, there is no invention or patent about this; but as sure as the sun rises each morning and sets each evening the liquors resulting from teas so manufactured will be as "soft" as castor oil.

I claim to be the engineer who first knocked into shape a machine for oxidising tea leaf. I hold the patent rights and shall take such steps as the law provides against anyone making, selling, or infringing my apparatus; but if any planter is wishing to turn his present so-called fermenting room into a cool-oxidiser I shall be pleased to help him in doing so, without charging any royalty, provided the necessary equipment is obtained from me, and my designs faithfully adhered to. It is more than probable that before 1901 is very old I shall be once more amongst your Indian readers, and although, as they say in the dramatic world, I have been "resting" since 1897. I have not yet ceased to interest myself in tea machinery.—Yours faithfully,

NATHAN SHARPE,

HOW TO DEVELOPE TRADE.

MR. DE COURCY HAMILTON (FORMERLY OF CEYLON) TO THE FRONT.

ENGLISH TRADE WITH JAMAICA.

COMMERCIAL EXPEDITION.

A correspondent informs us that yesterday the commercial expedition organised by the Bristol Chamber of Commerce to visit the West Indies, for the purpose of promoting the home export trade to those islands, left Southampton in the Royal Mail steamer "Orinoco." The expedition, which is under the charge of Mr. de Courcy Hamilton, who has had a very extensive connection with the West Indies, is taking over one hundred cases of samples of all descriptions of merchandise, most of the chief manufacturers within a hundred miles of Bristol being represented. It is proposed to open an exhibition in Jamaica, to hold conferences, organise lectures, and in every possible way to bring under the notice of the population of the West Indies the merits of the English goods shown. The opening of the new fast mail and fruit service between Bristol and Jamaica, in January next, has stimulated the merchants of the West of England in the direction of improving the export trade to Jamaica and the neighbouring Colonies, and it is confidently hoped that a very large increase in this business will result from the present venture. Mr. A. L. Jones (of Messrs. Elder Dempster and Co., the contractors for the new service), together with many other gentlemen interested in the movement, journeyed down to Southampton, and gave the departing experts a hearty send-off.

In the course of the day the following telegram was dispatched to Mr. Chamberlain: "Just off to Southampton to bid farewell to expedition going to Jamaica to open exhibition of all the manufactures within a hundred miles of Bristol. Bristol is entering very heartily into this great enterprise to resuscitate the trade of Jamaica. This will be pleasant news to you, who have the interests of the Colony so much at heart. Shall do utmost to make venture a success.—A. L. Jones." To this the following reply was received by Mr. Jones from Mr. Chamberlain: "Thanks. I cordially wish success to expedition, and I anticipate great results from their inquiries and your energy.—Chamberlain."—*Daily News*, Sept. 20.

COVERING WOUNDS IN TREES.

Mr. Peter Van Metchen says that the wounds made in the stems of trees by pruning or otherwise should have the wood preserved to keep it from decay till the new bark and wood extends over it, but he thinks gum shellac dissolved in alcohol far better than paint. He advises to put the shellac into a wide-mouthed bottle, cover it with alcohol, and let it stand twenty-four hours, when it may be applied with a swab or a brush. It serves, as nearly as may be, as the substance of bark; is not affected by heat, or cold, or wet, or dry weather; and retains the sap up the cut, healing the wound without a scar. Any limbs cut off square on top will leave a dead end from 6 in. to a foot, which will eventually dry and rot off. Limbs should be cut off slanting; never square on top, as is sometimes done, but this would be quite a task in 300 or 400 acre orchard.—*Auckland News*, Sept. 14.

Correspondence.

To the Editor.

SCIENTIFIC MANURING AND TEA.

London, Sept. 20.

SIR,—The importance of the subject and the deep interest that is taken in the effects of manure by Ceylon Tea Growers must be my excuse for again addressing you, after a delay, owing to my absence from home.

A point has been made by those who disagree with me of the fact; that I quoted the injurious effect on permanent pastures of the continuous application of sulphate of ammonia by itself, it being argued that those who understand the subject would not apply it by itself, but only when balanced by a proper proportion of mineral manure. I described the condition of the plot treated with sulphate of ammonia by itself for the same reason that I presume it was applied, namely, that it is only when one manure is used without others that its effect can be determined.

But as regards the effect of sulphate of ammonia when balanced by other manures, on plot 9 of the Rothamsted experiments, since 1879 the following mixture has been applied per acre:—

| | |
|---------|--------------------|
| 500 lb. | Sulph. of potash |
| 100 " | Sulph. of soda |
| 100 " | Sulph. of magnesia |
| 3½ cwt. | Superphosphate |
| 400 lb. | Ammonia salts |

which, it will be admitted, is a complete or "balanced" manure: the average yield has been 58 cwts. of hay an acre, against 24 cwts. from the unmanured. The grass is however rank and of extremely poor quality, almost valueless for feeding purposes; the finer grasses here are dying in patches, so much so that I feel sure that no one who saw the plot as it is now, would care to risk the health of any perennial plant by the use of a manure so exhausting to the soil.

I went over the Rothamstead experiments with Mr. Joseph Fraser and Mr. Forsyth and was glad of the opportunity of discussing the matter with two such good cultivators of tea and with one who understands manuring so thoroughly as Mr. Fraser.

I pointed out to them what I venture to say those who study the reports only and do not see the plots, do not find out and that is that though the yield of hay is good from the plot referred to, small patches are failing and that the hay is almost valueless, owing to its being so rank.

We went over, too, the Barley experiments which confirm the conclusion come to at Rothamsted against the use of sulphate of ammonia; now barley obviously requires a quickly acting manure, for it has to grow and mature between May and September and here the plot manured with rape cake and mineral manure was in better condition and shows a higher average yield than that treated with sulphate of ammonia and mineral manure, though the quantity of nitrogen supplied in both cases is the same.

You will have seen that since I last wrote to you on this subject, Sir John Lawes has

died; in his death Agriculture has sustained a great loss and for myself I feel with deep regret that I shall no more be able to consult one who has always ready to give the result of his experience to anyone who showed an interest in scientific agriculture.—
Yours truly, G. A. TALBOT.

ARTIFICIAL MANURING OF TEA.

REPLY TO MR. TALBOT.

Lake Bungalow, Kandy, Oct. 9.

SIR,—It is gratifying to see by Mr. Talbot's letter of 20th September to you that artificial manuring of tea has its importance admitted, though tardily, in a quarter where all such manuring used to be deprecated.

As regards the use of sulphate of ammonia, Mr. Talbot throws no further light on the question. Doubtless it was applied alone at Rothamsted for the purpose Mr. Talbot mentions; but its tendency to exhaust the lime in the soil must have been chemically known before the practical experiment, to which he refers, was made. In all probability, therefore, it was not applied for a series of years only to prove that tendency, already deduced, but to watch its general effects on permanent pasture. This can hardly be said to apply to tea cultivation.

Nor, I think, can any rational conclusion be drawn, of any use to the tea planter, from the results Mr. Talbot quotes of the application of a mixed manure over a series of years to a field of hay. The mixture is such as no prudent planter would apply to tea and there is not much similarity between a hay crop and a tea field, and a vast difference in the climates in which the two have to be grown.

That an immense amount of information and interest for the tea planter is attached to the Rothamsted experiments goes without saying, but Mr. Talbot has not given us the benefit of anything useful yet, though I understand he lived in the neighbourhood and paid frequent visits.

I have used sulphate of ammonia for ten years, but *never*, of course, alone, and I use it still; and it is within my knowledge that Mr. Joseph Fraser has done so for a year or two longer and still does so. No bad results of any kind have yet shown themselves, and that is all any one can say. It may, however, interest your readers to know that Mr. Fraser wrote me after his visit to Rothamsted as follows:—"The visit to Rothamsted disclosed no new fact, in regard to sulphate of ammonia and its distinct tendency to exhaust lime, that I was not aware of. As regards the appearance of the grass plots, it might quite reasonably have been expected," &c., &c. I need not take up more space by quoting from his letter, for doubtless you will hear from him direct.—I am, &c., A. MELVILLE WHITE.

COFFEE IN DUTCH GUIANA.—Owing to the very low prices obtained for the coffee grown in Dutch Guiana, which is almost entirely of the Liberian variety, it is on some estates being gradually replaced by cocoa. The crops for 1899 was 360,481 kilos.—*Planting Opinion*, Sept. 23.

THE SCIENTIFIC MANURING OF TEA.

With reference to the discussion started by Mr. Talbot in the Colombo papers as to the advisability of using sulphate of ammonia as a manure for tea, we learn that Dr. Koller, of Messrs. Freudenberg & Co., had already referred the matter to Professor Dr. Wagner, who is looked upon as one of the greatest authorities on scientific manuring. The following is a copy of the reply received:—

Darmstadt, 19th Sept., 1900.

Agricultural Research Station for the Grand-duchy of Hesse, Director, Professor Dr. Paul Wagner, Privy Councillor to Dr. P. W. Koller, Colombo.

My Dear Doctor,—It is a moot point, whether preference should be given to Sulphate of Ammonia over Nitrate of Soda or preference to Nitrate of Soda over Sulphate of Ammonia. About a year ago at the instance of the "Deutsche Landwirtschafts Gesellschaft"—a number of German Research Stations agreed upon thoroughly investigating this question by means of extensive experiments. At Darmstadt too this question has had our closest attention. Our experience tends to prove that on the average—the efficacy of Saltpetre-Nitrogen is not quite equalled by a like amount of Ammonia-Nitrogen. There are however conditions in which preference is to be given to the Ammonia salts over Saltpetre; this is especially the case with a soil, light and permeable in which the Saltpetre-Nitrogen will be drained away very heavily during the rains. Also where no immediate return is looked for from the application of Ammonia salts should be given the preference.

Our experience is that if as you say there is a marked deficiency in lime (or if in spring the weather continues to be cold and consequently the Ammonia does not act quickly enough) the crop will be smaller than if Saltpetre-Nitrogen had been applied. However, if care is taken that the soil has a sufficient supply of lime there need be no fear of the Ammonia acting too slowly; for under the climate conditions prevailing in Ceylon a delay in the nitrification of the Ammonia is impossible to occur.

Experiments with tea plants we have been unable to make, but on the other hand we have no evidence to show that Sulphate of Ammonia should have a lesser effect on certain species of plants than on others. I cannot, therefore, concur with the view that there are positive reasons for deprecating the use of Sulphate of Ammonia as a manure for tea culture.—Yours faithfully,

Signed) WAGNER.

We learn further from Dr. Koller that to those manure mixtures, of which sulphate of ammonia forms a part, the necessary amount of lime is always added by basic slag, sulphate of lime or coral lime, to replace the quantity of lime in the soil used up by the sulphate of ammonia.—Since writing the above, Mr. Melville White's letter has come to hand confirming the use of lime in Ceylon along with sulphate of ammonia for tea, and also that twelve years' actual experience has shewn no bad results.

COCHIN COCONUT OIL TRADE.

The *Cochin Argus* of the 6th inst. says:—Both millers and speculators have been evincing a desire to sell forward, and a good business has thereupon resulted. We quote today R89/8 for prompt and R88/8 for one to four months' forward delivery per caddy.

THE TEA INDUSTRY OF INDIA.

THE SERIOUS FALL IN PRICES

which has been brought about by excessive production has checked the opening up of more ground in this and other countries for the cultivation of the commodity, but, as it is, India has about half a million of acres under tea (or 82 per cent more than in 1885), which yield about 160 millions of lb. in an average year (or 161 per cent more than in 1885). The totals of the production of tea in other supplying countries are not accurately known, but, as showing the great changes that have come over the sources of supply within a short period, the following table of importations into the United Kingdom, which appears in the Moral and Material Progress of India report, is instructive:—

| Year. | From China. | From India. | From Ceylon. |
|-------|--------------|-------------|--------------|
| 1865 | 93 per cent. | 2 per cent. | 0 per cent. |
| 1875 | 86 do | 13 do | 0 do |
| 1885 | 66 do | 30 do | 2 do |
| 1895 | 16 do | 46 do | 32 do |
| 1898 | 10 do | 52 do | 36 do |
| 1899 | 12 do | 50 do | 35 do |

From this it appears that in the thirty-three years, 1865 to 1898, the imports from China fell off as much as 83 per cent; that in the thirty-four years, 1865 to 1899, the imports from India increased 48 per cent; and that in the fourteen years, 1885 to 1899, the imports from Ceylon increased 33 per cent. Had it not been for the great success that rewarded the tea industry in Ceylon it is probable that Indian tea would now be almost as paramount in the British market as China tea was in 1865. But Ceylon, urged by the failure of coffee, took a leaf out of India's book, and now seems determined to keep, and even improve upon it. For the present, China has practically retired from the field of competition in Western Europe and America,* but she still grows much tea for her own and for Russian consumption; and, given the opportunity, she is still capable of adding enormously to the supply of tea for the use of her former customers in foreign parts. She has not yet, apparently, discovered the method for placing in distant markets teas of delicate flavour, and careful manufacture, at comparatively moderate prices, and until she does this the coarser teas of India and Ceylon will continue to be preferred by the ordinary consumer of the cheering beverage.

This, however, is pretty certain, that as no one who was counted wise in regard to tea in 1865 could have had a ghost of an idea of the extraordinary changes in the course of the trade that would be brought about before the century came to an end, so no one who is prudent would venture on the prediction that the proportions of the sources of supply will remain as they now are for many years to come. Most sincerely do we hope that India will not only retain, but will tighten her grip upon the tea trade of the world. But India's hold of the trade is not so secure that she can afford to take it easy, or dare to be indifferent to the tastes and prejudices of consumers. If, as she may well be, she is ambitious in respect of tea to live to please, she must bear in mind that she must please to live. Her consumption of tea is small as compared with her population; but the taste for tea

* No—not yet from America, to which 31½ million lb. China tea have gone up to Sept. 28th, this season, against only 19½ million lb. to same date last season.—Ed. T.A.

grows with indulgence, and is stimulated by opportunity and low price. The inhabitants of India, unlike the inhabitants of China, cannot yet be included among the tea-drinking populations of the earth. But this may not always be the case, so that at no distant date a great demand for tea for consumption in all parts of this country may set in, and be difficult to meet. But for the present tea is cultivated primarily for export, and the growing of it gives profitable employment to 620,000 labourers in India, and adds some 5s millions sterling per annum to the value of India's exports. It also contributes considerably to the incomes of shareholders, mostly resident in the United Kingdom, in Indian Tea Companies.—*Madras Mail*, Oct. 10.

THE CAMPHOR-MONOPOLY.

The British Consul for the district of North Formosa, in his annual report for 1899 (F. O. 2,525, 1d.) gives some interesting facts concerning the working of the camphor-monopoly, and as the bulk of his information has been received direct from the Formosan Government, it may be taken as official. There is now no camphor-trade to be done in Formosa outside that of the monopoly, and as we have already reported, the foreign merchants had entirely withdrawn from the business before the monopoly was instituted owing to the difficulties connected with the working of the camphor still in the interior. We now learn that the Formosan Government are assiduously planting young trees to make up deficiencies caused by consumption, and that a new Government refinery is to be opened this year, which it is expected will have a capacity for a daily output of 8,000 lb. What has so far been refined is said to be of good quality, though it appears to be somewhat rich in oil. It will be remembered that Messrs. M Samuel & Co., of London, wrote to this journal on April 7, pointing out that the Japanese Government did not intend to compete with British refiners, by refining camphor; so we presume the Consul's remarks apply solely to "half-refined" or "pressed" camphor.

The report next traces the steps which were taken by the Government to establish the monopoly which occasioned much suffering to the natives and others interested in the factories, but by degrees other employment has been found for them. A significant remark in the report is that the Government maintains a staff of guards and rangers who supply funds for keeping up friendly relations with the savages, so that it would appear that the industry is not conducted without a certain amount of danger, which may diminish as time passes. The total amount of camphor purchased from the licensed producers or manufactured between August 5, 1899 and March 31, 1900, was 20,437 cwt., and 15,535 cwt. of camphor oil. The report goes on to say that hitherto Formosan camphor was losing its good name in foreign markets owing to crude methods of production, but that the monopoly has done away with all these disabilities, inferior qualities having been got rid of, and more attention paid to the superior grades. As a proof of this the following table is given showing the amount of camphor produced under three grades, month by month, from August, 1899 (when the monopoly came into force) to March, 1900:—

| | 1st Class. | 2nd Class. | 3rd Class. |
|--------------|------------|------------|------------|
| 1899. | Catties. | Catties. | Catties. |
| August .. | 16,361 | 29,686 | 3,374 |
| September .. | 33,404 | 50,892 | 15,635 |
| October ... | 95,075 | 116,638 | 21,829 |
| November .. | 156,722 | 103,856 | 21,807 |
| December .. | 147,597 | 100,223 | 14,934 |
| 1900. | | | |
| January .. | 171,165 | 88,218 | 16,250 |
| February .. | 126,802 | 52,656 | 6,207 |
| March .. | 241,098 | 74,819 | 7,925 |
| Total ... | 993,227 | 616,988 | 106,464 |

INDIAN GOVERNMENT CINCHONA.

Mr. W. M. Standen, director of the Government Cinchona-plantations, Nilgiris, has submitted to the Indian Government his annual report on the working of the cinchona estates and quinine-factory, for the year ending March 31, 1900. We gather from this that the season was altogether abnormal owing to the failure of two monsoons, but the drought has had no deleterious effect on the trees. The report shows that Mr. Standen has lost no time in utilising for the improvement of the factory and the plantations the valuable information he gathered in Java last year, as he is now conducting experiments in connection with the shading of the stems of the trees from the direct rays of the sun in order to produce a higher percentage of alkaloid in the bark. Mr. Standen wishes particularly to ascertain whether it would pay to protect the stems of old trees for this purpose, and he has accordingly selected a plot of six acres in an exposed position, and closely covered the stems of the trees with grass. The trees being large, the cost of the work was high, amounting to 58r. 2a. 10p. per acre; but the effect of the grassing on the appearance of the trees was most beneficial. The bark will be analysed when the trees have been under the protection of the covering for two years, and it will then be possible to show whether this mode of increasing the alkaloidal value of the bark is profitable or not. Another interesting experiment is being made to ascertain the yield of alkaloids from specially-manured plots. During the year 40,000 plants died, as against 47,600 in the previous year, nearly all the casualties taking place on the Hooker estate. Out of a total of 19,345 trees uprooted or coppiced on the estates for bark, 10,588 consisted of sickly and dying trees on this estate. It is observed that the land, originally poor grassland and unfavourably situated, has been under cinchona for thirty years.

The total quantity of bark harvested on the Government estates during 1899-1900 amounted to 110,279 lb., or about 40,000 lb. more than in the previous year, the increase being largely due to the heavy coppicing that was necessitated. In addition to this, 223,811 lb. were purchased in the local market. One magnifolia tree, thirty-four years old, was coppiced, and yielded no less than 120 lb. of dry bark. The total quantity of bark worked up by the factory during the year was 344,312 lb., consisting of 318,881 lb. crown and hybrid barks, and 25,431 lb. red bark, and the alkaloids extracted amounted to 10,188 lb. (163,008 oz.) quinine sulphate, and 4,615 lb. (73,880 oz.) of febrifuge. The output was less by 38,640 oz. quinine sulphate than in 1898-99, but the idea was to make out 10,000 lb. of quinine sulphate, whereas during the previous year an effort was made to show how much quinine could be produced in the factory in one year with the present machinery. The output in future is likely to be restricted to about 10,000 lb., as this is reckoned to be sufficient for all requirements, unless the demand should largely increase. The amount of quinine distributed during the year was the highest on record, being 7,378 lb. (118,048 oz.) compared with the previous year's 2,748 lb. (43,968 oz.). This increase was due partly to a considerable increase in the requirements of the Madras medical stores and of Native States. The issue of febrifuge amounted to nearly 1,000 lb. more than in the previous year, being 2,676 lb. Upwards of 561,000 5-gr. quinine-sulphate powders, at 3 pies per powder, were retailed to the public from the post-offices in the Presidency. The Government found itself able at the close of the year to reduce the price from 3 pies to 2 pies—a reduction which it is hoped will encourage larger numbers of the poor to avail themselves of the benefit of the

medicine in this cheap and readily-obtainable form.

Coming to the financial part of the business, we find that the net profit on the operations of the estates amounted to R50,822, which is represented by stock valued at cost price; but, taking the stock of quinine at market value (1s. 7d. per oz.), the profit would have been R154,631. Mr. Standen estimates that the total cost of manufacturing the 10,188 lb. of quinine sulphate was R129,390 3s 9p., or R12 11s. 2p. per lb. and, taking the value of the rupee at nominally 1s. 3d., this works out at 15s. per lb., or about 11½d. per oz. Since the commencement of the operations of the Madras Cinchona Department the charges have amounted to R33,19,101, and the receipts to R40,91,278, so that there has been an excess of revenue over expenditure of R7,75,177; while, after allowing for interest on receipts and charges, the net surplus to the end of last year was nearly 14 lakhs of rupees.—*Chemist and Druggist*, Sept. 22.

PLANTING NOTES.

JAVA QUININE.—The shipments from Java for June were five cases only. From July 1st to June 30th (twelve months) the shipment have been:—

| | | | |
|-------|-----------|---------|---------|
| | 1899-1900 | 1898-99 | 1897-96 |
| Cases | 1,352 | 1,619 | 458 |

The following are the dates fixed for the remainder of the quinine-auctions to be held in Batavia this year.—Oct. 31 (4,000 kilos.), Nov. 28 (4,000 kilos.), and December 19th (3,200 kilos.).—*Planting Opinion*, Oct. 6.

THE CAUVERY SCHEME: AMERICAN TENDER ACCEPTED.—The Mysore Government have at length finally settled all the points that were at issue between themselves and the Government of Madras relative to the water of the Cauvery Falls, and they have accepted the tender (£140,941) of the General Electric Company of the United States, who have undertaken to complete within twenty months the installation of the plant required at Sivasamudram to generate 5,000 horse-power and to transmit it a distance of ninety miles to a central station on the Kolar Gold Fields. Arrangements are being made with the various gold-mining companies now at work on the Fields for the distribution of the electricity from the central station, and for the installation of motors to work the machines now driven by steam.—*Pioneer*, Oct. 1.

VANILLA IN THE SOCIETY ISLANDS.—The quantity of vanilla exported from the Society Islands during the past year has been greater than at any previous period in the history of this Island, the figures being 130,113 lb. in 1899, as against 75,740 lb. in 1897, and 92,137 lb. in 1898. Its price, however, has sensibly decreased since 1897, for, whilst in that year, it realised on the local market as much as an average of 9s. 4d. per lb., it fetched only part, to foreign markets being overstocked, but principally, to the indifferent manner in which a great portion of the Tahiti vanilla is prepared for shipment by the Chinese merchants who, in order to remit to San Francisco and other places against goods received or ordered, buy up the green beans (often immature) which they casually and imperfectly dry, cure, and pack, whereby much of the aroma is lost. It may be said, however, that Tahiti vanilla properly treated before shipment, generally finds a fair market, although it cannot compete in quality with that from Bourbon, Seychelles, Fiji, and the West Indies.—*Planting Opinion*.

RUBBER ON THE BURMO-CHINESE FRONTIER.—The enormous rise which has taken place in the price of Indian-rubber is stimulating the trade in this article on the North-East frontier of Burma. The Kachins, however, have to go even further afield to get it. The township officer at Kaming reports that they continue to cut the roots of the trees, but that the competition among the Chinese rubber merchants is so keen that none of them will risk their status among the Kachin sellers by reporting specific cases. The practice accounts, no doubt, for the fact that the output from the forests within British jurisdiction in this area has fallen off to some extent of late.—*Indian Witness*.

THE DATE PALM IN NORTH-WEST AUSTRALIA.—The Woods and Forests Department has sent to the resident magistrates along the North-West coast, and the wardens of the goldfields north of the Murchison, parcels of seeds of the date palm, for experimental sowing. Many of these officials are taking great interest in this effort to introduce the date palm, and have caused the seed supplied to be sown in various suitable spots throughout their districts. The warden of the Pilbarra goldfield, in particular, has paid close attention to this matter, and has promised to distribute a further supply of seed to travellers and others for sowing at pools, soaks, etc., all over his goldfield. The date palm commences to bear fruit in tropical and sub-tropical Eastern Australia at the age of eight years, and survives through years of drought. It would, in time, prove a great boon to prospectors and others in the interior of the continent, and every effort should be made not only to establish it in this colony, but to protect the plants as soon as they appear.—*Perth Morning Herald*, Sept. 27.

INDIAN AND CEYLON TEA COMPANIES.—Says the latest *H. and C. Mail*:—

Mr. Seton's table, showing the results of the working of forty-five Indian tea companies during the season 1899 has been favourably commented upon by nearly all the financial papers. The average profit per pound was 1.74d, as compared with 1.43d in 1898; the average ratio of expenses to receipts, which have improved to 79 from 84 per cent, and the average profit on capital, viz., 6.59 against 5.56 per cent, are considered good evidence that the industry is now on a more steady financial basis, and not so liable as formerly to suffer from severe fluctuations.

This shows that 1899 was, on the whole, a better year than 1898 for Indian Tea Companies. From the tables given by our London contemporary we quote total results as follows:—

24 Ceylon Tea Companies.

| Capital | Acres | Crop 1898 | Crop 1899 | Reserve |
|-----------------|-----------------|---------------|------------|----------|
| Total. | Total. | Total lb. | Total lb. | Total £. |
| 2,739,574 | 83,741 | 26,464,471 | 27,595,111 | 224,113 |
| Working capital | Balance forward | Debts. amount | | |
| Total £. | Total £. | Total £. | Total £. | |
| 237,202 | 49,894 | 559,295 | | |

And again:—

45 INDIAN TEA COMPANIES.

| Total Lands. | Total mature. | Total young |
|---|---------------|-------------|
| Acres. | Acres. | Plants. |
| | | Acres. |
| 451,465 | 121,226 | 22,183 |
| Average cost per acre R43; per lb. 6-60 pence; profit per lb. 1-74d. receipts per lb. 8-34 pence; ratio of expenses to receipts 79 per cent., profit on capital 6-59 per cent.; average dividend 5-61 p.c.; Total Reserve £569,153 or 7-14 p.c. on capital. | | |

FRUIT CULTURE FOR THE NORTH.—A useful article on this subject, which will grow more pressing as the Northern Line advances, will be found quoted on another page. We are glad to see the emphatic advocacy given to the practice of grafting, and prominence afforded to the orange and mango as two of the most suitable fruits for cultivation in the Northern Province.

NUWARA ELIYA TEA ESTATES COMPANY.—As will be seen from the letter with which the local agents, Messrs. Leechman & Co., have courteously favoured us an interim dividend has been declared of three per cent for the past half-year, being the same as on the previous occasion although the full dividend for 1899 was seven per cent—a rate which we trust will be realised if not exceeded this year.

SUGAR INDUSTRY COMMISSION IN BEHAR.—Calcutta, Oct. 10.—The Government of Bengal has appointed a Commission consisting of Mr. J. E. O'Connor, Director of General Statistics, Mr. D. M. Hamilton, of Messrs. Mackinnon, Mackenzie and Co., and Mr. E. A. Hancock, Agricultural Chemist, to enquire into the prospects of a profitable revival of the sugar industry in Bihar, including the question of erecting central factories.—*Times of India*.

"DAYS OF OLD IN CRYLON."—It is seldom now-a-days we hear from an ex-planter like "R." (writing from Dublin) on another page, who carries us back to the "forties," almost to the very beginning of coffee; and who passed through a time when £35,000 was offered for a Kadugannawa estate to another season when a bushel of rice cost a bushel of plantation coffee—the one being so high and the other so low in price!

MINOR PRODUCTS.—The following from the *Friend of India* is of local interest; and perhaps some of our readers who have seen Mr. Mollison's paper will favour us with particulars:—An interesting description of the methods of cultivation of the betel palm, of cardamoms, and of pepper, in vogue in the Kanara district of the Bombay Presidency, written by Mr. J. W. Mollison, M.R.A.C., has been issued by the Government Central Press, Bombay. It is pointed out that the system of manuring with leaf-mould causes immense destruction to the forest growth, and Mr. Mollison recommends an enquiry into the efficacy of castor-cake or safflower cake as a substitute.

THE CAMPHOR CORNER.—That the cornering of camphor for its own purposes by the Japan Government is now ancient history is proved by the fact that it is fully reported on in two consular reports which we deal with this week. Such reports are not regarded as the source of prompt information but sometimes they are useful in bringing together details of a course of events which reach trade journals in instalments, and in throwing a little official light on these particulars. It is in this way that what the British and American Consuls say on the camphor monopoly is useful. Our consular representative in Formosa has been furnished with a report from the government of the island, and extracts from this appear on a later page.

PEERMAAD, September.—Tea prospects here point to a shortness of crop, as we have had very abnormal rain in June, July and August. At the west end of the district we measured, in June, 58.50 inches, in July 86.30 inches in August 86.10 inches, against 60, 39.50 and 18 inches, in the same months last year. The wind has been worse than I have ever known it.—*Indian Gardening and Planting*.

THE PISTACHIO TREE, *Pistachio vera*, the species which yields the eatable pistachio nuts of commerce is deciduous, growing about 20ft. high, and a native of Western Asia. It is largely cultivated throughout Southern Europe. Its fruits are oval-shaped, nearly an inch long, and contain a seed with bright green cotyledons. The nuts are largely eaten by the Turks and Greeks, and also by the people of southern Europe, either simply dried like almonds, or made into articles of confectionery. Baron Von Mueller, in his list of plants for industrial culture, refers to an ingenious method of inserting the pistachio seeds into dry figs, to secure their power of germination during transmission to remote places. Some of our horticulturists should try and grow the pistachio.—*The Planter*, Sept. 22.

PEACHES IN GEORGIA.—In many sections of the State the Peaches decayed badly, owing to the excessive amount of rain during the latter part of May and almost the entire month of June. Many of the early shipments were rushed into market in bad condition, consequently brought no returns to the growers others whose fruits was in good condition received remunerative prices. Some late consignments fetched handsome returns. The fruit industry in Georgia is rapidly growing. Heretofore, when we have had a large fruit crop, the market being glutted, enormous quantities of Peaches have been allowed to rot in the orchards. This in a measure is now obviated, as a number of firms are running canneries, evaporators and distilleries. One cannery in this State has a capacity of ten thousand quart cans per day. Growers are also exercising better judgment in placing their consignments, thus avoiding glutting the markets.—*Journal of Horticulture and Cottage Gardener*, Sept. 6.

THE DECADENCE OF COFFEE.—No one can accuse us of disloyalty to the old king. We stood by coffee in prosperity and adversity; but we must say we are compelled, albeit reluctantly, to abandon hope of its revival here. In India, too, its days would appear to be numbered, though it may hold on yet a while. An Indian contemporary thus summarises the situation:—The Halcyon days of the coffee-planter in India have apparently gone, not to return. At the end of 1899 there were 274,298 acres under coffee, all of it, with the exception of 450 acres, in Southern India. About 47 per cent of this area is in Mysore, where there were 128,010 acres under coffee last year, while 118,514 acres are devoted to the plant in the British districts of Coorg, the Nilgiris, and Malabar. The yield has been very poor since 1896, that of last year being the worst of the series and representing only about 17½ million pounds—or about half the production of fifteen years ago. The poverty of the crop is due to adverse seasons, the fall in prices, and leaf-disease. The production during the past ten years, on an average, has been 30,092,413 lb. almost the whole of which was exported. The foreign coffee imported during the last ten years has averaged 1,581,171 lb. of which 735,862 lb. were re-exported, so that 845,309 lb. of foreign coffee were left every year for consumption in India, as against only 74,733 pounds of Indian coffee

TO ALL PARTS OF ASIA, AFRICA, AMERICA AND OCEANIA.

Seeds & Plants of Commercial Products.

Castilloa Elastica Cervantes.—Orders being booked for the coming crop of seeds available in June and July, selected seed from very old trees. R. N. Lyne, Esq., Director of Agriculture, Zanzibar, writes under date 24th August, 1899:—"Please send me 200 seeds of Castilloa Elastica for further trial; the seeds of Castilloa you sent me last August germinated very well." Price and particulars in our Circular No. 32; special quotations for large orders according to quantity; immediate booking necessary to avoid disappointment.

Hevea Brasiliensis (Para Rubber).—Orders being booked for the coming crop available in August and September, 1900. This is the only crop of seeds in the year. All orders should reach us before the end of July to avoid disappointment, as we have to make arrangements in time; guaranteed to arrive in good order at destination. We have already booked a large number of orders. A leading Sumatra Planter, who ordered 50,000 Hevea Brasiliensis seeds last year writes under date 27th February, 1900:—"I received your favor of the 12th instant, out of which I learn that you booked me for 100,000 Hevea Brasiliensis seeds for August and September on the same conditions as before, but at the price of— per thousand." Plants can be forwarded all the year round in Wardian cases. Price and particulars as per our Circular No. 30. A Borneo planter writes dating, Sandakan, 17th August, 1899:—"The last lot of Para seeds turned out very well." Our shipments of Para plants last year has exceeded over 300,000 to different countries. Special terms for large orders on application.

Kickxia Africana (Lagos Rubber).—One of the staple articles of commerce in Lagos grow very vigorously, realizing over 3s. per lb. in the Liverpool market. Seeds and plants, price on application.

Hancornia Speciosa (Mangibeira Rubber).—Besides the value of rubber, it bears delicious fruits, which is a great favourite with the Brazilians, cultivated for both purposes. Seeds and plants, price on application.

Coffee Arabica Liberian Hybrid, Maragogopie Hybrid, C. Stanophylla and other varieties. Price of seeds on application.

Ficus Elastica (Assam and Java Rubber).—Seeds supplied with instructions; price according to quantity. This tree grows equally well in high and low land, in forest and grass land, its cultivation being extended largely by the Indian Government. For price of seeds with particulars as per our Circular No. 33.

Manihot Glaziovii (Ceara or Manicoba Rubber).—Fresh seeds available all the year round; price as per our Circular No. 31.

Urceola Esculenta (Burma Rubber) and Landolphia Kirkii (Mozambique Rubber).—Seeds and plants, both are creepers.

Cinchona Seeds.—Different varieties.

Sterculia Acuminata.—(Kolanut). Superior quality, seeds and plants; price on application, packed to stand the transit well for several months, a hardy tree, cultivation easy.

Erythrina Lithosperma.—Thornless variety, new crop of seeds ready in December, May and June. Price according to quantity on application.

Seeds and Plants of Cinnamon, Nutmeg, Clove, Sandlewood, Pepper, Cardamom, Vanilla, Cacao, Tea, Coca, Fibre, Medicinal and Fruit Trees, Shade and Timber Trees, Eucalyptus various varieties, also Palms, Bulbs, Orchids, &c.

Our enlarged Descriptive Price List of Tropical Seeds and Plants of Commercial Products for Foreign Countries for 1899-1900 are now being forwarded to applicants in different parts of the world. Also Descriptive Price Lists of Seeds and Plants of Fruit Trees, Bulbs, Tubers and Yams, and Orchids.

"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 Henaratgoda, 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."

Our new Descriptive Price Lists of Seeds of Shade Trees for Coffee, Cacao, Tea, Cardamoms, &c., Timber Trees, Trees for Avenues, Hedges, Wind and Shelter Belts, Ornamental Trees, Shrubs and Climbing Plants; and Seeds and Plants of Palms, Calamus, Pandanus, Cycads, Tree and other Ferns, Crotons and Dracinas, now being prepared and will be ready shortly.

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

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

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

Telegraphic Address:

J. P. WILLIAM & BROTHERS,

WILLIAM, VEYANGODA, CEYLON.

Tropical Seed Merchants,

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

HENARATGODA, CEYLON.

LIME AND MALARIA.

EVERYTHING that tends to add to our knowledge of malaria—whether as regards the conditions which increase its spread or virulence, or the agencies which help to reduce its evil influence—is of interest to us as inhabitants of an Island which, despite its general healthiness, yields more victims to malarial fever than to any other ailment or epidemic. Indeed, fevers account for more deaths, probably, than all other diseases combined; and malarial fever is more widely prevalent among us than any other; and if it is not directly fatal to the same extent as other fevers, it enfeebles and ultimately conquers in most cases in which prompt treatment is not followed by adequate nourishment and care. It is, therefore, encouraging after all the literature that has confronted us on the mosquito,—which is a troublesome enough customer without being reckoned as an active agent in inoculating one with malarial poison—to find that there is something to set against the mischievous mosquito. Though one may not be able to overpower the diminutive enemy directly with a coat of lime, lime has been found indirectly to be a potent agent against malaria. In France, Dr. Roche has discovered that the presence of lime in the soil or in the water, helps to exterminate malaria; and it is a curious illustration of the inter-dependence of widely different industries that this medico-scientific discovery was first made in connection with experiments in Manuring! This fact is particularly interesting to us as advocates, in season and out of season, or adding to the fertility of the soil by the judicious use of manures. The disappearance of marsh malaria from Puisaye, after lime had been used in the district as a fertiliser, led to investigations which are still being carried on, and which reasonably point to the probability that in lime a very effective agent has been found to neutralise the spread of malaria. Another medical man, Dr. Grellet, has taken up the suggestion, the credit of which is primarily due to Dr. Roche; and he has written to the *Revue D' Hygiene*, that the liming of the soil for agricultural purposes, in various provinces in France which were more or less affected by malaria, has resulted in the reduction of malarial cases, almost in proportion to the quantity of lime used. It is for experts to say whether his statement that, in many countries whose conditions favour the existence of malaria, the freedom or prevalence of malaria is the accompaniment of a calcareous soil is true. Lower Egypt is cited as an instance; while, in France, the district of Beaune on one side of the Loire is free from malaria, whereas the district on the opposite bank, with its sandy and clayey soils, is subject to it. So also the Channel coast of France is free; while at the mouth of the Loire, malarial fevers are prevalent; if the same observation applies to Algiers. Now this is a point which deserves special investigation in Ceylon, and we may add that there are peculiar facilities for observation in the compactness of our Island and in the free distribution of medical men throughout all the provinces.

PLANTING IN DOMINICA.

TO THE EDITOR OF *THE TIMES*.

Sir.—I venture to beg you to give publication to a few lines dealing with one of our West Indian Islands and claiming for it the attention of those who are interested in colonial enterprise. I refer to Dominica, one of the Leeward Islands, and of which I am administering the Government.

Those beautiful isles, that are strong like a necklace across the throat of the Caribbean Sea, have never been "hoomed" by advertisements nor exploited by chartered Companies, and it is to be feared that in the case of Dominica, in particular, there are few of my readers who know much more about the island than that it is "somewhere in the West Indies," and consequently only vaguely connected in their minds with huccaneers, rum, and yellow fever. I am, therefore, addressing you in the hope that this may meet the eyes of young men possessed of energy and a moderate capital, who are inclined to become planters in a tropical island, and who may be induced to associate themselves with the progressive fortunes of one of our most beautiful and valuable colonies.

Dominica lies midway between the French islands of Martinique and Guadeloupe and, for administrative purposes, has been placed under the control of the Governor-in-Chief at Antigua. It is one of the most picturesque spots in the world, and its marvellous mountain scenery and tropical luxuriance evoked from Froude some of his finest pieces of word painting. Comprising nearly 300 square miles Dominica is one of the largest of our West Indian islands, and offers a great field for agricultural enterprise. The cultivation of sugar has been practically abandoned, and, after a long period of difficulty and depression, the island appears, at last, to be entering on a phase of prosperity that bids fair to be permanent. Thanks to Mr. Chamberlain's lively interest in our great "undeveloped estates," the Imperial Parliament was, last year, induced to vote a grant-in-aid to Dominica and, by its means, the magnificent highlands and valleys of the interior are now being made accessible. Over 100,000 acres of virgin soil are thus being rendered available for cultivation and the natural conditions for successful enterprise are present everywhere.

Unfortunately, the actual inhabitants of Dominica are possessed of but little capital, and their scanty resources have been heavily strained in their efforts to replace the unprofitable cultivation of the sugar cane by their present industries. Unassisted by extraneous capital and energy, the salvation of the island will be worked out but slowly, while, on the other hand, its great natural advantages ought, if made known, to attract to it an abundance of uninvested money and enterprise. The men who are wanted in Dominica are those of

THE CLASS THAT HAVE MADE CEYLON AND BURMA

what they are. They should be young, healthy, and energetic; supplied with not less than £1,000, willing to work hard, and to wait three or four years for a good return. In the course of the last two decades hundreds of Englishmen, attracted by judicious advertisements and "puffs," have been induced to sink their energy and capital in Florida and California, while our own colonies, far nearer home and presenting latent possibilities of much greater advantages, have remained unvisited and undeveloped. If those men had been induced to try Dominica, Grenada, Trinidad, or any of the other West Indian islands, where sugar is not the supreme fetish, they would probably have been rich today instead of bemoaning the struggles and losses caused by frosts, droughts, blights, and dear labour.

The climate of Dominica is excellent and particularly suited to those who are inclined to pulmonary complaints. Yellow fever has been unknown for 50 years, and there is very little malaria. White children thrive remarkably, and those who live in the hills are as rosy and fresh as any in England. The temperature

is never excessive. It varies from 53deg. to 90deg., according to altitude and season. The rainfall is abundant while a vast number of streams afford water power. There are no venomous serpents, and mosquitoes are not unduly obtrusive. The soil is remarkably fertile, and is admirably suited to the cultivation of all tropical products notably that of fruit. There is a fair supply of labour, and wages vary from 8d to 1s 3d a day. Taxation is light, and the cost of living moderate.

The sugar industry, upon which the island once largely depended, has now become a minor industry, and its place has been taken by the cultivation of cocoa, limes, coffee, spices, oranges, and other fruits. All these products yield very handsome returns, and large areas have of late years been planted with them. The value of cultivated land in Dominica has increased very largely during the last two or three years, and it is a significant fact that very few owners of estates that have come into bearing are willing to sell their properties.

The exports of the island during last year were worth nearly double those of five years ago. Very good incomes are being yielded by comparatively small estates, and the output of the island will, in a few years, attain a large volume. Over 1,500,000 lb. of cocoa are already exported annually, while Dominica has always been the chief producer of the lime juice which is nowadays so extensively advertised. The soil and climatic conditions of the island are specially adapted to the production of oranges, bananas, and pineapples, and a small experimental shipment of the last-named fruit proved recently to be the finest ever received from the West Indies.

A CEYLON PLANTER, OF GREAT EXPERIENCE, has lately embarked in the cultivation of coffee in the higher altitudes, and the finest grades of the famous Jamaica "Blue Mountain" bean are found to thrive remarkably in lands over 2,000 feet above the sea. This industry is about to be very extensively developed. Vanilla of very high quality is also being produced and will soon become an important article of export. There is no reason why tobacco of the best grades should not be raised, and there are vast areas suitable for rubber.

The island possesses a valuable botanic station under the direction of Dr. Morris, C.M.G., Commissioner of Agriculture for the West Indies. Vast numbers of seedling plants of all the best varieties of economic products are kept on hand and may be purchased at much under cost price. An intending planter can thus save a considerable space of time in the cultivation of his product, and the returns are proportionately earlier. The officers of the Agricultural Department are ready to give valuable assistance and instruction to inexperienced planters, and many costly mistakes may thus be avoided.

CROWN LANDS MAY BE PURCHASED FOR 10s per acre, at present and facilities are given for payment. A planter who proposes to cultivate virgin lands should be able to dispose of a capital of not less than £1,000. Given this sum there is every reason to believe that an energetic man would in a few years realise a handsome income from his plantation. Pineapples and bananas yield a crop in less than two years, coffee in less than three years, oranges and limes in four years. Cocoa requires five to six years to give large crops, and nutmegs give a valuable return in eight years. The clearing and cultivation of virgin lands are very interesting operations, and, owing to the cool and clear atmosphere of the mountain lands, a white man can work as well there as if he were a couple of thousand miles further north of the equator. The forests abound in valuable woods, and a bachelor planter could build a comfortable cottage out of native materials for less than a hundred pounds. The rivers are teeming with fish, and some shooting can be had.

Social life is very pleasant, and cricket, tennis and golf are played. There are good schools, an hotel, and several boarding houses. Dominica can be reached in 13 days from Southampton by Royal Mail steamers

single fare, first class, £25. Numerous lines of steamships call at the island giving ample facilities for shipment of produce to the United Kingdom and to the States.

If the foregoing induce any of your readers to consider seriously the prospect of becoming planters in Dominica I would be very happy to afford any further particulars that may be desired. I shall be returning to Dominica on October 16 next; but in the meantime any communications addressed to me, care of Messrs. Grindlay and Co., Parliament-street, will receive my best attention.

With many thanks for the space you have been good enough to accord me,—I am, Sir, yours faithfully,
H. HESKETH BELL
(Administrator of Dominica).

GRAPHITE OR PLUMBAGO.

The least erudite laymen are aware at the present time that charcoal, graphite, and the diamond are primarily nothing else but carbon, and that each of the three bodies named represents an allotropic modification of that element. Not long ago these substances were not properly distinguished from one another, and it was the common belief that graphite, lead sulphite, molybdenite, stibnite, and pyrolusite, on account of their similarity in appearance were identical, or at least belonged to the same family. To have cleared up this misunderstanding is the merit of Scheele, a Swedish chemist, originally an apothecary, who, imbued from youth with a spirit of investigation, developed into one of the most successful chemists of his time. To his exertions chemistry owes the discovery of some of the elementary gases then absolutely unknown, and the first distinctive features relating to the class of bodies enumerated above. Towards the year 1779 he found that graphite when warmed with nitric acid generated carbon dioxide; while molybdenite which was regarded as a kind of graphite owing to the fact that it produced a black streak on paper, changed under these conditions to a white oxide or earth, as these bodies were called at that time. From these observations he drew the conclusion that graphite must be a body related to carbon, a result which has since found ample confirmation.

The mineral graphite is of special interest to the mining fraternity, for the reason that deposits of this mineral are found in various parts of the world. A short description of its occurrence and properties seems, therefore, to be in place, the more so as the mineral is not always found in such a state of purity as to warrant its immediate application, and foreign admixtures or gangue must be eliminated in certain cases.

Graphite received its name from the Greek term meaning "to write, an appellation which is quite appropriate and characteristic, so that other designations, like plumbago, blacklead, and even "carburet of iron," which have passed over into the present nomenclature from less enlightened times, must necessarily appear as quite superfluous and improper.

Almost every part of the civilised world having contributed its quota to the production of graphite to some extent, the enumeration of the most prominent mines of this kind only seems of importance. Thus the Borrowdale Mine, in Cumberland, which yielded during the sixteenth and seventeenth centuries an annual revenue of £40,000, and remained during that period the only producer, placed only 45 tons on the market in a recent year. The product from this mine was formerly considered as the best material for manufacturing pencils, and it was worked only for a few weeks in the year, for fear of exhausting the deposit. This diffidence in the capacity of the mine was only too well justified, for the Borrowdale Mine does not count any more with the producer of graphite at the present time,

The next graphite deposit of extraordinary size—having since its discovery become famous owing to the great quantity of material stored up in it—is the Ceylon mine, which, counting all the hands at work in mining and the manufacture of articles prepared from graphite, employs 24,000 men, women and children. A great deal of the Ceylongraphite finds, however, its way to Nuremberg, Germany, where the well-known Faber pencils are prepared, and 5,500 people find employment in their manufacture. Formerly the granular variety of graphite found at Borrowdale was thought to be exclusively applicable to the manufacture of good pencils, but recently it has been found that pure material, when ground finely, then mixed with a cement, and the mass thus resulting subjected to heavy pressure, produces a good grade of merchandise. By the addition of fine clay to the ground material, any degree of hardness can be imparted to the graphite stem enclosed in the wooden part of the pencil. The recently-opened graphite deposits of Southern India are becoming of increasing importance as producers, although not, as yet, threatening the premier position of their more southern neighbour, Ceylon.

Artificial graphite having been obtained in the laboratories of chemists as a casual by-product, it was expected that a closer study of the reactions involved might lead eventually to its manufacture. This expectation, however, has not been realised until lately, for the reasons that the methods known till 1894 were almost exclusively of an expensive and impracticable nature. Of these the method of heating charcoal with molten iron, and dissolving the latter by means of acids from the mass resulting, deserves mention, for the reason that it was followed persistently with the intention of producing an artificial graphite, and that it received an unusual impetus by the introduction of the electric furnace. Henri Moissan, a French chemist, has become prominent in this regard by his experiments performed in a reverberatory electric furnace of his own invention, the apparatus having movable electrodes and allowing of continuous operation. Moissan, having investigated the graphite formed in cast iron under various conditions of temperature and pressure, found that soft iron, when mixed with an excess of carbon from sugar, and heated in a carbon crucible in the electric furnace with a current of 2,000 amperes and 60 volts for ten minutes, dissolves large quantities of carbon, and becomes so pasty that the crucible can be inverted without the contents running out. The graphite obtained from this iron ignites in oxygen at about 650°; it contains only 0.28 per cent of hydrogen, and is, therefore, much purer than graphite from ordinary cast iron. Large works are now established at Niagara Falls for the manufacture of artificial graphite by the Acheson process, the author of which is also the inventor of the artificial abrasive carborundum.—*Mechanical World.*

BRITISH FORESTRY.

Upon the Chiltern Hills, where beech is extensively grown for the furniture-makers of Wycombe, well-managed beech woods are returning five times, and in many cases six times, the annual income that the adjoining agricultural land is yielding. Mr. John Nisbet tells us in a new book. In the case of the West Wycombe estate the account books show that for over a hundred years, the annual income from the woods has been thirty shillings an acre. These are, perhaps the best results that are now obtained in any part of England. In most cases the results are very different, partly owing to want of care, but more often to want of knowledge. Forestry is a science that must be

studied, and an art that must be practised as much as medicine or surgery. Dr. Nisbet mentions a case of a landowner who, even under his present system of management, is getting more than £1,000 a year out of his woods and who pays his forester fifteen shillings a week. This means that a capital of over thirty thousand pounds in timber is being administered by a man of no education at a wage of £39 7s 6d a year; yet the scope for increasing the capital value and the annual yield must be enormous:—

“It can hardly be denied that British landowners as a class, are decidedly apathetic with regard to forestry. So far as game preservation is antagonistic to good management of the woodlands, that matter has been fully dealt with in the last chapter. Other three causes, perhaps in some cases equally powerful in this direction, are want of funds, want of encouragement offered by the State to induce landowners to plant waste land, and danger of fires along railway lines..... As most landowners have merely a life interest in their estates, and as the calls on their purse are many (beginning with the heavy demand on succession), they have not, as a rule, much money to spare for forming plantations which are only likely to yield substantial returns after their individual tenure of the estate is at an end.”

“As matters are, our woods and forests now only aggregate about three million acres, and are so inadequate for the supply of existing requirements in timber and other woodland produce, that our imports under these heads amounted to the enormous sum of over twenty-five and a third million pounds sterling during 1899. Of this, over five million pounds were for rough-hewn and over sixteen million pounds for sawn or dressed timber, practically all of it coniferous timber from the Baltic, Scandinavia, and Canada, which might quite well be grown in the British Isles. Making a liberal deduction for the value of labour included in these coniferous imports aggregating over twenty-one million pounds, the undeniable fact is laid bare that Britain annually pays, and principally to foreign countries, no less than between eighteen and nineteen million pound sterling for pines and fir timber, which could quite well be grown in Great Britain and Ireland. There are some sixteen million acres, now practically unproductive, available for this purpose; and if our existing woods and forests were managed on business principles, and State encouragement were given for making large plantations under economical management, Britain might in the future be self-supporting as to all the coniferous wood required for building purposes..... If our present three million acres of woodlands were trebled in extent, and were well managed on business principles, in place of being under uneconomic management as game coverts and pleasure grounds as is now mostly the case with British forests, this would merely be able to supply existing requirements, and no more. Nay, even if we had twelve million acres under forest, and all under the best of management, they would probably be just about able to supply the demand for timber likely to exist at the time plantations now formed may become mature. Past experience has shown that the demands for timber are constantly increasing, despite the more extensive use of substitutes like iron and stone for constructive purposes.”

CINCHONA.—The N. V. Vriesseveem cinchona-bark department at Amsterdam report the shipments from Java from August 21 to September 24, 1900, at 1,249,000, Amst. lb., and the total from January 1 to September 24 at 6,450,408 Amst. lb. The exports from Ceylon for the week ending September 3 were 270 lb. only.—*Chemist and Druggist, Sept. 29.*

OUR PEARL FISHERIES.

We are specially gratified to find that His Excellency the Governor and Mr. Chamberlain have dealt so promptly with Sir Wm. Twynnam's special Report on the Pearl Fisheries, and that the result is to secure so long and useful a Report from the Director of the Natural History Department of the British Museum. The whole Correspondence will be found elsewhere. Professor Ray Lankester, as is natural, rather magnifies the "mission" which he recommends should be taken up; and while we concede its importance, we cannot see why a Scientist who would be allowed to continue his four months' professorial work in England, each year, should, besides all expenses, have so handsome an allowance as £1,000 a year, considering the local staff that would inevitably be necessary. Still, if the desired work could be accomplished within three years, this amount should not be grudged to a first-class man, and we should suppose that Professor Herdman of Liverpool (whom we met in the Isle of Man four years ago when he was leading a section of the British Association) stands in the very first rank, having given special attention to oysters and oyster fisheries. We are a little disappointed that no reference is made to Professor Saville Kent, who has done so much valuable work around the Australian coasts on the fisheries, including those of oysters for pearl shells and pearls, and also has published (at three guineas a copy) a very elaborate, illustrated volume with the results of his labours. But, of course, Professor Herdman must be acquainted with all that has been attained in that direction. It is especially encouraging to learn from Professor Lankester that Mr. Holdsworth who came out for five years during the administration of Sir Hercules Robinson was *not* the right man in the right place, since he was not a trained Scientist, but only acquainted with sea-fishing as a sportsman! (Those were assuredly the days when "jobs" were freely perpetrated by the Colonial Office and Sir Hercules Robinson had his full share of them, e.g. when he wanted a trained expert to reform and supervise the Prisons of the Colony, a retired R. N. Captain, son of a peer, was sent out to him!) Dr. Lankester would have emphasised his opinion as to the utter failure of the "Holdsworth" Mission, had he recalled the fact that that gentleman never had the good fortune to witness a Pearl Fishery while in Ceylon! We therefore sincerely hope that the Council of the Royal Society may recommend, and the Government appoint, Professor Herdman, F.R.S., (or Professor Saville Kent) to come to Ceylon on a Three Years' Mission, and we only trust that the four months' Professorial duty at Liverpool may not clash with the best period of the year—February to May—for inspecting and working on our Pearl Oyster Banks. It is of special importance that the Scientist, whoever he may be, should have the practical help, and the benefit of all the vast experience, of Capt. Donnan, while Sir Wm. Twynnam can also

be referred to on moot points. Under these auspices we should certainly anticipate valuable practical results from such a Mission as Professor Ray Lankester recommends and we hope it may be arranged for in time for the approaching working season at the Pearl Banks:—February-May, 1901.

MALIGNED MOSQUITOS.

THEY WERE NOT MADE TO PREY ON HUMAN BEINGS.

Some interesting information about mosquitos has been recently issued by the United States Department of Agriculture. It is not much consolation to those who are subject to the irritating attacks of these insects to know that in the opinion of Dr. Howard, the entomologist, the mosquito was not made to prey on human beings or any other warm-blooded animal. The fact remains that he does it. Besides being a nuisance the mosquito delights in intoxicating beverages. A male mosquito has been observed sipping beer, and a number of them—again males, be it noted—placed under a bell jar with a single drop of port wine became hopelessly intoxicated staggering about in a ridiculous manner.

It is only fair to the mosquito to say that the latter was an experiment by Prof. A E Schwartz. There are bad mosquitos and those that are worse. But the worst of all seem to belong to a part of America (unnamed) where some soldiers were forced to sleep with their heads thrust into holes in the earth and their necks wrapped round with their hammocks. It is comforting to know that mosquitos cannot fly long distances though they may be carried 15 miles by a strong wind. This at least keeps them to circumscribed areas.

Numerous methods of combating and destroying these pests are mentioned such as pouring kerosene over marshy districts where they breed, the placing of carp in these marshes to destroy their eggs. In New Jersey a primitive but effective system is in vogue. A baking-powder box is nailed on the top of a long stick and some kerosene poured in. The merry householder then scans the ceiling and pushes the cup under the resting mosquito into which it soon falls—a victim of the Standard Oil Trust.—*Morning Leader*, Sept. 21.

ELEPHANTS IN MADRAS.

Twenty-five elephants were captured in the Madras Presidency during the year ending the 30th June last, which is the largest catch on record. Of these, six died, and of the 25 captures, 18 were in North Malabar. All the five elephants captured in South Coimbatore died, owing, it is said, to the extreme heat and want of suitable fodder consequent on the prolonged drought on the Anamalais. Besides elephants, 23 bison, 1 pig, 1 bear, 19 sambhur, 1 tiger and 1 wild sheep also fell into the pits. Of these, 8 died or were shot, while the rest either escaped or were released. One of the men engaged in shooting the bear accidentally fell into the pit, and was so badly mangled that he died soon afterwards.—*Madras Mail*, Oct. 12.

PRODUCE AND PLANTING.

REGULATING SUPPLIES.—We regret to learn that owing to a want of unanimity the committee of the Indian Tea Association has resolved that it is not practicable this season to continue the arrangements for regulating the quantity of tea to be brought forward weekly, and therefore the responsibility will rest upon the brokers to advise their respective merchants as to selling or holding back supplies.

THE RUSSIAN TEA MARKET.—According to the Customs returns, the remarkable features in the import trade of Odessa in 1899 are the increased demand for Ceylon and China teas, which attained the high figure of 7,500,000 lb.—a substantial advance of about 1,000,000 lb. over 1898—and for coal, of which the importation has been nearly quintupled; that is, from 32,480 tons in 1898 to 160,200 tons in 1899. Ceylon tea is consumed in increasing quantities, and is competing favourably with China teas. Japanese tea has been introduced, but does not suit Russian tastes, and cannot compete with Ceylon teas, either in quality or in price. The bulk of the tea imported into Odessa passes in transit to Moscow and other towns. The trouble in China will, it is feared, affect this trade, as the vessels of the Volunteer Fleet, which carry tea at preferential rates of freight, are at present engaged as Government transports, and in many instances have already declined cargo from merchants.

INDIAN TEA ASSOCIATION, (LONDON).

A meeting of the Committee was held on the 25th instant, when the following members were present:—Messrs. D Cruickshank (in the chair), G.W. Christison, J S Hulbert, F A Roberts, J N Stuart, and A G Stanton.

WORK IN AMERICA.—A proposal to divert a portion of the funds towards advertising green tea in Canada was not agreed to, no green tea being yet available.

WORK ON THE CONTINENT.—A letter from Mr. J M Harrington, dated 22nd instant, with reference to certain tea rooms in Rome, was read, and the Committee resolved, before granting a subsidy, to await further particulars regarding the same.

ERNEST TYE, Secretary.

—*Home and Colonial Mail*, Sept. 28.

COCONUT MILK.

The Colonial Museum at Haarlem, in its annual report recently published, has raised, at the request of an old planter, the question whether a market could be created for preserved coconut milk. As thousands of tons of dried coconut (coprah) are annually shipped, the milk of which is thrown away when collecting the kernels, hundreds of gallons of coconut milk are wasted for want of a proper method of preserving this refreshing beverage. It has been suggested that by adding a slight quantity of silicic acid the fresh milk in air-tight bottles would prove to retain its qualities, so much appreciated in Southern countries.—*Sells' Commercial Intelligence*.

THE WINTER RICE CROP IN BENGAL.

From the preliminary forecast of the winter rice crop of Bengal for the year 1900 which has been issued we extract as follows:—

The Provincial total of the normal area under winter rice now stands at 31,023,000 acres against 31,076,400 acres shown in the final forecast of the preceding year. The area sown with winter rice this year is estimated at 28,883,300 acres against 31,344,700 acres in 1899. On the whole, the season has not been altogether favourable for the winter rice crop.

According to the estimates made by the District Officers, the outturn of the winter rice crop this year for the Province, as a whole will amount to 87 per cent of a normal crop, as compared with 90 per cent as finally estimated last year.—*Pioneer*, Oct. 11.

THE CONSOLIDATED ESTATES COMPANY, LTD.

Ninth Annual Report of the General Managers submitted to the Shareholders at the General Meeting held at 34, Great St. Helens, E.C., on Wednesday, the 3rd October 1900, at 11-30 a.m.

The General Managers have the pleasure to submit their ninth annual report and balance sheet, together with statement of accounts for the crop year ending 30th June, 1900.

The profit and loss account shows a balance (including £671 6s. 6d. brought forward from last year) of £7,101 18s. 7d. after paying interest on the debentures, and an interim dividend of 4 per cent on the preferred shares.

Out of this sum the General Managers propose—

| | |
|--|-------------|
| To pay a balance dividend of 4 per cent on the preferred shares making 8 per cent for the whole year, which will absorb .. | £1,480 0 0 |
| *To set aside for redemption of 5 per cent of the debentures at 103 | 2,575 0 0 |
| To pay a dividend of 5 per cent on the ordinary shares, requiring .. | 1,950 0 0 |
| To place to Reserve Fund .. | 500 0 0 |
| Carrying forward the balance, viz.: | 596 18 7 |
| | £7,101 18 7 |

The following shows the result of the year's working, viz.:

| NET PROCEEDS OF CROP. | | | | |
|--|--------|-------|--------|-------|
| 1,651,410 lb. tea at an average net price of about | £ | s. d. | £ | s. d. |
| 5 15-16d per lb. realised .. | 40,742 | 11 1 | | |
| Cocoa, Cardamoms, Cinchona Bark, and Cinna- | | | | |
| mon .. | 1,266 | 16 1 | | |
| Surplus on produce brought forward from 1898-9 .. | 110 | 9 6 | | |
| Interest account .. | 188 | 6 8 | | |
| | | | 42,308 | 3 4 |

EXPENDITURE ON ESTATES.

| | | | | |
|--|---------|------|---------|-------|
| Messrs. George Stenart & Co.'s drafts— | | | | |
| R449,584 at an average of 1/4 31-64 per rupee .. | £30,885 | 6 8 | | |
| Less—Balance of coast advances | 423 | 16 4 | | |
| | | | 30,461 | 10 4 |
| Bonus to Superintendents | | | | |
| —R8,250 @ 1/4 1-32 .. | 551 | 1 6 | | |
| | | | 31,012 | 11 10 |
| | | | £11,295 | 11 |

The past season in Ceylon has been very favourable for the flushing of tea, and this fact combined with the good effects of liberal manuring, and a system of somewhat coarser pulking on some of the Company's Estates, has resulted in a large increase in the intake of Tea: the total crops amounting to 1,651,410 lb. against an Estimate of 1,326,000 lb. Unfortunately however this increase of the crops has been more than counteracted by a further fall in the price of tea and the rise in Exchange, but owing to some economies in the cost of production, the net result of the season's working is about the same as that of last year.

Exchange has again been rather more unfavourable to the Company, the average cost of the Rupee having been 1s 4 31-64 (for drafts at three months' sight) against 1s 4-11-32 for similar drafts last year. The rate now current is, however, only 1s 4 5-16d.

* By the Articles of Association it is provided that five per cent of the Debentures must be redeemed before any Dividend can be paid on the Ordinary Shares.

No new properties have been acquired since the date of the last Annual Report, and the total acreage of the Company's Estates remains the same. The following statement shows how this acreage is distributed. A slight error in the acreage of the Sorana Estate in the last Annual Report is now corrected.

| Name of Estate. | Ceylon District. | Tea Full Bear'g. | Tea partial bear'g. | Tea Recently Planted. | Reserve Suitable for Tea. | Other Products, Grass, Waste, Water, &c. | Total Acreage. |
|-----------------|------------------|------------------|---------------------|-----------------------|---------------------------|--|----------------|
| Wattegodde | Dimbula | 800 | Nil | 25 | Nil | 70 | 895 |
| Hoonocotua | Kotmale | 560 | 25 | 15 | 45 | 117 | 762 |
| Tallagalla | Kalutara | 515 | Nil | 102 | 60 | 23 | 700 |
| Ellagalla | Matale | 223 | 8 | 9 | 33 | 167 | 445 |
| Rutland | Hewaheta | 443 | 6 | 70 | 85 | 59 | 663 |
| Warrigalla | Nilambe | 493 | 61 | 26 | 57 | 624 | 1,261 |
| Sorana | Kalutara | 263 | 158 | 125 | 81 | 131 | 758 |

3,297 258 372 366* 1,191 5,484

The capital expenditure for the purposes indicated in the last annual report which was estimated at £3,000, actually amounted to £3,012 5s. 0d. thus bringing the total amount at debit of the Factory and extension account to £4,333 13s. 6d., while for next season the expenditure on this account is estimated at about £1,800 (chiefly for the extension of the factory at Warrigalla to provide for the increased intake of leaf on that estate) which would increase the debit balance to a little over £6,000. To provide for this, and further requirements of the same nature, it is proposed at the end of this year to make a small issue of shares and debentures, full particulars of which will be given in two or three months' time. The issue will in the first instance be offered on favourable terms to the shareholders then on the Register.

A tabulated statement accompanies this report showing the progress of the Company since its commencement, which it is hoped will be found interesting to the shareholders. They will see that notwithstanding the fall in the price of tea and the rise in exchange, the Company has been able to hold its own fairly well, chiefly owing to the gradual increase of crops arising from the extension of cultivation, and the General Managers recommend a continuation of the policy of such extension, provided the necessary additional capital is forthcoming.

The Estimates for the New Season have been carefully framed, and are as follows:—

| | Expenditure. | Tea Crop. |
|------------|--------------|-----------|
| | R. | lb. |
| Wattegodde | 107,916 | 400,000 |
| Hoonocotua | 73,044 | 260,000 |
| Ellagalla | 32,723 | 110,000 |
| Tallagalla | 59,599 | 230,000 |
| Warrigalla | 63,653 | 230,000 |
| Rutland | 63,502 | 220,000 |
| Sorana | 57,486 | 230,000 |

Totals R457,923 @ 1/4³ = £31,243 14s 0d 1,680,000

Also about 25,000 lb. of Cinchona from Rutland, 7,500 lb. Cardamoms, and 1,680 lb. Cocoa from Warrigalla, and 15,000 lb. Cinnamon from Sorana; the value of the whole of such products being estimated at about £1,500.

The Ceylon Agents report that the Company's Estates are in good order and appearance and that the Tea seems remarkably free from pests and blight, though the latter has given some trouble on Tallagalla. Samples of the soil from this Estate have been sent home and subjected to a careful chemical analysis with a view to ascertain the most suitable manures to strengthen the soil and thus enable the bushes to throw off the blight. The recommenda-

* Of which 299 acres are planted with Cardamoms, Cocoa and Cinnamon.

tions of an eminent Agricultural Chemist are being carefully carried out and there seems to be every hope of their proving successful.

The General Manager have pleasure in informing the Shareholders that as the result of continued agitation on the part of Importers, the Wharfingers have consented to reduce their charges on tea by an additional 10 per cent. all round to take effect on all shipments that arrived after 1st July. This concession will result in a saving to the Company of about £200 per annum.

ARBUTHNOT, LATHAM & Co.,
General Managers.

RATWATTA COCOA COMPANY
(CEYLON).

The following is the report of the Directors submitted at the annual meeting held in the Queen's Hotel, Kandy, last month:—

THE DIRECTOR'S REPORT.

The Directors beg to submit their report and statement of accounts for the season ended 30th June, 1900.

The Directors regret to have to report that the original estimate of 300 cwts. cocoa has not been secured; this is attributable to the drought during the early months of the year.

The total cocoa crop secured amounted to 208 cwts. 2 qrs. 1 lb. which sold at an average of a little over R43 per cwt.

The tea crop including 1,520 lb. made from bought leaf amounted to 53,510 lb., against an estimate of 50,000 lb., which sold for an average of 30.57 cents per lb. against an average of a little over 33½ cents the previous year.

On the year's working the crop bearing portion of the estate shows a profit of R5,320.65, which has been carried to credit of profit and loss account.

The present appearance of the cocoa is very satisfactory; no sign of disease and the trees looking healthy and vigorous.

The prospects for the coming season for cocoa seem to be favourable, fine blossoms have for the most part set well.

Now that the young tea clearings are coming into bearing, the returns of leaf should show a marked increase annually for some time to come.

The estimate of cocoa for the coming year is 400 cwts., and that of tea 75000 lb. together with 6,000 lb. made from bought leaf against an expenditure of R33,807.50.

The following is a definition of the Company's property as at 30th June:—

| | A. | R. | P. |
|------------------------------|------------------|-----|--------|
| Cocoa planted 1893 | 72 | 1 | 2 |
| Do do 1894 | 85 | 0 | 29 |
| Do do 1895 | 65 | 2 | 07 |
| | -----223 0 19 | | |
| Tea planted 1890 (and Cocoa) | 118 | 3 | 27 |
| Do do 1896 | 4 | 0 | 00 |
| Do do 1897 | 99 | 3 | 27 |
| Do do 1898 | 75 | 0 | 00 |
| | -----317 3 14 | | |
| Grass | .. | .. | 3 0 00 |
| | ----- | | |
| Jungle | Total cultivated | 543 | 3 33 |
| | .. | 181 | 0 00 |
| | ----- | | |
| | Total acreage | 724 | 3 33 |

During Mr. Gordon Pyper's temporary absence from the island Mr. T C Huxley is undertaking the duties of Managing Director.

Under the articles of association Messrs. T C Huxley and A Collingwood Small retire from the Directorate by rotation, but are eligible for re-election.

An Auditor has to be appointed for the current year. The appointment rests with the meeting.

PLANTING NOTES.

"FIRE INSURANCE TARIFF ON TEA GARDENS BUILDINGS."—It will be observed from extracts in our daily that the Committee of the Indian Tea Association in Calcutta have been considering "excessive rates" fixed for various buildings; and a Sub-Committee is appointed to report. Should not the Ceylon Planters' Association cooperate and work in unison with the Calcutta body in this matter?

"INDIAN AND CEYLON TEA"—is the heading of an article in the *Investors' Review*, which we take over in our daily and *T.A.* It contains some interesting facts and figures and offers encouragement to persevere with the American and Continental campaigns. We see the Indian planters look to Mr. Harrington to tour through Europe and report on the best steps for pushing their teas. Home consumption keeps up; but the war tax is strongly condemned.

THE BANANA A MORAL EVIL.—According to the report of Sir H. Johnston, we may congratulate ourselves upon the fact that the banana does not grow in England. The idleness and vacuity of the lives of the natives in Uganda are, according to him, entirely due to this plant. It practically grows itself, and once it is planted no trouble need be taken about it whatever. The tree grows up, bears a couple of bunches of fruit, and dies down again in rather less than a year. However, it throws up shoot after shoot from an underground rhizome, and these in their turn grow up into trees and bear fruit. A banana tree planted seems to go on for ever, and the only thing its grower has to do is to pick the fruit. —*Mail paper.*

"FLIMSY MICA."—This is the name that has fallen to the thin films into which refuse mica plates are split—says an Indian contemporary—and which find a market, even though classed as "waste." The thin films of mica are used in the preparation of micanite, an American new patent, which serves as a cheap substitute for mica slabs of large sizes and is used largely in connection with electrical machinery. The films are laid out by hand with a special gum cement between each layer and when sufficiently thickly built up they are subjected to enormous pressure under heat and when cold retain the cohesion of natural slabs of mica. Mica is a great resistant of heat, and it has also been suggested that mica "waste" might be used to advantage for overlaying the roofs of houses in hot countries. The trade in "flimsy" mica is in its infancy and the prices realised seem to vary considerably with reference to colour, size and thickness, so that it is by no means easy to fix an average value for the purpose of calculating the Government royalty, which is 5 per cent. *ad valorem*, and an inquiry on the subject has been dealt with by the Board of Revenue. As a tentative measure the Board resolves to fix the valuation of "flimsy" mica, at the rate of 6 annas per lb. for spotted, cloudy and lined mica; and of 10 annas per lb. for clear mica. The rates now prescribed will be subject to revision at the end of a year in the light of the experience which may be gained during the interval.

INDIAN COOLIES FOR FIJI.—The ship *Rhine* arrived, from Calcutta, on Thursday, with 492 coolie immigrants, after a prolonged voyage of ninety days. This is the fourth and last vessel due to arrive from India, this year. The number of passengers brought by the four vessels total some 2,000, while the departures amount to about 400—an addition to the coolie population of 1,600 people.—*Fiji Times*, Sept. 1.

CLOVES AND SLAVERY.—As all the world knows, it receives its supply of Cloves from the islands of Zanzibar and Pemba; the yield last year was 570,600 frasilas, or, at 35 pounds to the frasila, equal to 19,971,000 pounds! This is the largest crop ever reported, and was 8,061,259 in excess of that of the preceding year. Notwithstanding this produce, however, the plantations are not being cultivated as they ought to be—a falling-off in this respect having become noted over since the edict abolishing slavery was promulgated in 1897. Nature has been very bountiful, but she must be assisted more by free labour than appears likely to be given by those "coloured persons" who find laziness more congenial to their feelings than moderately hard work. Attempts are made by means of fair wages to get work out of the emancipated slave; he is also tempted by free grants of land in exchange for a certain supply of labour, but the bait does not appear to take freely. Some effort has been made to raise crops other than Cloves, but the results are unsatisfactory. Only time and every judicious management of the native workers rescued from slavery can be trusted to retain for the Sultanate that celebrity it so long enjoyed by the aid of slavery.—*Gardiners' Chronicle.*

RUBBER PLANTING IN TOBAGO.—We direct the notice of our planting readers to the letter of Mr. Short, a Tobago planter, on the growing of rubber in the West Indian island. The reports of *Castilloa* growth in Tobago are encouraging, and in reply to Mr. Short we may refer him—on the point of obtaining rubber from seedlings—to the process of a French rubber-planter in the Far East, which was recently recorded in our *Tropical Agriculturist*. In the case referred to the whole plant, bark and all, was taken and rubber extracted in paying bulk. We expect to hear more of the process, and how far it has been successful, before very long. The results will be duly published in our *Tropical Agriculturist*. If proved successful, we see no objection to the close planting, suggested by Mr. Short—except in so far as it is likely to hinder the rapid growth which would be the main object of such cultivation as our correspondent would then carry on.

SALE OF QUININE IN BURMA.—The Sanitary Commissioner of Burma says the scheme for the sale of quinine by post-offices in the interior of the province does not appear to have achieved much success. The Burman villager is said not to appreciate quinine, and though some are willing to use the drug if given to them, yet few wish to buy it and prefer their own remedies. In some instances deputy-commissioners report that the use of the drug is unpopular, and recommend that the scheme should be given up altogether. The sale of quinine-powders by post-office subordinates increased from 547 packets in 1896 to 1,527 issued in 1899, but the number issued to other offices decreased from 1,553 issued in 1897 to 998 issued in 1899. In Burma, where post-offices are so few, the dissemination of quinine among the outlying villages is dependent mainly on the district officers, who take little interest in the matter.—*Chemist and Druggist*

"HUNTING" AND PLANTING IN CEYLON BY THE LATE G. A. CRUWELL.

A LEAF FROM THE PAST.

Turning over old papers we have come across some manuscript in the handwriting of the late Mr. Cruwell, which is well worth giving to our readers even now. Mr. Cruwell was a great hunter in his day:—

Of course there are drawbacks to hunting as well as to billiards, card-playing, horse-racing, and other sports—and not only drawbacks, but dangers. Who does not recollect the fate of the unfortunate young German in Maskeliya, who was

KILLED BY A BUCK-ELK AT BAY

striking the hunter's knife into the heart of the inexperienced young hunter. Mr. F— in Nuwara Eliya narrowly escaped a similar fate. Something of the same nature occurred in Haputale when a party of planters proceeded to Wellanwutte for a few days' hunting. They had to cross a swollen river over the log of a fallen tree. To enable their baggage coolies to do so, they had provided themselves with a rope to be stretched across for the coolies to hold on by. When clearing the brushwood on the opposite side one of the party fell into the river. The next moment the planter who was clearing the brushwood had him by the collar and tried to pull him out, but not being strong enough the poor fellow, who had fallen into the river, fell in a second time, and before any further assistance could be rendered he

FELL ON THE OTHER'S HUNTING KNIFE

which penetrated within a hundredth part of an inch of his liver. He had a very narrow squeak of it and a month's confinement to his couch. This happened not far from the K— estate, and to show how fast news will travel in less than an hour, half the coolies of that estate came hurrying down to help their master, who was lying calmly under a huge tree, unable to move without experiencing agonies of pain. Dr. Moss was of the party and arrived on the scene just as W— had sewn up the wound and successfully stanching the bleeding. He (the Doctor) took the more dead than alive hunter in hand. His coolies had in the meantime constructed a litter, covered with a mattress and pillow, and after being moved into this, he was carried back to his estate. In the night a fearful thunderstorm occurred, and the lightning shattered the big tree under which poor B— had lain after the accident, all to atoms. The other members of the party wished to give up the hunt, but after consulting with the Doctor they continued their journey to Wellanwutte. The Doctor argued that the wounded man might be needlessly alarmed if the others did not proceed; and that he would be cheered to a certain extent if he saw his friends indifferent about him. The sequel proved the Doctor to have been right.

On a recent occasion another young fellow, also of the same estate, when out pig-hunting, had a finger of the left hand smashed and had to submit to an amputation. A few years ago there was a YOUNG PLANTER KILLED BY HIS COMPANION who mistook him for a red-deer.

Hunting is especially an amusement to the man who cannot shoot and who cannot ride, and to whom his hunting-knife and spear are sufficient weapons. True there are some who combine all three accomplishments, but who that knew poor dear James MacDonald will not admit that he was about the *beau idéal* of a hunter and he never carried a gun? De Monteneae was another hunter of this class.

This brings us to the "Circular" a great firm has issued to the Superintendents in its employ.

Much, indeed, is to be said on both sides. The only individual planter who, rumour says, flung the "Circular" back at the sender's head, was an able, trusted Superintendent who, by his estate books and accounts, carried his employer's approval of his conduct, but who was given to a little *penchant* for hunting and could not resist the temptation, when

THE SNIPE WERE IN SEASON,

or when he heard a deer or an elk bark, to go hunting. No doubt he made up for it; but his conscience pricked him and he resigned at once. No one can blame him, nor can anybody blame the firm which, however, did not attach any particular weight to his

HUNTING AND SHOOTING PROCLIVITIES.

Submissiveness, humility, obedience are the attributes of slaves; and we all know that "Britons never never, will be slaves." And now since the *métier* of a coffee planter is to well understand and what coolies must and can do for a day's pay, when the cost of pruning, handling, and manuring is all laid down by estimates, and when the prices realised for the coffee are satisfactory, one cannot help thinking that the great and good firm issued the "Circular" more with the intention of putting their Superintendents generally on their guard, than for any other base or tyrannical motive. Certain it is the firm would never find fault with a Superintendent who would go at early dawn with his gun for a few dogs to hunt a hare or brace of hares or may-be a red-deer or go snipe-shooting after "muster" and running home to breakfast would require no leave-asking for that. If again the Superintendent were inclined to go for a week's hunting or shooting in the low-country, he ought to write to the firm that he intended doing so, and that the work in hand admitted of his doing so, and can it be doubted for a moment that the firm would grant him such a holiday? Quite another thing would be going to the Jymkhana in Nuwara Eliya, in crop time; or to the Races in Colombo, in September; or to the Badulla Sports in August. For such amusements leave should be asked, "circular" or no "circular."

In other respects, as has been previously stated, the nature of the country forbids travelling through the district as a source of pleasure, except on foot; and there are very few planters fond of climbing and descending. As a rule, therefore,

THE HAPUTALE PLANTER

may be regarded more in the light of a slow fellow than in that of a fast one, often victimised by loafers from other districts, but withal a kind-hearted and obliging creature. Almost the majority are married men and the minority would soon follow suit, if they had only the chance. Card-playing is, with the exception of a quiet whist party here and there, seldom indulged in. There is a billiard table at Haldummulla, which is chiefly monopolised by the few Europeans of that station and perhaps by a traveller passing through. There was often made an attempt at a Club; but it always sooner or later collapsed.

RICE-GROWING; A NEW COMPANY REGISTERED.

A new Company has been registered at the office of the Registrar of Joint Stock Companies, under the name of the Walaway Estate Co., Ltd., for purchasing, leasing or acquiring Walaway Estate situated at Ambalantota, and for carrying on cultivation in paddy and tea, for manufacturing copra, coconut oil, &c., and to carry on business as bankers, storekeepers and shipping agents. The nominal capital of the Company

to be R125,000, consisting of 205 preference shares of R100 each carrying cumulative dividend of 8 per cent, 225 ordinary shares of R100 and 595 shares of R100 to be issued whenever found necessary. The profits, after paying cumulative dividend of 8 per cent for preference shares and 8 per cent dividend for ordinary shares, are to be divided as follows; two thirds to go to the shareholders, and one third to go to Mr. E Elliott, so long as he manages the business of the Company. The following have signed the articles of Association purchasing one share each:—Messrs. H Creasy, G H Alston, G W Carlyon, A Thomson, W H Figg, R E Shaw and Whittall and Co.

CHAULMOOGRA OIL AND ITS VIRTUES.

We have to acknowledge the receipt of an interesting and valuable monograph on Chaulmoogra Oil by Dr. G. Desprez of Paris.* The value of this oil, in the treatment of various skin diseases, but especially of Leprosy known to India and China for centuries, has been sufficiently recognised by its inclusion among the standard drugs of the Indian Pharmacopœia since 1868 and of the British Pharmacopœia since 1884. But what is not so well known is that the pure oil, from which alone the best therapeutic effects are obtainable, is hardly to be procured, unless it is specially extracted from the genuine seeds, which are themselves not easily distinguishable from allied species. It is in the original researches made in this direction, (for which he has been highly complimented by Dr. Prain, the Superintendent of Botanic Gardens, Calcutta) more perhaps even than in the valuable compilation of clinical cases from various sources illustrating the value of the oil in Leprosy, Syphilis, Tuberculosis, etc. that Dr. Desprez's pamphlet will be appreciated by medical men in the East. It is possible that a full translation of the monograph may be read before the local Medical Association shortly, and we may hope that some information will be given as to the cultivation of the plant yielding the genuine seeds.

RUBBER IN EQUATORIAL AMERICA.

M. Henri Jumelle, professor of the Faculty of Sciences at Marseilles, communicates to the *Revue des Cultures Coloniales* a letter received from M. E. Ch. Van Issehot, an Engineer of Guyaquil, in which it is stated that the production of rubber in that country is diminishing daily. The forests situated near the coast do not contain any more rubber trees and it is found necessary to search up to the forests at the foot of the Cordilleras in order to find specimens of *Jastilloa*, the destruction of which follows immediately on discovery. Rubber merchants have now commenced to search on the other side of the Cordilleras, but as it is necessary to descend again 1,000 metres (3,000 feet) into a country without roads or resources of any kind the exploitation is very different. All carriage is by porters.—*Indian Gardening and Planting*, October 11th.

* de Chaulmoogra—Études Botanique, Chimique, Pharmaceutique et Therapeutique par Georges Desprez, Docteur en-Pharmacie, Paris, J. B. Bailliere et Fils, 1900,

IMPROVEMENT OF COFFEE CULTURE

IN S. INDIA.

"Fred. D M." writes:—At the meeting of the U.P.A. S.I. held at Bangalore in August last, Mr. Gompertz, Chairman of the Shevaroy Planters' Association, suggested the introduction of the Brazilian system of coffee cultivation, which he stated is to give the tree more space for growth than it is allowed in Southern India. In the Brazil the space allowed is 12 feet between the trees, and in some instances he said even that space is exceeded, the result being better growth and development of the trees, and an average crop of 5 lb. of coffee per tree, and he estimates that the number of trees to the acre planted at 12 feet apart would be 300, whereas planting trees at 6 feet apart, as is now done in Southern India, the number per acre is 1,210. This large difference shows at once the great saving there would be in the cost of planting an acre of land by the Brazilian system—a saving probably of three-fourths or two-thirds of the present cost of cultivation—which would amount to something considerable in planting 100 acres of land. The produce of 300 trees, according to Mr. Gompertz's estimate of 5 lb. per tree, would average 12 cwt. 36 lb. per acre, which is about double the average crop produced at present from an acre of 1,200 coffee bushes. He made mention of an interesting experiment that is now being carried on on the Shevaroy by Mr. Leeming, a member of the Association, to practically test the value of the Brazilian system—for which purpose he had removed from one of his estates every other coffee bush from a lime originally planted 6 feet apart, and by that means increased the space between the bushes left in the line to 12 feet from bush to bush. The trees or bushes in the line so treated, Mr. Gompertz told the Meeting, have made luxuriant growth and are at present bearing a heavy crop—what it would average per tree it was not possible to say then, but he expected that in time it would break the Brazilian record of 5 lb. per tree.

I fully agree with the theory propounded by Mr. Gompertz, but I differ with him on one point, and that is my doubt of the dwarfed coffee bushes of the South Indian estates being capable, notwithstanding the advantages of the improved system of cultivation suggested, of producing the estimated average crop of 5 lb. per tree, in these days of leaf disease and repeated unfavourable seasons caused by drought; and it is upon the realisation of the estimated Brazilian crop of 5 lb. per tree that the advantage of the proposed change in cultivation hinges. From Mr. Gompertz's silence on the height of Brazilian coffee trees that bears 5 lb. per tree, I am led to believe that although in his remarks he mentioned *tree*, he means the ordinary 4½ feet bush grown on South Indian coffee estates. My impression is that the stunted coffee bush may, under favourable circumstances and improved cultivation, bear an average crop of about 2½ lb. per bush. It is unfortunate that Mr. Gompertz did not, when remarking upon the Brazilian system of cultivating coffee, make some allusion to the height the tree is allowed to grow there, as the quantity of crop a coffee tree is capable of bearing depends as much upon its height as upon the space allowed it for development.

There is a German method of lining for tree planting by which 500 trees to the acre could be planted at exactly 12 feet apart. By the ordinary method of lining Mr. Gompertz gets only 300 trees to the acre; consequently, many a square yard of land that goes to make up the acre is wasted, not only by the coffee but also by the tea-planter. But by the German method of lining every square yard of land of the 4,840 that go to make the acre is utilised, and, as stated above, after allowing 12 feet of space between the trees, 500 acres instead of 300 could be planted on an acre of land.—*Madras Mail*, Oct. 16.

TEA MANUFACTURE IN BAD WITHERING WEATHER.

In reply to a reference we made to Mr. A. Cooke of the Chota Nagpore Tea Company *re* certain experiments made by him in tea manufacture that gentleman sends in the following, which will be of interest to our tea planting readers:—The experiment you read in my note had nothing to do with green tea. The experiment referred to (I think) was rolling heated leaf after it had got the proper colour—this improves the twist, without spoiling the liquor much. In bad weather, when withering is impossible or imperfect, I have always rolled the leaf and allowed it to get the proper copper colour for black tea; then, instead of firing the leaf fully, I warm it and get it flaccid, and then give a final roll; after which it is fully fired and dried.

This improves the appearance wonderfully without doing any harm to the liquor. Good black tea cannot be made in this way, but the intermediate firing saves the appearance. Unwithered leaf makes awful looking tea, all chips and ragged bits, and the liquor cannot be really good, but the above plan will give a fairly good appearance and no worse liquor.

During the wet days of the late cyclone I had leaf three days old and still *krutch*, and had to roll it anyhow, or it would be in to smell bad. I rolled twice, twenty minutes each time, very lightly within a period of three hours and the leaf got a good bright colour. It was then heated and rolled again. Comparing the wet leaf in the sample cup with some ordinary tea made from well withered leaf, I found that the coppery colour was brighter, and deeper in the withered leaf and the liquor was much darker. The plan I wrote of does not obviate withering, but it minimises the loss from under-withering.—*Indian Gardening and Planting*, Oct. 11.

“PLANT SANITATION.”

MR. J. B. CARRUTHERS' LECTURE.

Mr. Carruthers was called upon by the Chairman, Mr. E. Webb, at the commencement of the meeting of the Northern Districts Planters' Association on Saturday afternoon to deliver his lecture on “Plant Sanitation” with special reference to cacao canker.

The lecturer commenced by saying that sanitation was recognised in human medicine and with animals, but was not yet recognised with regard to plants. People recognised that dead bodies should not be left lying about and other such rules and he wished to impress on them the necessity of observing the same rules as applied to plants. Plant diseases, he said, could be grouped into three or four groups. First, diseases due to environment, *i.e.*, due to want of moisture, or excess of moisture and due to too high or too low a temperature. These were neither contagious nor infectious. There were diseases caused by large animals as well as insects, such as the damage done by squirrels, *helopeltis*, red spider, etc. Those were subjects really looked after by his colleague, Mr. Green, and he thought he should not say anything about them. There was a more important disease in view of plant sanitation due to the tax of fungi and bacteria and it was in these they had to try and use sanitary measures as they were nearly all conta-

gious or infectious to describe what fungus is. The lecturer took as the best instance the mushroom consisting of the spawn or *mycelium* below the ground and the portion above the ground known as the mushroom carrying the spores of the fungus which is the reproductive part. Spores may be considered as the seeds of the fungus. The mushroom was easy to see with the naked eye, but unfortunately the fungi which grow on cultivated plants were not so easy to recognise. The lecturer then went on to say that fungi were divided into two groups, *viz.*, *Parasitic* and *Suprophytic*. *Suprophytic* fungi grow only on dead organic matter and were not so interesting to the practical man as they did no damage to cultivated plants. The *Parasitic* fungi were most important to cultivators as they caused much damage and were fatal to cultivated plants. He then went on to say that of the *Parasitic fungi* one that interested them most was the cacao canker which he explained to the meeting by means of pictures. With cacao canker as in other fungi when the planter first observed it and wrote to him (the lecturer) or any other such worker saying that the disease had just broken out, it had probably been in the tissues of the plant for months or perhaps years. The way the planter generally noticed it was by the production of the fruits of the fungus, but that only meant that the fungus had been in the bark a long time before producing its spores just as a flowering plant grew some time before producing its fruit. It was very important for planters to learn to recognise this in their earliest stages. The cacao canker could be recognised in its earliest stages by the discoloration of the bark and *canbrium*. The colours were different, from a yellowish tint to dark claret colour. This discoloration was due to the presence in the tissues of the spawn or *mycelium* of the fungus *nectria*. His experience had shewn him that when this spawn had been in the tissues for some varying time from ten days to a year, the spores were produced and they were to be noticed as whitish with yellow or pink tint masses coming through the bark. The lecturer then shewed pictures of the canker. Inside those masses were found, if magnified with a microscope, spores of two kinds, and those spores, if they lighted on any other cacao tree, and in the presence of moisture, would cause a second patch of canker. The only thing necessary for the germination of those spores were heat and moisture. There was always sufficient heat in Ceylon, and during a good many months of the year there was sufficient moisture. The first spore was more or less egg-shaped and the size could best be understood by saying that a layer of five millions covered a ten-cent piece. Almost simultaneously, or a little later, there were formed a larger spore crescent-shaped, having five divisions.

He then explained how the spores began to grow in presence of moisture. After those white masses had been formed, a careful observer would see some minute red bodies forced through the white masses but that did not occur until the portion of the cacao tree was dead. Those red bodies, each about the size of a pin's head, were seen in clusters containing another form of the fungus. On opening one of the red bodies he said there would be found a number of transparent bags or sacks, each containing eight spores, technically called *asco spores*; while the spores previously mentioned were called *gonodia* spores. The *asco spores* were fitted to carry the fungus

over a period of drought and it was probable that they could remain without growing, yet retaining their vitality for months, probably years. The *gonodia* spores were fitted to quickly spread the fungus while damp conditions prevailed. Unfortunately this fungus did not live only in the bark of the tree, it was found and only too commonly on the pods and its life history on the pods was the same as previously described except that the time taken to produce all its spores was very much less. On the pod the whole life history could be gone through within under 10 days, whereas the same number of months only sufficed when it grew on the bark. The canker on the pods was very important as it reduced the crop and it was still more important as it was the chief means of spreading the disease because of the rapidity the fungus could grow in the softer tissues on the pod. With regard to rules for combating this and other diseases, in the first place it was perfectly clear that all spore masses as far as possible should be destroyed by burning and it was impossible to too strongly insist upon the fundamental importance of that measure. The lecturer then mentioned an instance of a small native holding not far from Kandy, which he visited recently on his way to an estate. He went to the holding and on examination found over 100 dead trees covered from top to bottom with spores, many others dying and the whole place practically a spore farm. Unfortunately there was no Ordinance in Ceylon to compel owners to reduce danger of infection and it would be a matter of importance to planters to consider whether they could not arrange some means of getting such spore farms treated on sanitary principles.

At the conclusion of the lecture, Mr. CARRUTHERS, in answer to some strongly expressed views of Mr. Chas. Gibbon, deprecated the views widely held by planters that there was any special predisposition of the cacao tree to take the canker. The lecturer pointed out that all views of that kind should be rigidly tested by carefully conducted experiments. In his experience healthy cacao trees were quite as liable as sickly ones to take infection nor did manuring enable a plant to "throw off" the disease. This opinion was very common among horticulturists and farmers, but in the majority of cases of fungal disease it had no foundation.

Mr. GIBBON referred to the reported remark of Mr. Arden that cacao would cease to be cultivated owing to the canker.

Mr. CARRUTHERS in reply said that Mr. Arden, who was undoubtedly competent in horticultural matters, had stated his views on insufficient evidence having visited one estate and that badly cankered but from his (the lecturer's) knowledge of large areas of cacao, if care was used and money spent, the effects of the disease could be reduced so that cacao might be grown to a profit and might go on and increase.

The CHAIRMAN, Mr. WEBB, proposed a vote of thanks to Mr. Carruthers for his able lecture which was carried with acclamation.—*Kandy Cor.*

HOME-MADE GUANO OF UNEQUALLED EXCELLENCE.

Save all your fowl manure from sun, and rain. To prepare it for use, spread a layer of dry swamp muck (the blacker it is the better) on your barn floor, and dump on it the whole of your fowl

manure; beat it into a fine powder with the back of your spade; this done, add hard wood ashes and plaster (gypsum), so that the compound shall be composed of the following portions:—

Dried muck 3 bushels
Fowl manure, 2 bushels
Ashes, 1 bushel
Plaster, 1½ bushel

Mix thoroughly and spare no labour; for in this matter the elbow-grease expended will be well paid for. A little before planting moisten the heap with water or, better still, with urine, cover well over with old mats, and let it lie till wanted for use. Apply it to beans, corn, or potatoes at the rate of a handful to a hill, and mix with the soil before dropping the seed. This will be found the best substitute for guano ever invented, and may be depended on for bringing great crops of turnips, corn, potatoes, etc.—*Queensland Country Life*, Sept. 22.

PLANTING IN DOMINICA.

(To the Editor of the *Times*.)

SIR,—The very interesting account given in the *Times* of today by Mr. H. Hesketh Bell as to the capabilities of Dominica applies to most of the West India islands. As head of the Jamaica Botanical Department for long period of years I cordially endorse Mr. Bell's sympathetic declarations as to the latent resources of these islands—resources which are unsurpassed with regard to most of the cultures to which he has directed attention.

I shall not trespass on your space further than to say that Dominica, with which I am acquainted, presents peculiarly attractive conditions to young English adventurers to embark upon most of the cultures indicated by Mr. Bell. It may be further stated that it would be impossible to render a great service to hundreds of young well-to-do Englishmen than to recommend them to turn their energies to this most interesting feature of colonial life.—Yours obedient servant,
ROBERT THOMSON.

Grass Mount, Queen's-road, Forest-hill, Sept. 20.
—*London Times*, Sept. 25.

SULPHATE OF AMMONIA OR SALT-PETRE AS TEA MANURE.

With reference to what has already appeared *re* Sulphate of Ammonia as a Manure for Tea, Messrs. Freudenberg & Co. have now placed at our disposal the letter of another German authority, Professor Stutzer of the Government Research Station at Königsberg, who has taken a great interest in Scientific Manuring in general and Manuring of Tropical Plants in particular. The following is a copy of the letter referred to;—

"I have to acknowledge receipt of your letter of 21st August. Sulphate of Ammonia is an excellent nitrogenous fertiliser and there is no reason why it should be discredited in the cultivation of Tea. In Europe Sulphate of Ammonia has, of late, gained considerably in favor compared to Saltpetre and rightly so; the unit Nitrogen in the form of Sulphate of Ammonia now commands a much higher figure than that in the form of Saltpetre. Whether this is, in every case correct I should not like to maintain, I only mention it to show that our farmers fully appreciate the value of Sulphate of Ammonia.

There is no reason why Sulphate of Ammonia as a fertiliser should be discontinued in a Tropical Climate; it can be applied to Tea as well as to any other perennial. That it ought not to be applied by itself, but along with others Manures, supplying Phosphoric Acid and Potash, goes without saying."

VANILLA IN CEYLON.

A NEW PRODUCT—AS AN ADJUNCT TO TEA.

WE commend the following practical remarks to the attention of planters up to 2,000, 3,000 and in some climates even 3,500 feet above sea-level. To have two or three acres of vanilla netting R1,000 per acre is an addition to an estate's income, not to be despised:—

(By an experienced Planter.)

GIVEN a favorable season, vanilla cultivation—at the present price of the staple—is a most lucrative one, but the plant is keenly susceptible to climatic influences in its cropping.

An acre of vanilla, properly planted, can easily give 200lb of prepared pods, its present market value in Mauritius is R19 per lb.

In Madagascar, Bourbon, Mauritius and Seychelles it is subject to a disease which sometimes completely wipes out the vanilleries; but the inhabitants are not disheartened—they open up and plant other land—to replant on diseased land is useless. The market value of vanilla depends on the latter being gathered at the proper stage—almost to a single day—and on its preparation. The latter appears easy, and many a crop has been spoiled through a novice imagining he 'knows all about it' after having seen a few hundred pods prepared. Only very careful observation and much practice will ensure satisfactory results in the preparation vanilla.

The plant is not jealous as to altitude. It grows and flowers freely from sea-level up to 2,000 ft. in the islands mentioned. It requires a moist heat and a fair amount of rain, but is intolerant of anything approaching swampy and ill-drained land.—E. H. E.

PRODUCE AND PLANTING.

THE APATHY OF SHAREHOLDERS.—The letter on "Tea Companies and their Policy," which appeared in the *Financial Times* some two months ago, under the signature "Ex dividend," and was quoted in these columns, has drawn forth a note of sympathy from a correspondent serving with the Army in South Africa. This letter signed "Anglo-Indian," seems to be in harmony with the views of "Ex Dividend" about the apathy of shareholders in tea companies. "Anglo-Indian," who yearns after some kind of reform in the management of tea companies, says: "The general apathy of tea shareholders is a thing to be deplored, most general meetings of tea companies consisting of a gathering of directors and their friends. Being a shareholder in one of the largest tea companies registered in London, the working of the estates of which I was familiar with, I issued to the shareholders towards the end of the season 1897 a circular letter, in which I pointed out the reckless expenditure which was adopted by the company. Further, I particularised the meagre and coifficking accounts invariably presented to the shareholders, and suggested certain reforms therein. In answer to that circular letter the directors issued a rejoinder which was generally acknowledged to be as feeble a production as ever was ventilated by a presumably intelligent body of officials. I then issued a second circular letter hopping to stir the shareholders to combined action, which I pointed out was the only hope of reform. Numerous were the apparently grateful replies I received to both my circular letters, and many were the congratu-

lations I obtained for having displayed several defts in the management of the company's affairs, not a little prolonged correspondence occurring with some, a few of whom were tea planters of many years' experience. Not unnaturally, I expected to find a representative gathering of shareholders at the next annual general meeting. At that meeting there were not over half-a-dozen shareholders present, including myself. Two of us had only had any knowledge of the tea industry, consequently the directors, assisted by one or two shareholders who I was convinced knew little of what they were doing, and understood less of what they were told, simply transacted business as they wished, and they have continued to do so to date. The outcome of such absolute apathy on the part of the shareholders is shown in the results of the last two seasons' working, and by the continued meagre accounts presented to the shareholders, accounts which consist almost entirely of a series of bulked items, and are, therefore, unintelligible from want of detail. Never since the company was first formed have the shareholders been told what the estimates were for either crop or expenditure for the ensuing season, particulars which the directors are always in possession of and yet do not voluntarily disclose to the shareholders. The auditing of the accounts is, so far as I can judge, a farce, for no accounts such as those rendered to the shareholders are capable of being properly vouched for. On the other hand, if the accounts have been properly audited, the individuals responsible have received full and detailed information which has been withheld from the shareholders. I fully agree with 'Ex Dividend' when he says that the auditor should be the servant of the shareholders."

INDIAN PATENTS.

APPLICATIONS FOR THE UNDER-SPECIFIED INVENTIONS HAVE BEEN MADE.

No. 330.—Samuel Molyneux Bailie, mechanical engineer, Suntok, Assam. A tea-packing machine.

No. 332.—C S Bivar, tea planter, at present of Seconee, Silghat, Assam. Instantaneous withering of leaf for the manufacture of tea, whether green or black, or for any other purpose for which such a system of withering may be suitable.

No. 347.—Francis Dillon Bellew, licensed branch pilot, residing at 22, Royd Street, Calcutta, British India. A new or improved blender for tea and the like.

No. 354.—David Miln Salmond, planter, Mariawatte tea estate, Gampola, Ceylon. Improvements in tea-rolling tables.—*Indian and Eastern Engineer*, October.

RUBBER IN BURMA AND CEYLON.

WE had a very interesting visitor today in Major Wyllie (I.S.C. in Civil employment) of Burma, who is returning from leave by the ss. "Shropshire." He has for many years been interested in Rubber and Gutta cultivation, partly in connection with his official duties in the Rangoon district and has been a student for a long time of our *Tropical Agriculturist* and *Planting Manuals*, particularly that on Rubber (1st and 2nd editions). With this interest and his well-known botanical and practical tastes, it is no wonder that the Burma Government thought of Major Wyllie as the proper person to take charge of the new enterprise, sanctioned by the Viceroy, whereby 10,000 acres of land in Burma are to be devoted to rubber and perhaps gutta cultivation. Knowing this enterprise was coming off, Major Wyllie, while at home, tried

to get permisison to visit Brazil (for which mission his knowledge of the Portuguese language makes him peculiarly fit) to secure seed of different kinds of rubber—there is a species of castilloa which contributes largely to Brazil exports, of which little is known—and there are many other points which a good linguist and botanist (very different from an ordinary planter) could get cleared up. The India Office was at first favourable; but the China War breaking out with its call on the Indian Service, Major Wyllie was recalled and the trip to the West had for the time to be given up. We should think, however, with so large an investment as 10,000 acres in hand, that the Viceroy especially, will see the advantage of one so admirably suited as Major Wyllie being sent to Brazil and Central America, calling at Trinidad, as well as to Java, Sumatra and Ceylon to collate all useful information up to date and collect specimens. Here, in Colombo, Major Wyllie was only able to run to Heneratgoda Gardens where, however, he obtained some interesting specimens of different kinds of rubber and other plants to take away with him. He much regrets having no time to go to Peradeniya. He has been noting the "Hancornia" referred to in a recent circular from Haiti given in the T.A., and he was interested in what we showed him of Mr. Godefroy-Lebeuf's experiments in Paris. He was able to guess at the correct name of the species of "Castilloa" mentioned in the last letter from this gentleman—"Castilloa Tunu" not "bunn" as printed the other day.—Altogether Major Wyllie reminds us much of Colonel Beddome of South Indian botanical fame—who used so often to visit Ceylon in days gone by, in his devotion to public advantage and single-minded attention to the special department he has made his own. We shall watch with interest the progress of the Burma enterprise and trust Lord Curzon will see the propriety of sending Major Wyllie to all important rubber-growing countries to enquire, collect and report. Such a Mission could not fail to redound to the credit—as well as material advantage—of the Indian Government which in times past did so much to introduce and promote cinchona cultivation, and to develop tea and other new industries.

EXPORT OF INDIARUBBER FROM INDO-CHINA.

The export of indiarubber from Indo-China has made considerable progress and is raised to 79,153 kilos for the first half of 1900, whilst in 1899 it was only 51,000 kilos for the whole year. Of this Saigon sent 9,676 kilos, while Tonquin was the larger exporter with 69,482 kilos. A great part of this came really from Laos and Annam and was transported to Tonquin.—*Tonkin paper*, Aug. 17.

THE SEYCHELLES.—We do not often hear from these out-of-the-way, vanilla-growing isles; but on our sixth page today will be found some chatty notes from a recent visitor, giving interesting first-hand information as to "Royalties" banished to the Seychelles; Men-of-war; and the Vanilla Crop.

CORAL REEFS OF THE INDIAN REGIONS.

Interim Report of the Committee, consisting of Mr. A Sedgwick (Chairman), Mr. J Graham Kerr, Professor J W Judd, Mr. J J Lister and Mr. S F Harmer, appointed to investigate the Structure, Formation, and Growth of the Coral Reefs of the Indian Region.

The Committee have received the following report from Mr. J Stanley Gardiner:—

The expedition under my charge has been carrying out work during the last eighteen months in the Laccadives, Maldives, and Ceylon.

During the month of May 1899 I toured through the raised coral-reef areas of Ceylon and round the coast. In the north of the island these form a succession of higher and higher raised reefs down to Dambulla, broken only by isolated flat-topped peaks of older rocks, on the sides of which the successive elevations are sometimes clearly visible in horizontal lines of wave action. It is only in the topography of the older, often much dolomitised country that the previous existence of either barrier or isolated reefs is indicated. The greater part is formed of a mixed reef sand, and appears before elevation to have borne a considerable resemblance to the large mudflats round the islands of Viti Levu and Vanna Levu, in the Fiji group.

Round the coast of Ceylon, especially to the south, a recent elevation of five to twenty feet was found in broad flats by the sea. These are now invariably being washed away down to the low tide level, at which they persist, to a certain extent, as fringing reefs of varying breadth. The greater part of the west and south coasts is devoid, however, of any reef-growths, the shore being rocky or formed of fine siliceous sand. In May 1899 the rocky shore near Bentota was seen to be covered with small coral colonies, which were evidently a growth of the previous north-east monsoon. In September these had completely disappeared, having been washed away in the south-west monsoon. At Galle, Talpe and Weligama numerous recently living colonies of corals, particularly of the genera *Porites* and *Pocillopora*, of four to eight months' growth, were found completely silted up with sand and dirt of all sorts.

A noticeable point about the reefs immediately round Ceylon is the comparative absence of reef-building nullipores, which are a marked feature of all isolated oceanic reefs. In connection with this an attempt was made to examine the shoals two to six miles off the south and south-west coasts of the island, which indicate with the soundings the possible upgrowth of a barrier reef. The weather, however, at that season was so unfavourable that I was unable to dredge, land, or anchor on any.

Subsequent visits to south India and north Ceylon indicated clearly a former land connection between the two. The so-called Adam's Bridge and the islands of Manaar and Ramasserim, which the former joins, appeared indubitably to be the remains of a formerly elevated limestone flat, which has been more or less cut down by the sea to the low-tide level. The coast lines, too, of Ramasserim and to the north of the Jaffna peninsula were also probably at one time continuous.

The months of June, July, and August 1899 were spent in Minikoi, an isolated atoll, the most southern of the Laccadive group. Here I was accompanied by Mr. L A Borrodaile, who proposed to study various points connected with the Crustacea and Chætopoda. Unfortunately Mr. Borrodaile, who had been collecting these forms in Ceylon, almost at once succumbed to the climate, and after five weeks returned to Ceylon, whence he was at once ordered home. Every part of the island was visited: a survey was made and numerous cross-sections were run. From these it was clear that there had been an elevation of the original reefs to a height of at least twenty-five feet above low-tide level. Numerous observations were made on the currents at different

depths within the lagoon in reference to its shoals, &c. Work on this point could seldom be carried on outside the reefs, as originally intended, owing to the heavy north-westerly winds which prevailed. The lagoon was dredged to ascertain the distribution of its corals, and a few water samples and temperature observations were taken.

Considerable attention was paid at Minikoi to the sand-feeding organisms, especially *Holothuridæ*, *Enteropneusta*, and *Sipunculida*. These forms appear to be largely instrumental in finely triturating the sand, the small particles being subsequently carried out of the lagoon in a state of suspension. The boring organisms, too, are very important in causing the decay of dead coral and rock, especially in the lagoon. These, accordingly, do not form points of attachment for fresh reef-growths to arise, and owing to the larger surface exposed are the more readily dissolved by the water. Indeed all evidence collected showed that the lagoons of atolls may be, and are, very generally formed by the solution of the central rock of originally more or less flat reefs.

In October 1899 I left for the Maldiver group, to which I was accompanied by Mr. Forster Cooper, who assisted me in all the work and very largely took charge of the dredging. The Sultan lent us a schooner of about eighteen tons, which we at once fitted out in Male, subsequently cruising through the northern atolls during the months of November, December, and part of January. About a hundred islands in the atolls of *Gaifurufendhu* (Horsburgh), *S Mahlos*, *N Mahlos*, *N Miladommadulu*, *S Miladummadulu*, *Fadifolu*, and *Male* were visited. Numerous soundings were made and dredgings everywhere taken. *Horsburgh Atoll* and the two atolls of *Mahlos Madulu* in particular were thoroughly worked over.

Parts of January and February 1900 were spent at *Hulule*, a small island at the south-east corner of *Male Atoll*, this being the month of *Ramazan*. A thorough survey of this island and its reefs was made, the whole forming an atoll of the second order, an atollon on the rim of an atoll. Large collections were obtained of the fauna of this atollon from all depths, together with observations on many special points. A set of corals of known period of growth was collected from an artificial passage through the reef to the landing-place of the island.

In February Mr. Forster Cooper took the schooner off for a short dredging cruise in *Male Atoll*, while I remained in *Male* making special observations on the water temperature, currents, food, &c.

In March I was unfortunately obliged owing to illness, to return to Ceylon, where I spent some time in hospital. Mr. Forster Cooper meantime continued the work, taking the schooner and dredging the atolls of *S Male*, *Felidu*, *Molaku*, *Kolumadulu*, and *Haddumati*.

In April I returned with the s.s. "*Ilefaee*," a vessel of about 350 tons which I had chartered. Mr. Forster Cooper was relieved in *Haddumati Atoll* and joined the steamer, the schooner being sent back to *Male*. We then proceeded to *Huvadū* (*Suvadiva Atoll*), which we entered by a northern passage. The lagoon to the east was dredged and sounded, the positions of islands and reefs observed and four islands visited. A move was then made to *Addu Atoll*, the outer slopes of which and also the lagoon were dredged and sounded. The islands were charted in with the assistance of Captain *Molony*, and the majority were visited by some member of the party. On returning to *Suvadiva* the south and west sides of that atoll were dredged. On account of the heavy weather we were prevented from seeing *Mulaku*, which we had especially desired to visit.

Proceeding north to *Male* we skirted *Haddumati Atoll* and crossed *Kolumadulu*, then visited and dredged *S* and *N Nilandu Atolls*, subsequently anchoring in *Felidu* and *Ari*. The passages were sounded between the following atolls: *Kolumadulu* and *S Nilandu*, *S* and *N Niladdu*, *Mulaku* and *Wattaru*, *Wattaru* and *Felidu*, *N Niladdu* and *Ari*; *S* and *N Male*.

Three further lines of soundings were run across the central basin between the east and west lines of atolls.

More than three hundred dredgings were taken, and in addition large and, we believe, very complete collections were made of the reef-fauna at *Minikoi* and *Hulule* four natives at least always accompanying and assisting us in this work. The collections of land-fauna we believe to be equally complete from these islands. Collections of the plants of five separate Maldivian islands are now in the hands of Mr. J. C. Wills, *Peradeniya Gardens*, Ceylon.

A large number of anthropological measurements and considerable ethnological collections were procured, of which we hope to give the Association an account at some subsequent meeting.

PLANTING NOTES.

CAMPHOR.—The market in Japan is very firm, crude being quoted at from 182s 6d to 185s per cwt., c.i.f. Inquiries on the spot show there is practically nothing to be had, although 192s 6d is quoted. In the drug-auctions 100 cases of pressed *Formosa camphor* in cases of 133 lb. net each were held at 205s. per cwt. Today, German refiners have reduced their price by 1d., per lb., and now quote 2s 13d per ton, c.i.f., for prompt delivery. English refiners, however, are very firm, and the tendency is towards an advance, if anything.—*Chemist and Druggist*, Sept. 29.

THE TRIUMPHS OF ELECTRICITY.—Surely this is one of the most notable experiments with electricity in the East. An Indian contemporary writes, "the Mysore Government have at length finally settled all the points that were at issue between themselves and the Government of Madras relative to the water of the *Cauvery Falls*, and they have accepted the tender (£140,941) of the *General Electric Company of the United States*, who have undertaken to complete, within twenty months, the installation of the plant required at *Sivasamudram* to generate 5,000 horse-power and to transmit it a distance of ninety miles to a central station on the *Kolar Gold Fields*. Arrangements are being made with the various Gold-mining Companies now at work on the *Fields* for the distribution of the electricity from the central station and for the installation of motors to work the machine now driven by steam."

THE CONSOLIDATED ESTATES COMPANY, LD.—We give the very full Report of the Managers, Messrs. *Arbuthnot Latham & Co.*, in our daily and *T.A.* In a separate table, the progress of the Company from the beginning is shewn and we notice the figures for 1899-1900. Besides the preference capital of £37,000 and ordinary £39,000, the Company has £46,700 of debentures (or £2,500 less than in the previous year). The total capital £122,700 represents 3,929 acres in cultivation so the rate per acre is not high, without counting 366 acres reserve fit for tea and over 800 acres besides. The last crop of tea was 1,651,410 lb. realising 5 15-16d average; the rupee averaged 1s 4 31-64d: total proceeds of crop £42,197 13s 10d and the profit £11,295 11s 6d. The dividends (8 per cent on preferences and 5 per cent ordinary) are the same as last year; but besides the reduction on debentures, the Reserve Fund now at £2,097 is £426 above last year. Altogether, therefore, the Company has done well during 1899-1900.

HUNTING AND HAPUTALE PLANTERS IN DAYS OF OLD.—On another page will be found some reminiscences by the late G. A. Cruwell which have never been in print before. They afford a peep of a Haputale planter's life in the hey-day of coffee, before there was any railway and only a few roads in Uva. G.A.C. gives some true incidents of injuries (some fatal) to hunters; but we never heard that he or MacLellan, Duff, Hood, Corbet or Rose suffered for all their gatherings in the "merrie greenwood" in the days when all was forest between Radella and Adam's Peak.

"OSTRICH-FARMING: WOULD IT DO IN UVA?"—It is suggested to us that one or more of our enforced visitors at the Diyatalawa Camp may have had experience in South Africa of Ostrich Farming, and may be able to say whether the uplands of Uva would at all offer a suitable region for the establishment of a farm? Of course the pursuit is usually associated with expanses of flat country; but we do not know that undulating patanas would be objectionable. Sand, and lime, or shells however, are said to be necessary for the birds for the development of bone. Water supply and fresh vegetable food could be managed in Uva. The food of ostriches in Egypt is said to cost 2d a day. Each adult bird, five years old, is estimated as worth £40. The annual crop of feathers, after three years old, equals about £4 10s in value on an average, and there are the young ostriches hatched each year, to count on against the general expenses. But perhaps there are enough of ostrich farms already in Africa?

HOW TO FREE A TOWN FROM MOSQUITOES.—In view of the now established connection between mosquitos and malaria, the following extract from the *British Medical Journal* is likely to be read with interest by many of our readers, especially in Calcutta. Expert opinion is pretty well unanimous that the mosquito pest can be controlled. All that is wanted is united action. It is a fair field for village improvement societies. At a meeting of the Societa Medico-Fisica Universitaria of Sassari, on 23rd March, Dr. C Fermi gave an account of certain experiments made in Sassari, in conjunction with Dr. Lumbau and Dr. Cossu-Rocca, with the object of freeing the town from mosquitos. He was able to discover all their breeding places in different parts of the city, in drains, cisterns, puddles, etc. The method adopted was the destruction of the larvæ by means of petroleum placed in the breeding grounds twice a month. The mosquitos were destroyed in shops by means of chlorine, and in houses by means of ulicides, such as a mixture of pyrethrum, chrysanthemum flowers, valerian, and Calamus aromaticus, or the "zanjoline" of Celli and Casagrandi. The results obtained were so satisfactory that Dr. Fermi concludes from them that it is always possible to free a town from mosquitos unless the conditions are exceptionally unfavourable—as, if it be situated in the midst of a swamp. He estimates the expense of freeing a town of fifty thousand inhabitants at 1,000 to 1,500 lire (about R1,000 to R2,000) a year. This includes the wages of the staff required to carry out the measures prescribed.—*Indian Gardening and Planting*, Oct. 11.

THE PHYLLOXERA IN SWITZERLAND.—This pest made considerable progress last year in Switzerland, and in Waadtlande (Vaud) the Vines were attacked with great virulence. Of the 6,568 hectares planted with Vines, thirty four hectares were devastated by Phylloxera. Although the percentage of $\frac{1}{2}$ per cent., may appear small, the seriousness of the case lies in the fact that sixty-eight out of a total of 183 wine-growers, i.e., roughly about one-third, had their vineyards affected. The owners hesitate to introduce the American Grape vines as stocks on which to graft, fearing a deterioration of the good quality of the wine, although nothing else can be done.—*Gardeners' Chronicle*, Oct. 6.

CALIFORNIAN VEGETABLES FOR LONDON MARKET.—In so excellent condition do all kinds of fruit arrive from California, that it was determined to try the experiment of introducing Asparagus to the English market. As we are told the experiment has been tried but the cool chamber of the steamer was a trifle too cool: the "grass" was frozen and so rendered unfit for marketing. Next season every effort will be made to furnish supplies of Asparagus in good condition to consumers here at a reasonable charge. It is a "long order" from the Pacific to Covent Garden. By-and-by it may be found possible to make it a paying concern to place orders for the same vegetable at the Cape.—*Gardeners' Chronicle*, Oct. 6.

THE SHAN STATES.—The resolution of the Government of Burma on the reports of the administration of the Shan States during the past official year has lately been issued in Rangoon. In the Southern Shan States the year was barren of incident; the people were prosperous, crime light, and the harvest good. Relations between the different chiefs were good, and those between Ken-tung and the adjacent French and Siamese territories were also good. Slavery was abolished in Ken-tung during the year by the chief himself after a visit that he made to Burma and Ceylon. Dacoity has disappeared, old roads have been improved, new ones opened, bridges constructed, and much other work of the same kind has been carried out. In the Northern Shan States also tranquility has been maintained, except in one frontier State, where the operations of the Boundary Commission between China and Burma were resisted by a petty local chief. Otherwise crime has decreased and many works of public utility are being carried out by the chiefs. Another memorandum describes the trade of the Shan States as nearly three-fifths of the total trans-frontier trade of Burma. It amounted to 178 lakhs of rupees last year, and when communications with Burma are in a better state a large growth in this trade must take place. The States send down to Burma cattle, ponies, provisions, such as potatoes, tea, and other articles not grown in Burma, as well as pigs, geese, and fowls. A considerable quantity of teak also finds its way down to the coast from the States. Of all the regions adjacent to Burma the Shan States appear to be the one in which land trade with that province is most prosperous and most likely to increase. The reports, in the words of the resolution, "afford striking proof of the benefits which have accrued to the Shan States from the settled government of the last 12 years."—*London Times*, Oct. 6.

Correspondence.

To the Editor.

IGNORANCE OF CACAO:—THIS PICTURE
AND THAT.

Oct. 22.

DEAR SIR,—With reference to your remarks on cacao in Saturday's *Observer*, one might regard the word of a botanist, according to the vehement criticism by Mr. Chas. Gibbon in the local "Times," as something akin to the wand of a conjuror. The young botanist from Kew, Mr. Arden, could not be expected to give an opinion from personal experience on cacao cultivation in Ceylon, nor do I see how his general remarks as reported by the "Times" can have materially influenced any person of larger experience.* Is it not a fact, however, that at Kew there may be seen growing on a small scale practically all tropical products, the uses, value and cultivation of which the students at that institution are regularly taught? Is it not through Kew that our best varieties of cacao have been introduced to Ceylon?†

Mr. Carruthers, the Cryptogamist, in his report last year on the cacao disease, stated that "some estates are practically wiped out by the disease," whilst leading cacao planters declared that there were prospects of the cacao enterprise being doomed. It is not surprising therefore that a new-comer, taught in European principles of agriculture, should be led to the opinion that cacao "in the course of time" should have a bad time of it unless the present methods of cultivation were altered. "In the course of time" is an indefinite period. Mr. Chas. Gibbon, however, calls this "crass ignorance," and makes a direct libel when he says that Mr. Arden "goes on to describe a very exceptional instance of tapping trees to promote thick growth." Mr. Gibbon, for some reason of his own, interprets "topping" (which term in England meaning "coppicing," he apparently is not acquainted with) into "tapping" and he takes pains to show that this is not applied to cacao, which is ridiculous. It is amusing to see Mr. Chas. Gibbon use such big words to make a "contradiction" which he afterwards contradicts himself by stating that "the cacao has many enemies to combat." That cacao can, however, luxuriate in many parts of Ceylon, with careful cultivation, is amply testified.—I am, yours faithfully,
ONE INTERESTED.

LIME AND MALARIAL MOSQUITOES.

Matale, Oct. 22.

SIR,—Last week you had an editorial, wishing to know the local experience of using lime as a preventive of mosquitoes. As you know there

* How are people absent from Ceylon to know of Mr. Arden's experience? We scarcely think he could have meant his words to be printed as they stand: he was very cautious in his conversation with ourselves.—Ed. T.A.

† But what does Kew know of cultivation on at large scale.—Ed. T.A.

are several places in Ceylon that have lime in the soil. The Matale district (notoriously malarious) is full of lime; and yet mosquitoes and their larvæ are plentiful in every swamp. The only effective germicides are Jeyes' Fluid or Kerosine; and as neither of these is expensive they should be used for every swamp or pool in malarious localities.

By the way, can any of your readers explain why new clearings, digging up of soil, etc., should cause fever?

I am a believer in the mosquito malaria theory; but the theory does not cover the cases where a deadly outbreak of malaria follow the disturbance of the soil; as for instance, the outbreak of fever when the railway to Galle was being opened.

ENQUIRER.

[The mosquitoes to give an attack of malarial fever have first to feed on an afflicted patient; but turning up the soil in a malarious district releases germs which, imbibed, result in fever.—Ed. T.A.]

VARIETIES OF CASTILLOA RUBBER
IN CEYLON.

ss. "Shropshire," Oct. 23.

DEAR SIR,—I enclose a note of the references bearing on the dispute as to the identity of *tunu* or *ule* with *castilloa elastica*, and of *C Markhamiana* with *C elastica*, also of *C elastica* with the tree yielding the *caucho* rubber of the Amazon valley. The matter is, I am afraid rather, obscure still. But it would appear probable that you have not got the true *Castilloa elastica* in Ceylon. Perhaps your Paris correspondent might be asked to tell us what he knows about *tunu*.

Besides the references I have quoted, I remember reading an article (I think in the New York "India Rubber World," two or three years ago) on the prospects of trade in Honduras in *tunu*, but to the best of my recollection the writer claimed it to be the source of *chicle* or chewing gum, which would make it out to be the *achras sapota*. This rather adds to the confusion than otherwise, but my memory may be at fault. I am sorry I cannot find this reference in my file. My reference I. (b) seems to point to the possibility of *tunu* being a *balata*.—Truly yours,
J. A. WYLLIE.

I.—*Ceylon Manual* "All about India rubber" 1899—p. cxvii.

(a) Plants sent out from Kew 1876 differ from *ule* of Mexico as described by Cervantes.

(b) *Castilloa* from Honduras three species. Two—*ule*, the third is *tunu*—said to yield a gutta percha.

(c) p. cxix—item IV., description of *tunu*.

II.—*Ceylon Manual*, p. cxx., Cross says there is only one species—difference is due to growth in sun or under shade.

III.—*Ibid* p. cxlviii. Clements Markham thinks there are two species—(i) *C elastica* (ii.) *Markhamiana*.

IV.—*Tropical Agriculturist* Sept. 1st, 1899, p. 206. Name *ule* or *tunu*=*Castilloa* in Central America.

V.—*Ibid*, March 1st, 1899, p. 602, *C Markhamiana* turns out to be a *perbeea* species, so Seeligmann says.

VI.—*India-rubber World*, Oct. 1st, 1899, p. 4. Dr. Huber (Curator, Para Museum), says *caucho* of Amazon valley is a *Castilloa*—identifies it with *C elastica* or *ule*.

RUBBER EXPERIMENTS.

Paris, Sept. 26.

DEAR SIR,—Can any of your readers procure me a sample of the plant you call *Castilloa elastica* in Ceylon? I believe the plant grown there is *Castilloa bunn*. *Castilloa elastica* is less injured by the temperature and there is an interest to know exactly what is the species grown.

About rubber barks, the results obtained vary. If the bark has been quickly dried by exposure to full sun, the rubber is more abundant than in barks slowly dried; fermentation in that case has destroyed parts of the gum. The bark quickly dried can after be exposed to moisture with less inconvenience than bark slowly dried. It is easily proved by bags of bark partly musty; if well dried first, the damage is not great; but fermented barks affected after by moisture, are quite unfit for any use. So, it is important if any of your readers sent me samples—to dry these quickly. Our Company for Extraction of Rubber is founded, and will buy on analysis any bark offered. The price will vary like for barks of cinchona.—Believe me, yours most truly,
A. GODEFROY-LEBEUF.

P.S.—I have introduced this year several new rubber products,—such as, *Forsteronia gracilis*, *Hancornia speciosa*, *Euphorbia speciosa*—a new sort from Guinea, producing gum of inferior quality, but in very great quantity.

[We have just sent Mr. Godefroy-Lebeuf a parcel of Para rubber from a Ceylon planter who wants a report after analysis of the same. Can any one spare a sample of *Castilloa* bar—Ed. T.A.]

IMPORTANCE OF LOWCOUNTRY GREEN TEAS; AND THE GLAZING OF TEAS.

Stagbrook, Peermaad, S. India.

SIR,—I was interested to see by your issue of the 12th October, that Arapolakanda had obtained such an encouraging average for low-grown green teas, though of course, it would have been more satisfactory had the sales been made direct in America, Canada or Russia. However we may take it for granted that Colombo buyers, as a rule, are on the safe side. This being so, I would remind you that lowcountry green teas has been a hobby of mine for some years, and you will find, that while on June 20th, Mr. F. F. Street, in an interview, says:—"I certainly do not recommend the lowcountry planter to make green tea, etc., etc." that I not having seen his remarks, writing to the Press on 2nd July, 1900, said:—"I am of opinion that low-grown teas will make the best green teas, and have made experiments which tended to prove my theory." If this opinion prove correct, or at any rate if "lowcountry" green teas can get as favourable prices as high-grown green teas, it will be of great benefit to all interested in the tea industry, for I take it that it is much more to the interest of the Planting Community to get low-grown black teas off the market.

I hope experiments are being made in "glazing" the teas as per my directions issued by Messrs. Brown & Co., Ltd. as I am certain it protects the teas and enables them to be kept longer.—I am, dear sir, yours faithfully,

H. DRUMMOND DEANE,

THE MATURATA TEA COMPANY, LTD.

DIRECTOR'S REPORT

submitted to the Shareholders at the Third Annual Ordinary General Meeting, held at the Offices of the Company, 16, Philpot Lane, London, E. C., on Wednesday, 3rd day of October, 1900, at 12 noon:—

The Directors herewith beg to submit their third annual report and balance sheet for the year ending 3rd June, 1900. After bringing forward £678 16s 3d from last year's account, and after payment of Debenture Interest and London Charges (Directors' fees, &c.), the net amount of Profit and Loss Account is £2,464 14s 7d. A dividend of 3 per cent. has been paid on the Preference Shares for the half-year amounting to £120. A further 3 per cent. was paid on the Preference Shares on July 1st, making 6 per cent. for the year, amounting to £120. It is proposed to pay a dividend of 10 per cent., less income tax, on the Ordinary Share Capital which will absorb, £800. Thus leaving to be carried forward to next year a balance of £1,424 14s 7d. Total £2,464 14s 7d. The past year has again showed very satisfactory results, and the yearly earnings of the Company have been substantially increased. The Directors therefore feel justified in recommending a dividend of 10 per cent on the Ordinary Share Capital of the Company, as, after payment of this, there still remains a considerable sum to carry forward. £1,000 of the debenture debt has been paid off during the past year thus enhancing the value of the Preferred and Ordinary Capital. The thanks of the Company are due to the Superintendent for the excellent way in which he has worked the estate and more than maintained the quality of our tea notwithstanding that the factory during the greater part of the year, was in course reconstruction which made his work considerably more difficult. The last report from the Visiting Agent in Ceylon as to the condition of the estate is highly satisfactory. The crop for the past year amounted to 159,054 lb., which sold at a nett average of 8 88d. For the current year the crop is estimated at 140,000 lb. Mr. G. Alderson Smith retires in accordance with the Articles of Association, but offers himself for re-election as a Director.

FERNLANDS TEA COMPANY, LTD

ANNUAL REPORT.

L C o g e

FERNLANDS.

| | | | |
|------------------------|----|-----|--------|
| Tea in full bearing | .. | 212 | acres |
| Tea in partial bearing | .. | 7 | " |
| Grass and Jungle | .. | 52 | " |
| Total Estate .. | | 271 | acres. |

ETON.

| | | | |
|-------------------------|----|-----|--------|
| Tea in full bearing | .. | 150 | acres. |
| Tea in partial bearing | .. | 9 | " |
| Tea not in bearing | .. | 5 | " |
| Coffee in bearing | .. | 47 | " |
| Cardamoms | .. | 14 | " |
| Grass, Jungle and Scrub | .. | 25 | " |

Total Estate ... 250 acres.

Grand Total 521 acres.

The directors submit to the shar holders the accounts for the season ending 30th June last.

The tea crop of 150,067 lb. realised a net average of 48.35 cents per lb. after making a safe estimate for proceeds of tea for which closed accounts have not yet been received from London. Coffee crop was as foreshadowed in last year's report larger than that of 1898-99 though short of the estimate.

After writing off 10 per cent depreciation on buildings and Machinery, the balance at credit of profit and loss account is R19,256.16. In March last an interim dividend of 2 per cent was declared and paid,

which absorbed Rs.500, and the directors now recommend the payment of a final dividend of 4 per cent, making 6 per cent for the year, and that the balance of Rs.2,756'16 be carried forward to this season's working.

The estimated crops for the current season are 155,000 lb. tea, 25 bushels coffee and 1,200 lb. cardamoms, on an expenditure on the estate of Rs5,235'33.

On the resignation of Mr. G H Alston the remaining directors appointed the Hon. W H Figg to the vacant seat on the board.

The appointment of a director and an auditor will rest with the meeting.

THE NEW DUMBULA COMPANY LTD.

REPORT, SEASON 1899-1900.

The Directors have the pleasure of submitting the accounts for the financial year ending June 30th, 1900.

The season generally has been a favourable one for flushing, the yield has exceeded the estimated quantity, and is considerably in excess of that of the previous year. The fields affected by the frost last season have recovered.

The net average yield per acre was 539 lb., compared with 456 lb. last season, and the net average price 8'76d as against 8'28d in 1898-99.

The acreage of the Estate is—

| | | |
|------------------|-----|--------------|
| Tea in bearing | ... | 2,200 acres. |
| Young Tea | ... | 150 |
| Timber Trees | ... | 108 |
| Grass Ravines | ... | 45 |
| Buildings | ... | 22 |
| Forest and Swamp | ... | 600 |

Total ... 3,125 acres.

The Estate is reported on as being in first class order, and the Tea very vigorous; the Buildings and Machinery are kept in excellent condition; an extension of the Factory has been sanctioned, so as to render the treatment of leaf as satisfactory as possible, a portion of the cost of this extension is provided for in the accompanying accounts.

The accounts now presented show a surplus of £23,222 6s. 4d., after writing off the amount of Tea extension, viz., £309 12s. 6d., and the amount of the Factory and Machinery account, viz., £206 4s. 8d., and providing £1,000 towards extension of Factory. The Directors propose a dividend of 20 per cent. per annum for the year ended June 30th last, 5 per cent. of which was paid in March, together with a bonus of 3 per cent., and the placing of £3,000 to the Reserve Fund.

The Board wish to express their satisfaction with the management of the Estate while under the charge of Mr. S. Payne Gallwey. Mr. Dick Lauder resumed charge on January 1st, and the Directors feel that the continued good working of the Company's property by the Resident Manager and Staff in Ceylon must commend itself to the Shareholders. By order of the Board. A. CRABBE, Secretary.

THE DUCKWARI (CEYLON) TEA PLANTATION COMPANY, LTD.

REPORT BY THE DIRECTORS TO THE TENTH ORDINARY GENERAL MEETING OF THE COY.

The Directors have pleasure in submitting the Accounts for the year ending June 30th, 1900. Profit and Loss account, after writing off 10 per cent. depreciation on value of machinery and buildings, shows a credit balance of £1,313 10s 2d for the year to which has to be added £1,514 8s 4d, the

balance brought forward from last season, making a total of £2,827 18 6 which the Directors propose should be applied as follows:—

| | | |
|---|-----|-----------|
| (1) In payment of seven per cent. Dividend of Preference Shares | .. | £840 0 0 |
| (2) In payment of seven per cent Dividend on Ordinary Shares | ... | 560 0 0 |
| (3) In increasing Reserve Fund by | .. | 500 0 0 |
| | | 1,900 0 0 |
| Leaving | .. | £927 18 6 |

to be carried forward to next year.

The returns of crop have been 321,026 lb. Tea and 8,779 lb. Cardamoms, against 277,408 lb. Tea and 10,012 lb. Cardamoms last season.

The estimates for the coming year are 300,000 lb Tea and 12,000 lb. Cardamoms.

The increased crops coming off the Company's estates have necessitated the purchase of more machinery. The outlay on this, amounting to £412 16s 5d, has been debited to capital account.

Mr. Troutbeck retires from the Direction by rotation, and being eligible, offers himself for re-election.

The Auditors, Messrs. Brown, Fleming and Murray, also retire, and offer themselves for re-appointment.

P. G. SPENCE, Chairman, and R. CROSS AITKEN, Secretary,
17, Philpot Lane, London, E. C., Oct. 19'00.

THE HORNSEY TEA ESTATES COMPANY, LIMITED.

THE FOURTH ANNUAL REPORT, 1899-1900.

The Directors beg to submit to the shareholders the report and audited Accounts for the year closing the 30th of June last.

The crop has weighed out 191,844 lb., against last year 172,139 lb., giving an increase of 19,705 lb. of made tea.

The Directors regret that although the crop is larger, the profit earned is somewhat smaller than last year. This result, however, is entirely due to a fall in prices, which has affected the whole industry. The teas have been carefully made, and the quality has been quite as good as in former years. The markets, however, have been rather over-supplied with tea, owing to a season of very favourable weather in Ceylon, resulting in large crops and lower prices.

The cost of production, with manufacture, has been 29'30 cents, against last year 31'12 cents, or, in sterling, 4³/₄d per lb. Colombo, against 5d per lb.

The sales in London have totalled 28,435 lb. of tea, selling at an average of 9'87d per lb., and the balance of the crop has been sold in Colombo, and realised an average of 38'90 cents, equivalent to a London price of 7¹/₄d per lb., against last year 4s'40 cents, or 8¹/₂d per lb. The average sale price for the whole crop has been equivalent to a London price of 7'94d per lb., or nearly 8d per lb., against last year 8'72d per lb.

During the 12 months the Coast Advance Account has been reduced by £97 13s 8d, leaving only £81 3s 3d outstanding.

The audited accounts show that, after paying all fixed charges and Preference Dividend for the 12 months, there is a balance at credit of Profit and Loss of £412 9s 7d. The Directors propose to write off £224 6s from preliminary expenses account, and to pay a dividend of 1¹/₂ per cent on the ordinary shares, absorbing £180, and leaving a small balance to carry forward. The Directors, in again writing off so large a proportion of profit to preliminary expenses account, are acting on the determination to close this account during five years, and next

year being the fifth year of the Company's existence the balance of £158 11s 8d outstanding should disappear from the balance sheet.

It is well known to shareholders that this Company does not possess a factory, and that the Battalgalla Company is manufacturing Hornsey leaf. This arrangement has worked satisfactorily up to the present time, but next year the agreement to manufacture between the two companies expires, and owing to increasing crops, Mr. Saunders, the Managing Director in Ceylon, strongly urges that the time has now arrived when this company should build a factory and manufacture its own tea. Mr. Saunders also claims that he can manufacture much more cheaply than at present. To meet the cost of a factory the Directors purpose issuing a further £3,000 in six per cent preference shares.

The Directors desire to express their best thanks to Mr. W S Saunders and to Messrs. E Benham & Co., the Colombo Agents, for the attention given to the Company's interest during the year.

In accordance with the articles of Association, Mr. W S Sichel retires from the Board, and being eligible, offers himself for re-election.

The Auditors, Messrs. Singleton, Fabian & Co., also offer themselves for re election.

CHARLES A. REISS W. S. SICHEL, Directors ; ALBIN B. TOMKINS, Secretary.
51, Lime Street, E.C., London, 1st Oct., 1900.

PUBLIC SALES OF TEA IN COLOMBO.

DURING THE NINE MONTHS ENDED SEPT. 30TH, 1900.

| | Offered | Sold | Avg. | Exchange Demand | |
|-------------------|------------|------------|------|-----------------|-----------|
| | | | | 1900. | 1899 |
| | lb. | lb. | c. | s. d. | s. d. |
| Jan. 10 | 1,831,280 | 1,614,158 | 35 | 1 4 1-8 | 1 4 1-8 |
| " 17 | 1,364,973 | 1,183,022 | 36 | 1 4 5-16 | 1 4 1-8 |
| " 24 | 1,139,005 | 827,623 | 34 | 1 4 3-16 | 1 4 3-32 |
| " 31 | 737,556 | 588,927 | 34 | 1 4 3-16 | 1 4 3-32 |
| Feb. 7 | 599,791 | 516,696 | 35 | 1 4 5-32 | 1 4 3-32 |
| " 14 | 782,790 | 653,888 | 34 | 1 4 5-32 | 1 4 1-32 |
| " 21 | 1,185,369 | 973,956 | 35 | 1 4 1-8 | 1 4 1-16 |
| " 28 | 740,953 | 566,329 | 34 | 1 4 3-32 | 1 4 1-32 |
| Mar. 7 | 891,630 | 653,715 | 32 | 1 4 1-8 | 1 4 |
| " 14 | 819,391 | 681,953 | 34 | 1 4 3-32 | 1 4 |
| " 21 | 951,391 | 807,324 | 35 | 1 4 1-32 | 1 4 |
| " 28 | 902,110 | 744,408 | 35 | 1 4 | 1 4 |
| Apr. 4 | 887,021 | 813,242 | 36 | 1 3 15-16 | 1 4 |
| " 10 | 1,006,717 | 782,748 | 36 | 1 4 | 1 4 |
| " 18 | — | — | — | — | — |
| " 25 | 1,640,060 | 1,447,035 | 35 | 1 4 | 1 4 |
| May 2 | 842,428 | 722,417 | 35 | 1 3 31-32 | 1 4 |
| " 9 | 912,161 | 765,843 | 36 | 1 3 31-32 | 1 4 |
| " 16 | 1,038,550 | 792,090 | 35 | 1 3 31-32 | 1 3 31-32 |
| " 23 | 1,305,127 | 954,197 | 31 | 1 3 31-32 | 1 3 31-32 |
| " 30 | 1,115,133 | 947,564 | 31 | 1 4 | 1 3 31-32 |
| June 6 | 1,005,763 | 803,025 | 30 | 1 4 | 1 3 31-32 |
| " 13 | 938,853 | 800,258 | 32 | 1 4 | 1 4 |
| " 20 | 926,783 | 772,084 | 32 | 1 4 | 1 4 |
| " 27 | 1,173,115 | 952,675 | 30 | 1 4 | 1 4 1-32 |
| July 4 | 971,589 | 831,096 | 31 | 1 4 | 1 4 1-32 |
| " 11 | 1,011,171 | 914,153 | 34 | 1 4 | 1 4 1 32 |
| " 18 | 1,224,480 | 1,135,262 | 33 | 1 3 31-32 | 1 4 1-32 |
| " 25 | 992,287 | 921,723 | 36 | 1 3 15-16 | 1 4 |
| Aug. 1 | 874,762 | 728,817 | 37 | 1 3 15-16 | 1 3 31-32 |
| " 8 | 909,992 | 691,142 | 35 | 1 4 | 1 4 |
| " 15 | 776,353 | 638,447 | 36 | 1 3 15-16 | 1 4 |
| " 22 | 952,063 | 786,871 | 35 | 1 3 15-16 | 1 4 |
| " 29 | 658,559 | 580,731 | 37 | 1 3 31-32 | 1 4 |
| Sept. 5 | 663,701 | 600,818 | 36 | 1 3 31-32 | 1 4 |
| " 12 | 623,281 | 507,424 | 37 | 1 3 15-16 | 1 4 3-32 |
| " 19 | 897,018 | 778,004 | 40 | 1 3 15-16 | 1 4 3-32 |
| " 26 | — | — | — | — | — |
| Total for 1900— | 35,298,997 | 29,530,670 | 34½ | 1 4 1-16 | 1 4 1-32 |
| Same period 1899— | 28,255,604 | 24,229,544 | 38½ | | |

PUBLIC SALES OF TEA IN LONDON.

DURING THE NINE MONTHS ENDED SEPT. 30TH, 1900.

| | Packages Offered. | Packages Sold. | Reuter's Average. | Gow. Wilsons and Stanton's Average. | |
|------------------|-------------------|----------------|-------------------|-------------------------------------|-------|
| | | | | 1900. | 1899. |
| Jan. 11 | 24,000 | 23,000 | 8 | 8 | 8 |
| " 18 | 31,000 | 29,000 | 7½ | 7½ | 8 |
| " 25 | 38,000 | 29,000 | 7½ | 7½ | 8 |
| Feb. 1 | 25,000 | 21,000 | 7¼ | 7¼ | 8 |
| " 8 | 24,000 | 22,000 | 7¼ | 7¼ | 8½ |
| " 15 | 25,000 | 23,000 | 7¼ | 7¼ | 8 |
| " 22 | 23,000 | 21,000 | 7¼ | 7¼ | 8 |
| Mar. 1 | 32,000 | 29,000 | 7¾ | 7¾ | 8½ |
| " 8 | — | — | — | — | — |
| " 15 | 27,000 | 22,000 | 7½ | 7½ | 8½ |
| " 22 | 28,000 | 26,000 | 7½ | 7½ | 8½ |
| " 29 | 26,000 | 25,000 | 7½ | 7½ | 8½ |
| Apr. 5 | 28,000 | 26,000 | 7½ | 7½ | 8½ |
| " 11 | 27,000 | 24,000 | 7½ | 7½ | 8½ |
| " 19 | — | — | — | — | — |
| " 26 | 31,000 | 31,000 | 7½ | 7½ | 8½ |
| May 3 | 32,000 | 30,000 | 7½ | 7½ | 8½ |
| " 10 | 39,000 | 37,000 | 7½ | 7½ | 8½ |
| " 17 | 27,000 | 24,000 | 7½ | 7½ | 8½ |
| " 24 | 31,000 | 28,000 | 7 | 7 | 8½ |
| " 31 | 34,000 | 32,000 | 6¾ | 6¾ | 8 |
| June. 7 | — | — | — | — | — |
| " 15 | 32,000 | 31,000 | 6¾ | 6¾ | 7½ |
| " 21 | 35,000 | 32,000 | 6¾ | 6¾ | 7½ |
| " 28 | 27,000 | 25,000 | 6¾ | 6¾ | 7½ |
| July. 5 | 21,000 | 20,006 | 6¾ | 6¾ | — |
| " 12 | 27,000 | 26,000 | 6¾ | 6¾ | — |
| " 19 | 21,000 | 20,009 | 7 | 7 | 7½ |
| " 26 | 27,000 | 27,000 | 7½ | 7½ | 7½ |
| Aug. 2 | 43,000 | 39,000 | 7½ | 7½ | — |
| " 9 | — | — | — | — | — |
| " 16 | 45,000 | 42,000 | 7½ | 7 | 7½ |
| " 23 | 41,000 | 38,000 | 6¾ | 6¾ | 6¾ |
| " 30 | 31,000 | 28,000 | 6¾ | 6¾ | 6¾ |
| Sept. 6 | 23,000 | 20,000 | 7 | 6¾ | 7¾ |
| " 13 | 27,000 | 25,000 | 7 | 6¾ | 7¾ |
| " 20 | 31,000 | 26,000 | 6¾ | 6¾ | 8½ |
| " 27 | 20,000 | 18,000 | 7 | 7 | 8½ |
| Total for 1900 | 1,003,000 | 919,000 | 7½ | 7½ | 8 |
| same period 1899 | 832,000 | 740,000 | | | |

[The figures for local sales are compiled from the weekly circular of Messrs. Forbes & Walker, while those for London sales are from the telegrams received weekly.]

PLANTING NOTES.

THE OLD, OLD STORY.—The scheme for starting a trust to control tobacco planting in Deli, Sumatra, has fallen through from the impossibility of getting the planters to combine in the desired direction.—*The Planter*, Oct. 20.

SURVEYORS FOR NEW GUINEA.—Brisbane, Oct. 9.—The Surveyor-General was recently requested by the Lieutenant-Governor of New Guinea to select several surveyors for service in the island possession. All but one of these selections were made today. The appointments are:—Messrs. D Rutherford, Licensed Survey Department, Brisbane; H B Matthews, New South Wales; and W J Callendar, Queensland. Mr. John Richmond, of New South Wales, has been appointed draftsman at a salary of £300 per annum. The surveyors will each receive £400 a year, and be allowed an assistant at £200 a year. They are to provide their own instruments, but the New Guinea Government will supply camp gear, boats, and native crews.—*S. A. Register*, Oct. 9.

PROPOSED INDIAN TEA CESS.

We publish below a letter from the Hon. Mr. G. L. Acworth, to the Secretary of the U. P. A. S. I., which has been circulated among the various District Planting Associations in Southern India. There is no reason to believe (says the *M. Mail*) that Calcutta and London brokers would refuse to collect a cess in the manner Mr. Acworth suggests. Where there might be trouble, however, is in respect to teas shipped direct to foreign ports and passed through the hands of brokers there, and teas bought without the intervention of a broker for shipment to foreign markets. Little difficulties of this kind will no doubt be taken into consideration by District Planting Associations. Mr. Acworth shows that a very important sum could be collected annually, and if this were prudently employed in advertising and pushing Indian teas, there would probably soon be an end to the cry of over-production.

The following is Mr. Acworth's letter:—"As it is possible that the Government of Bengal may still decline to impose a tax on tea for the benefit of the Foreign Market Fund, it is as well to be prepared with some alternative scheme, which will be acceptable to the great majority of Indian tea planters, and at the same time result in a Fund which will compare favourably with that raised by our brethren across the water. Such a scheme has been evolved by Mr. A. F. Bruce, of Calcutta, and, having received his permission to make it public, I laid it before the Central Travancore Planters' Association at our last General Meeting. With slight modification Mr. Bruce's idea has been accepted by the C. T. P. A. and I now write to ask you to place the matter before other Tea Associations in South India. Should they accept the proposal, it would be as well to pass it on to the Indian Tea Association in Calcutta and London at as early a date as possible. The scheme as accepted by the C. T. P. A. is as follows:— 'That a charge of half a pie per lb. be levied on all tea sold in India, and of 1-24 of a penny per lb. on all teas sold in London. That tea brokers be requested to enter this charge in their account sales, and to forward the proceeds when collected to the Indian Tea Association in Calcutta and London respectively.' This charge would amount roughly to a sum of R4 lakhs per annum, against the present pittance of barely one lakh collected by India. Every concern, whether a public Company or a private garden, would contribute in equal ratio. The levy is so small that it would be felt by nobody. There would be no expenses of collection, for I feel sure that the brokers, if approached, would keep the money and forward it to the right quarter free of charge."

RAINFALL RETURN FOR COLOMBO.

(Supplied by the Surveyor-General.)

| | 1895. | 1896. | 1897. | 1898. | 1899. | Av of 30 yrs. | 1900. |
|--------------|-------|--------|-------|--------|-------|---------------|-------|
| | Inch. | Inch. | Inch. | Inch. | Inch. | Inch. | Inch. |
| January .. | 5.00 | 2.92 | 3.81 | 2.32 | 6.98 | 3.22 | 3.72 |
| February .. | 0.81 | 0.35 | 1.05 | 1.98 | 2.78 | 1.93 | 0.63 |
| March .. | 1.84 | 5.64 | 3.66 | 4.21 | 0.88 | 4.78 | 3.71 |
| April .. | 9.34 | 5.93 | 10.97 | 22.81 | 6.66 | 11.31 | 15.12 |
| May .. | 10.09 | 9.31 | 8.30 | 5.80 | 17.73 | 12.09 | 10.63 |
| June .. | 13.99 | 8.37 | 10.14 | 10.94 | 9.23 | 8.37 | 7.83 |
| July .. | 0.52 | 2.85 | 5.24 | 6.15 | 1.11 | 4.38 | 6.77 |
| August .. | 0.92 | 6.35 | 9.09 | 0.97 | 0.62 | 3.67 | 7.35 |
| September .. | 4.09 | 10.99 | 4.58 | 6.90 | 1.4 | 5.01 | 4.00 |
| October .. | 30.36 | 16.78 | 4.71 | 20.60 | 12.99 | 14.52 | 9.47 |
| November.. | 5.83 | 19.81 | 11.66 | 17.38 | 8.58 | 12.66 | 0.04 |
| December.. | 9.44 | 11.76 | 8.89 | 3.65 | 4.44 | 6.39 | |
| Total.. | 92.23 | 101.06 | 82.73 | 103.11 | 73.48 | 88.33 | 69.27 |

(* From 1st to 2nd Nov. 0.4 inches, that is up to 9-30 a.m. on the 2nd Nov.—Ed. C.O.)

Ceylon Rainfall.

THE P. W. D. METEOROLOGICAL OBSERVATIONS FOR SEPT 1900.—We append the Monthly Return of rain from which it will be seen that the highest fall in Sept. was at Padupola in the Central Province, 38.45 inches, and the lowest at Murungan in the Northern Province, 0.09 inches.

| WESTERN PROVINCE | | URUBEKKA, Mr. Caldico | |
|---|---------|-----------------------|--|
| Negombo, Mr. Bucknall | (6) | 2 93 | (890) 13.90 |
| Kalutara Mr. Gregson | (36) | 7 23 | Tangalla Mr. Russell (94) 1.89 |
| Labugama, Mr. Bond | (389) | 18.01 | Mamaola, Mr. Doole |
| Henaratgoda, Mr. Silva | (33) | 11.43 | (56) .. 4.99 |
| CENTRAL PROVINCE. | | EASTERN PROVINCE | |
| Katugastota, Mr. Morgan | (1,500) | 5.59 | Irrakkulam, Mr. Bower (42) |
| New Valley, (Dikoya) Mr. Ward | (3,700) | 16.21 | Devilana, Mr. Vanderstraeten |
| Helboda (Pussellawa) Mr. Gosset | (3,500) | 14.81 | (136) 2.89 |
| Yarrow Estate, Mr. Padwick | (3,400) | 8.98 | Sagamata, Mr. Bower |
| Peradeniya Mr. Macmillan | (1,540) | 11.30 | (40) 2.46 |
| Duckwari, Not received | (3,300) | — | Ambare, do (65) 2.67 |
| Caledonia, Not received | (4,273) | — | Kantabai, Mr. Carte |
| Pussellawa, Mr. Powell | (3,000) | 14.25 | (150) 1.18 |
| Hakgala, Mr. Nock | (5,581) | 8.44 | Allai, Mr. Carte (95) 13.63 |
| S. Wananajah Estate, Mr. Tatnam | (3,700) | 16.72 | Rukam, Mr. Vanderstraeten |
| Padupola, Mr. Ward | (1,636) | 38.45 | (120) .. 1.60 |
| Mylapitiya, Mr. Fletcher | (1,777) | 0.65 | Periyakulam, Mr. Carte |
| | | | (20) .. 2.17 |
| | | | Chadayantalawa, Mr. Edge |
| | | | (57) 3.49 |
| | | | Kalmuna, do (12) 2.87 |
| | | | Rotewala, Mr. Bower (30) 2.99 |
| | | | Lahugoda, do (70) 4.91 |
| | | | Naulla, do (3) 2.34 |
| | | | Andankulam, Mr. Carte |
| | | | (41) .. 2.57 |
| | | | Manapoddy, Mr. Vanderstraeten |
| | | | (21) 1.58 |
| | | | Maha-Oya-Tank, Mr. Vanderstraeten |
| | | | (190) 1.40 |
| | | | Putuvil, Mr. Sinnayah |
| | | | (10) 1.90 |
| NORTHERN PROVINCE. | | N.-W. PROVINCE. | |
| Mullaitivu, Mr. Oudatje | (12) | 1.48 | Magalawewa, Mr. Soopena- |
| Jaffna Mr. Macdonnell | (8) | 1.06 | yan (176) .. 0.60 |
| Mankulam, (N. Road) Mr. Ebert | (167) | 0.80 | Maha Uswewa tank, Mr. Adams |
| Elephant Pass, Mr. Silva | (7) | 2.25 | (160) .. Nil |
| Vangalachettykulam, Mr. Oorloff | (179) | 0.85 | Tenepitiya, Mr. Churchill |
| Point Pedro Mr. Chittanjalam | (24) | 3.10 | (8) .. 0.45 |
| Jaffna College, Mr. Cooke | (9) | 0.96 | Batagoda, Mr. Madhupata |
| Kayts, Mr. Kretser | (8) | 0.61 | (354) .. 4.94 |
| Kankesanurai, Mr. Pararachinghe | (10) | 2.48 | |
| Pallai, Mr. Silva | (24) | 4.86 | |
| Murlkandy, (North-Central Road) Mr. Silva | (7) | 1.90 | |
| Nedunkeni, Mr. Ebert | (122) | 8.37 | |
| Chavakacheri, Mr. Silva | (16) | 2.00 | |
| Udupiddi, Mr. Brown | (15) | 1.67 | |
| Marichechukaddi, Mr. Thampue | (14) | 0.51 | |
| Murugan, Mr. Walker | (52) | 0.09 | |
| Vavuniya Mr. Ebert | (318) | 2 | |
| SOUTHERN PROVINCE. | | N.-C. PROVINCE. | |
| Ella Vella Mr. Caldico | (262) | 10.69 | Kalawewa, Mr. Chellappa |
| Kekanadura, do (150) | 17.90 | 2.20 | (268) |
| Denagema, do (26) | 11.69 | 2.72 | Maradankadawala, Mr. Emerson |
| Udukiriwila Mr. Lourens | (235) | 8.21 | (443) .. 2.72 |
| Kirama, Mr. Vanderstraeten | (260) | 10.73 | Mihinatale, Not received |
| Hali-ela, Mr. Caldico | (200) | 10.40 | (354) .. — |
| Tissa Mr. Silva | (75) | 1.02 | Horowapotana, Mr. Oudatje |
| Matara Mr. Caldico | (15) | 8.85 | (217) .. 5.60 |
| Dandeniya, do (167) | 12.29 | 0.80 | Madawachchiya, Mr. Oudatje |
| | | 0.64 | (285) .. 0.80 |
| | | | Topare, Mr. Jayewardane |
| | | | (200) 1.06 |
| | | | Minneriya Mr. Eves |
| | | | (137) 1.37 |
| | | UVA PROVINCE. | |
| | | | Bandarawela, Mr. Toke |
| | | | (400) 2.20 |
| | | | Haldunomolly, Mr. Vyanutso |
| | | | (3160) 3.21 |
| | | | Kumbukan, Not received |
| | | | (445) .. |
| | | | Koslanda, Mr. Tanwaid |
| | | | (2,258) .. 3.41 |
| | | | Ramalwila, Not received |
| | | | (550) .. — |
| | | | Bibile, Mr. Silva (630) 5.16 |
| | | | Taldena, Mr. Ferrand |
| | | | (1,100) .. 1.57 |
| | | | Alutunwara—Mr. Leembruggen |
| | | | (300) 1.57 |
| | | SABARAGAMUWA. | |
| | | | Ambanpitiya, Mr. Weerasinghe |
| | | | (729) 12.55 |
| | | | Pelmadulla, Mr. Rotertsen |
| | | | (480) .. 19.24 |
| | | | Kolonna Korale (Hulanda- oya) Mr. Dobre |
| | | | (203) 1.17 |
| | | | Avisawella, Mr. Clarke |
| | | | (105) .. 15.64 |

SHARE LIST.

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 | 1000 | — | — |
| Ceylon Tea and Coconut Estates | 500 | — | — | — |
| Castlereagh Tea Co., Ltd. | 100 | — | 95 | 95 |
| Ceylon Hills Estates Co. Ltd. | 100 | — | — | — |
| Ceylon Provincial Estates Co. Ltd. | 500 | — | 510 | 500 |
| Claremont Estates Co., Ltd. | 100 | — | — | — |
| Clunes Tea Co., Ltd. | 100 | 75 | — | — |
| Clyde Estates Co., Ltd. | 100 | 50 | — | — |
| Dunmoo Tea Co., Ltd. | 100 | 60 | 65 | — |
| Drayton Estate Co., Ltd. | 100 | 100 | 150 | — |
| Ella Tea Co., of Ceylon, Ltd. | 100 | 55 | — | — |
| Estates Co. of Uva, Ltd. | 500 | 225 | — | — |
| Gangawatta | 500 | — | — | — |
| Glasgow Estate Co., Ltd. | 500 | 975 | — | — |
| Great Western Tea Co., | 500 | 625 | — | — |
| Hapugabalan Tea Estate Co. | 200 | — | — | — |
| High Forests Estates Co., Ltd | 500 | — | 600 | 587-50 |
| Do part paid | 350 | — | — | — |
| Horekelly Estates Co., Ltd. | 100 | — | 70 | — |
| Kalutara Co., Ltd. | 500 | — | 325 | — |
| Kandyan Hills Co., Ltd. | 100 | — | 70 | — |
| Kanapediwatte Ltd. | 100 | — | 90 | — |
| Kelani Tea Garden Co., Ltd. | 100 | — | 120 | — |
| Kirklees Estates Co., Ltd. | 100 | — | 65 | — |
| Knavesmire Estates Co., Ltd. | 500 | 887-50 | — | — |
| Maha Uva Estates Co., Ltd | 500 | — | — | — |
| Mooba Tea Co., of Ceylon, Ltd. | 500 | — | 375 | — |
| Nahavilla Estate Co., Ltd. | 500 | 450 | 500 | 450 |
| Neboda Tea., Co. Ltd | 100 | — | — | — |
| Nyassaland Coffee Co. Ltd | 500 | — | 500 | — |
| Ottory Estate Co., Ltd. | 100 | — | — | — |
| Palmerston Tea Co., Ltd. | 500 | — | 100 | — |
| Penrhos Estates Co., Ltd. | 100 | — | 5150 | — |
| Pine Hill Estate Co., Ltd. | 500 | — | — | — |
| Pitakanda Tea Company | 100 | — | — | — |
| Putupaula Tea Co., Ltd. | 500 | — | — | — |
| Ratwatte Cocoa Co., Ltd. | 100 | — | — | 55 |
| Rayigam Tea Co. Ltd. | 100 | 60 | — | 60 |
| Roeberry Tea Co., Ltd. | 100 | — | 40 | — |
| Ruanwella Tea Co., Ltd. | 500 | 510 | — | — |
| St. Heliers Tea Co., Ltd. | 100 | — | 35 | — |
| Talgaswela Tea Co., Ltd. | 100 | — | — | — |
| Do 7 per cent Prefs. | 500 | — | 450 | — |
| Tonacombe Estate Co., Ltd. | 100 | — | — | — |
| Udabage Co., Ltd. | 50 | — | — | — |
| Jdugama Tea & Timber Co., Ltd. | 500 | 200 | — | — |
| Union Estate Co., Ltd. | 500 | — | 450 | — |
| Upper Maskeliya Estate Co. Ltd. | 100 | 65 | — | — |
| Ovakellie Tea Co., of Ceylon, Ltd. | 100 | — | 75 | — |
| Vogan Tea Co., Ltd. | 500 | — | 1060 | — |
| Wanarajah Tea Co., Ltd. | 100 | 350 | 360 | — |
| Yataderiya Tea Co., Ltd. | 100 | — | — | — |

CEYLON COMMERCIAL COMPANIES

| | | | | |
|--|-----|--------|--------|--------|
| Adam's Peak Hotel Co., Ltd. | 100 | 25 | 50 | — |
| Bristol Hotel Co., Ltd. | 100 | 120 | 125 | 121-50 |
| Do 7 per cent Debts | 100 | 107-50 | — | — |
| Ceylon Gen. Steam Navig'n. Co., Ltd. | 100 | — | 215 | — |
| Colombo Apothecaries' Co. Ltd. | 100 | — | 142-50 | 142-50 |
| Colombo Assembly Rooms Co., Ltd. | 20 | 15 | — | — |
| Do prefs. | 20 | — | — | — |
| Colombo Fort Land and Building Co., Ltd. | 100 | — | 97-50 | — |
| Colombo Hotels Company | 100 | — | — | 295 |
| Galle Faces Hotel Co., Ltd. | 100 | 147-50 | — | 110 |
| Kandy Hotels Co., Ltd. | 100 | — | 127-50 | — |
| Kandy Stations Hotels Co. | 100 | — | 25 | — |
| Mount Lavinia Hotels Co., Ltd. | 50 | 175 | 200 | — |
| New Colombo Ice Co., Ltd. | 100 | 185 | — | — |
| Nuwara Eliya Hotels Co., Ltd. | 100 | 30 | — | 32-50 |
| Do 7 per cent prefs. | 100 | — | — | — |
| Public Hall Co., Ltd. | 20 | 15 | 16 | — |

LONDON COMPANIES*

| Company | paid p. sb. | Buy. ers. | Sell. ers. | Tran- sactions |
|---|-------------|-----------|------------|----------------|
| Alliance Tea Co., of Ceylon | 10 | 8½ | 9-10 | .. |
| Anglo Ceylon General Estates Co. | 100 | — | 45-50 | .. |
| Associated Estates Co., of Ceylon | 10 | — | 2-3 | .. |
| Do. 6 per cent prefs. | 10 | — | 6½-7½ | .. |
| Ceylon Proprietary Co. | 1 | — | — | .. |
| Ceylon Tea Plantation Co., Ltd. | 10 | — | 25-26 | .. |
| Dimbula Valley Co., Ltd. | 5 | — | 5½-6 | .. |
| Do prefs. | 5 | — | — | .. |
| Eastern Produce & Estates Co. | 5 | — | 5-5½ | .. |
| Ederapolla Tea Co., | 10 | — | 8-10 | .. |
| Imperial Tea Estates Co., Ltd. | 10 | — | 5-5½ | .. |
| Kelani Valley Tea Asscn., Ltd. | 5 | — | 5-6 | .. |
| Kintyre Estates Co., Ltd. | 10 | — | 7-8 | .. |
| Lanka Plantation Co., Ltd. | 10 | 4½ | 4-5 | .. |
| Nahalma Estates Co., Ltd. | 1 | — | — | .. |
| New Dimbula Co., Ltd. | 1 | — | 2½-3 | .. |
| Nuwara Eliya Tea Estate Co., Ltd. | 10 | — | — | .. |
| Ouvah Coffee Co., Ltd. | 10 | — | 6-7 | .. |
| Ragalla Tea Estates Co., Ltd. | 10 | — | — | .. |
| Scottish Ceylon Tea Co., Ltd. | 10 | — | 13-15 | .. |
| Spring Valley Tea Co., Ltd. | 10 | — | 4-5 | .. |
| Standard Tea Co., Ltd. | 6 | — | 11-11½ | .. |
| The Shell Transport and Trading Company, Ltd. | 100 | — | — | .. |
| Vatiyantota Ceylon Tea Co., Ltd. | 10 | — | 7½-8 | .. |
| Do. pref. 6 o/o | 10 | — | 9½-10½ | .. |

BY ORDER OF THE COMMITTEE.

Colombo, November 2nd, 1900,
* Latest London Prices.

THE LOCAL MARKET.

(By Mr. James Gibson, Baillie St., Fort.)
Colombo, Nov. 1st, 1900.

COFFEE:—

| | |
|-----------------------------|---------------|
| Estate Parchment per busbel | none |
| Cbetty do do | — |
| Native Coffee } per cwt. | } Nil. |
| do F. O. B. } | |
| Liberian coffee:—per busbel | } Nil |
| do cleaned coffee:—per cwt | |
| Cocoa unpecked:—per cwt | } Nil |
| do cleaned do | |
| Cardamoms Malabar per lb | R1'00 to 1'10 |
| do Mysore do | R1'40 to 1'60 |

RICE:—

| | |
|--------------------------------|-------------------|
| Soolai per bag of 164 lb. nett | R9'37 to 9'50 |
| 1st quality:—per bushel | R3'65 to 3'70 |
| Soolai 2 & 3rd. do do | R3'55 to 3'65 |
| Coast Calunda | R4'25 to 4'50 |
| Coast Kara | R1'00 to 4'12 |
| Kazala | R3'55 to 3'58 |
| Muttusamba Ordinary | R5'25 to 5'75 |
| Cinnamon per lb No 1 to 4 | 52c to 51c |
| do do 1 and 2 | 62c to 64c |
| do Chips per candy | R9'00 to 9'50 |
| Coconuts Ordinary per thousand | R35'00 to 38'00 |
| do Selected do | R38'00 to 39'00 |
| Coconut Oil per cwt | R14'00 to 14'25 |
| do do F. O. B. per ton | R289'00 to 285'00 |

POONAC:—

| | |
|----------------------------------|-------------------|
| Gingelly per ton | R100'00 to 102'50 |
| Coconut Cbckku do | R82'50 to 85'00 |
| do Mill (retail) do | R5'00 |
| Cotton Seed per ton | R90'00 |
| Copra per candy | — |
| Kalpitiya do | R43'00 to 44'50 |
| Marawilla do (Boat) | R42'00 to 45'00 |
| Cart Copra do | R36'00 to 40'00 |
| Satinwood per cubic feet. | R2'00 to 2'25 |
| do Flowered do | R5'00 to 6'00 |
| Halmilla do | R1'90 |
| Palu do | R1'60 to 1'12 |
| Ebony per ton | R75'00 to 175'00 |
| Kitul fibre per cwt | R30'00 to 32'00 |
| Palmyra do do | R5'00 to 13'00 |
| Jaffna Black Cleaned per cwt | R 2' 0 to 13'00 |
| do mixed do | R1'00 to 11'50 |
| Indian do | R7'00 to 10'50 |
| do Cleaned do | R5'00 to 13'00 |
| Sapanwood per ton | R47'50 to 50'00 |
| Kerosene oil American per cases, | R7'00 to 7'25 |
| do bulk Russian, per tin | R3'02 to 3'15 |
| do Russian per cases | R 5'00 to 6'75 |
| Nux Vomica per cwt | R2'00 to 2'50 |
| Croton Seed per cwt | R2'00 to 2'20 |
| Kapok cleaned f o b per cwt | R24'00 |
| do uncleaned do | R5'00 |
| Plumbago large lumps | R30'00 to 700'00 |
| per ton, Ordinary size lumps | R250'00 to 650'00 |
| according to grade | R150'00 to 450'00 |
| do Dust | R60'00 to 300'00 |

at the lower figure.

COLOMBO PRICE CURRENT.

(Furnished by the Chamber of Commerce.)

EXPORTS.

Colombo, 29th Oct. 1900.

CEYLON EXPORTS AND DISTRIBUTION, FOR SEASONS 1899 AND 1900.

| COUNTRIES | Tea. | | Coffee—cwt. | | Cocoa, Cinnamon. | | Cinnamon. | | Coconut Oil. | | Copra. | | Peanut Coconuts lb. | | Peanut Coconuts No. | | Plumbago. | | Ebony. | |
|--|-----------|-----------|--------------|-------|------------------|---------|-----------|-------------|--------------|-----------|--------|----------|---------------------|------------|---------------------|-------|------------|------------|--------|-------|
| | 1900 lbs. | 1899 lbs. | Plan- tation | Total | Total | lbs. | lbs. | Chips. lbs. | 1900 cwt. | 1899 cwt. | cwts. | cwts. | 1900 cwts. | 1899 cwts. | No. | cwts. | 1900 cwts. | 1899 cwts. | Fibre. | cwts. |
| To U K. | 80754577 | 88857219 | 6568 | 6568 | 6568 | 273218 | 720464 | 197754 | 187221 | 161295 | 17470 | 7108402 | 8728839 | 157382 | 44614 | 280 | | | | |
| " Austria | 1107 | 749 | | | | | 150 | 1080 | 7281 | 6173 | 25742 | 897 | 14 | 14 | 44614 | | | | | |
| " Belgium | 12855 | 13039 | | | | | 1080 | 107462 | 136 | 1602 | 4539 | 6985 | 34 | 34 | 15486 | | | | | |
| " France | 243952 | 80476 | | | | | 7269 | 167462 | 136 | 1602 | 4539 | 6985 | 34 | 34 | 15486 | | | | | |
| " Germany | 28448 | 80129 | | | | | 8898 | 41784 | 136 | 1602 | 4539 | 6985 | 34 | 34 | 15486 | | | | | |
| " Holland | 2000 | 30211 | | | | | 5987 | 46361 | 136 | 1602 | 4539 | 6985 | 34 | 34 | 15486 | | | | | |
| " Italy | 5032 | 19471 | | | | | 14700 | 136080 | | 404 | 1500 | 131080 | 7002 | | 440 | | | | | |
| " Russia | 6927566 | 2719244 | | | | | 177500 | 52500 | | 206 | 4403 | | 1590 | | 1188 | | | | | |
| " Spain | 15130 | 14800 | | | | | 17500 | 52500 | | 206 | 4403 | | 1590 | | 1188 | | | | | |
| " Sweden | 59285 | 5762 | | | | | 17500 | 52500 | | 206 | 4403 | | 1590 | | 1188 | | | | | |
| " Turkey | 22202 | 15674 | | | | | 17500 | 52500 | | 206 | 4403 | | 1590 | | 1188 | | | | | |
| " India | 671695 | 442965 | | | | | 516 | 10 | 68060 | 53806 | 437 | | 2000 | | 307 | | | | | |
| " Australia | 1374174 | 13210163 | | | | | 516 | 10 | 68060 | 53806 | 437 | | 2000 | | 307 | | | | | |
| " America. | 3581117 | 26730 | | | | | 10906 | 6831 | 48290 | 81695 | 104 | | 601750 | | 425 | | | | | |
| " Africa. | 161748 | 26730 | | | | | 10906 | 6831 | 48290 | 81695 | 104 | | 601750 | | 425 | | | | | |
| " China. | 1004357 | 1174745 | | | | | 2408 | 42 | 938 | 3184 | 20 | | 1682538 | | 127 | | | | | |
| " Singapore | 99029 | 57946 | | | | | 4029 | 4029 | | | | | 1503 | | | | | | | |
| " Mauritius | 710 | 80866 | | | | | | | | | | | | | | | | | | |
| " Malacca | 365023 | 236767 | | | | | | | | | | | | | | | | | | |
| Total export from 1st Jan. to 29th Oct. 1900 | 117067635 | 105108952 | 991 | 4 | 9835 | 2054688 | 416469 | 1328475 | 328647 | 812884 | 250705 | 10810500 | 11252616 | 539886 | 84043 | 2617 | 296496 | 539886 | 84043 | 2617 |

CARDAMOMS:—
All round parcel, well bleached per lb. R1.70
Do. dull medium do. 1.35
Special assortment, 0 and 1 only do. 1.85
Seeds do. 1.60

CINCHONA BARK:—
Per unit of Sulphate of Quinine 11c—For 1½ to 3 o/o

CINNAMON:—
Ordinary assortment per lb. 59c.
Nos. 1 and 2 only per lb. 64c.
Nos. 3 and 4 only per lb. 54c.

CINNAMON CHIPS:—
Per candy of 560 lb R95.00

COCOA:—
Finest estate red; unpicked per cwt R60
Medium do do R54
Bright native, unpicked and undried R52
Ordinary do do do R15

COCONUTS—(husked).
Selected per thousand R48.00
Ordinary " " R38.00
Small " " R29.00

COCONUT CAKE—
Peanut in robins f. o. b. per ton R82.50
Do in bags R60.00

COCONUT (Desiccated).
Assorted all grades per lb. 14½c

COCONUT OIL—
Dealers' Oil per cwt. R14.25
Coconut Oil in ordinary packages, f. o. b. per ton R322.50

COFFEE.—
Plantation Estate Parchment on the spot per bus.—None.
Plantation Estate Coffee f.o.b. (ready) per cwt - None.

NATIVE COFFEE, f.o.b per cwt.—None.

CITRONELLA OIL.—
Ready do per lb. 65c.

COPRA—
Boat Copra per candy of 560 lb. R45.00
Calpentyng Copra do do R45.00
Cart do do do R41.00
Estate do do do R45.50

CROTON SEED per cwt none

EBONY—
Sound per ton at Govt. depot—R205.
Inferior R155. Next Govt. sales on Dec 3rd.

FIBRES—
Coconut Bristle No 1 per cwt R10.50
Do 2 " " none
Do mattress " 1 " 4.00
Do " 2 " 3.00
Coir Yarn, Kogalla, " 1 to 8 18.00
Do Colombo " 1 to 8 16.00
Kitool all sizes 38.00
Palmyrah 16.00

PEPPER—Black per lb 28c.

PLUMBAGO—
Large lumps per ton R700
Ordinary lumps do 65
Chips do 450
Dust do 300
Do (Flying) 150

SAPANWOOD— per ton None
SATINWOOD (ordinary) per cubic ft. None
High Grown Medium Low Grown

TEA— Average. Average. Average.
Broken Pekoe and Broken cts cts cts
Orange Pekoe per lb 57 48 34
Orange Pekoe do 60 39 35
Pekoe do 45 37 32
Pekoe Souchong do 36 32 28
Pekoe Fannings do 37 24 20
Broken mixed—dust, &c. per lb 26 20 20

Business passing.

Total export from 1st Jan. to 29th Oct. 1900

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Prices Current, London, October 3rd, 1900.)

| | QUALITY. | QUOTATIONS. | | QUALITY. | QUOTATIONS. |
|--------------------------|--------------------------------|-------------------|--------------------------|--------------------------------|------------------|
| ALoes, Soccotrine cwt. | Fair to fine dry ... | 44s a 55s | INDIARUBBER, (Contd). | Foul to good clean ... | 8d a 3s 3d |
| Zanzibar & Hepatic ,, | Common to good .. | 20s a 60s | Java, Sing. & Penang lb. | Good to fine Ball .. | 2s 8d a 3s 6d |
| ARROWROOT (Natal) lb. | Fair to fine .. | 5½d a 6½d | | Ordinary to fair Ball .. | 2s a 2s 10½d |
| BEE'S WAX, cwt. | | | Mozambique ,, | Low sandy Ball .. | 1s 2d a 1s 7d |
| Zanzibar & White ,, | Good to fine .. | £6 a £7 10s | | Sausage, fair to good .. | 2s 6d a 3s 3d |
| Bombay Yellow ,, | Fair .. | £5 15s a £6 2s 6d | Nyassaland .. | Liver and livery Ball .. | 2s 4d a 2s 1½d |
| Madagascar ,, | Dark to good palish .. | £6 a £6 5s | | F-r to fine ball .. | 3s 1da 3s 1½d |
| CAMPHOR, China ,, | Fair average quality .. | 18s 6d | Madagascar ,, | Fr to fine pinky & white .. | 3s a 3s 3d |
| Japan .. | | 19s | | Fair to good black .. | 2s a 2s 10d |
| CARDAMOMS, Malabar lb | Clipped, bold, bright, fine .. | 2s 3d a 2s 4d | | Niggers, low to fine .. | 11da 2s 4d |
| Ceylon.-Mysore ,, | Middling, stalky & lean .. | 1s 5d a 1s 7d | INDIGO, E.I. ,, | Bengal-- | |
| | Fair to fine plump .. | 1s da 3s 9d | | Shipping mid to good violet .. | 3s 7d a 4s 6d |
| | See's .. | 1s 6d a 2s | | Consuming mid. to good .. | 3s a 3s 6d |
| | Good to fine .. | 2s 11d a 3s | | Ordinary to mid. .. | 2s 9d a 3s 3d |
| | Brownish .. | 2s 6d | | Mid. to good Kurpah .. | 2s 4d a 3s |
| | Shelly to good .. | 2s 11d a 3s 6d | | Low to ordinary .. | 2s a 2s 3d |
| | Med brown to good bold .. | 1s 10d a 3s 6d | | Mid. to good Madras .. | 1s 7da 2s 6d |
| CASTOR OIL, Calcutta ,, | Ists and 2nds .. | 4d a 4½d | MACE, Bombay & Penang | Pale reddish to fine .. | 2s a 3s |
| CHILLIES, Zanzibar cwt. | Dull to fine bright .. | 37s 6d a 47s 6d | per lb. | Ordinary to fair .. | 1s 4d a 1s 11d |
| CINCHONA BARK.-lb. | Lageriana Orig. Stem .. | 3½d a 6½d | | Pickings .. | 1s 3d a 1s 4d |
| Ceylon | Crown, Renewed .. | 5d a 7d | MYRABOLANS, } cwt | Dark to fine pale UG .. | 6s a 7s |
| | Org. Stem .. | 3½d a 5½d | Madras } | Fair Coast .. | 5s 6d a 6s |
| | Red Org. Stem .. | 4½d a 5½d | Bombay ,, | Jubblepore .. | 4s 3d a 7s |
| | Renewed .. | 5½d a 7½d | | Bhimlies .. | 4s 9d a 9s 6d |
| | Root .. | 3½d a 4d | | Rhapore, &c. .. | 4s 3d a 8s |
| CINNAMON, Ceylon | Ordinary to fine quill .. | 11da 1s 8d | | Calcutta .. | 4s 6d a 6s |
| per lb. | " " .. | 10d a 1s 7d | NUTMEGS-- lb. | 64's to 57's .. | 2s 4d a 2s 6d |
| 1sts | " " .. | 9½d a 1s 6d | Bombay & Penang ,, | 110's to 65's .. | 11 d a 2s 3d |
| 2nds | " " .. | 8½d a 11½d | | 160's to 130's .. | 6d a 11d |
| 3rds | " " .. | 2½d a 4d | NUTS, ARECA cwt. | Ordinary to fair fresh .. | 15s a 17s |
| 4ths | " " .. | 5½d a 9d | NUX VOMICA, Bombay | Ordinary to middling .. | 4s a 5s 6d |
| Chirs | " " .. | 4½d a 5½d | per cwt. Madras | Fair to good bold fresh .. | 7s a 10s |
| CLOVES, Penang lb. | Dull to fine bright bold .. | 3½d a 3½d | | Small ordinary and fair .. | 5s 6d |
| Amboyna .. | Good and fine bright .. | 3½d a 3½d | OIL OF ANISEED lb | Fair merchantable .. | 6s |
| Zanzibar .. | Common dull to fair .. | 3½d a 3½d | CASSIA | According to analysis .. | 3s 8d a 4s |
| Stems .. | Fair .. | 1½d | LEMONGRASS | Good flavour & colour .. | 3d |
| COFFEE | | | NUTMEG | lingy to white .. | 3d a 3½d |
| Ceylon Plantation ,, | Bold to fine bold color .. | 100s a 115s | CINNAMON | Ordinary to fair sweet .. | 3½d a 1s 6d |
| | Middling to fine mid .. | 85s a 9½s 6d | CITRONELLE | Bright & good flavour .. | 11d a 10½d |
| | Low mid. and low grown .. | 75s a 82s 6d | ORCHELLA WEED--cwt | | |
| | Small .. | 55s a 75s | Ceylon | Mid. to fine not woody .. | 10s a 12s 6d |
| | Good ordinary .. | 30s a 70s | Zanzibar .. | Picked clean flat leaf .. | 10s a 16s |
| Native | Small to bold .. | 37s a 45s | | " wiry Mozambique .. | 10s a 11s |
| Liberian | Bold to fine bold .. | 90s a 105s | PEPPER - (Black) lb. | | |
| COCOA, Ceylon | Medium and fair .. | 8's a 90s | Alleppee & Tellicherry | Fair to bold heavy .. | 6½d a 6½d |
| | Native .. | 7s a 80s | Singapore | Fair .. | 6½d a 6½d |
| | Middling to good .. | 2s a 20s | Acheen & W. C. Penang | Dull to fine .. | 5½d a 6½d |
| COLOMBO ROOT | | nominal | Plumbago, lump cwt. | Fair to fine bright bold .. | 4s a 40s |
| COIR ROPE, Ceylon ton | Ordinary to fair .. | £13 10s a £13 | | Middling to good small .. | 2 s a 32s |
| Cochin ,, | Ord. to fine long straight .. | £16 a £19 | chips | 10s to fine bright .. | 10s a 20s |
| FIBRE, Brush | Ordinary to good clean .. | £18 a £24 | dust | Ordinary to fine bright .. | s a 0s |
| Cochin ,, | Common to fine .. | £7 a £9 | SAFFLOWER | Good to fine pinky .. | 63s a 75s |
| Stuffing ,, | Common to superior .. | £15 a £33 | | Inferior to fair .. | 40s a 60s |
| COIR YARN, Ceylon | " very fine .. | £12 a £32 | SANDAL WOOD-- | | |
| Cochin ,, | Roping, fair to good .. | £10 a £14 10s | Bombay, Logs ton. | Fair to fine flavour .. | £20 a £50 |
| do. ,, | Dull to fair .. | 30s a 40s | Chips | " .. | 5s a £8 |
| CROTON SEEDS, sift. cwt. | Fair to fine dry .. | 23s a 36s | Madras, Logs | Fair to good flavour .. | £20 a £50 |
| CUTCH | Fair .. | 28s 6d | Chips | Inferior to fine .. | 4 a £8 |
| GINGER, Bengal, rough | Good to fine bold .. | 50s a 100s | SAPANWOOD Ceylon | Fair to good .. | £5 a £5 10s |
| Calicut, Cut A | Small and medium .. | 35s a 72s 6d | Manila | Rough & rooty to good .. | 4 10s a 15 15s |
| B & C | Common to fine bold .. | 25s a 33s | Siam | bold smooth .. | 51s 6d a 59s 6d |
| Cochin Rough | Small and D's .. | 25s a 28s | SEEDLAC | Good to fine bold green .. | 4d a 5½d |
| Japan | Unsplit .. | 27s | SENNA, Tinnevely lb | Fair middling medium .. | 4d a 5½d |
| GUM AMMONIACUM | Sm. blocky to fine clean .. | 20s a 45s | | Common dark and snal .. | 4d a 5½d |
| ANIMI, Zanzibar | Picked fine pale in sorts .. | £107s 6d a £20 | SHELLS, M. o'PEARL-- | | |
| | Part yellow and mixed .. | £8 2/6 a £10 10s | Bombay cwt. | Bold and A's .. | |
| | Bean and Pea size ditto .. | 70s a £9 2/6 | | D's and B's .. | |
| | Amber and dk. red bold .. | £5 10s a £7 10s | | Small .. | £1 a £5 2s 6d |
| | Med. & bold glassy sorts .. | 80s a 100s | Mergui | Small o bold .. | £5 12/6 a £7 10s |
| Madagascar | Fair to good palish .. | £4 8s a £8 | Mussel | Small to bold .. | 8s a £2 11s |
| | " red .. | £4 5s a £9 | TAMARINDS, Calcutta... | wid. to fine blk not stony .. | 15s a 16s |
| ARABIC E. I. & Aden | Ordinary to good pale .. | 35s a 60s | per cwt Madras | Stony and inferior .. | 7s 6d a 11s |
| Turkey sorts | | 67s 6d a 85s | TORTOISESHELL-- | | |
| Ghatti | Pickings to fine pale .. | 12s 6d a 35s | Zanzibar & Bombay lb. | Small to bold dark .. | 17s a 24s |
| Kurrachee | Good and fine pale .. | 52s 6d a 55s | | mottle part heavy .. | 28s nom. |
| | Reddish to pale selected .. | 30s a 41s | TURMERIC, Bengalewt. | Fair .. | |
| Madras | Dark to fine pale .. | 23s a 35s | Madras | Finger fair to fine bold .. | 25s a 27s 6d |
| ASSAFETIDA | Clear fr to gd. almonds .. | 40s a 35s | Do. ,, | bright .. | 2s a 21s |
| | Ord. stony and blocky .. | 1s a 25s | Cochin | Bulbs .. | 2s |
| KINO | Fine bright .. | 1s a 1s 3d | | Bulbs .. | 7s 6d |
| MIRRH, picked | Fair to fine pale .. | 65s a 75s | VANILLOS-- lb. | | |
| Aden sorts | Middling to good .. | 50s a 60s | Mauritius | Gd. crysallized 3½ a 9 in .. | 17s 6d a 27s |
| OLIBANUM, drop | Good to fine white .. | 35s 6d a 50s | Bourbon | Foxy & reddish 4½ a 8 .. | 15s a 2's |
| | Middling to fair .. | 25s a 35s | Seychelles | Lean and inferior .. | 1us a 13s 6d |
| | Low to good pale .. | 17s a 20s | VERMILION | Fine, pure, bright .. | 3s 3d |
| | Slightly foul to fine .. | 16s 6d a 18s | WAX, Japan, squares cwt. | Good white hard .. | 33s 6d |
| INDIARUBBER, Assamb | Good to fine .. | 2s 10½d a 3s 0½d | | | |
| | Common to foul & mixd .. | 1s 4d a 2s 6d | | | |
| | Fair to good clean .. | 2s 3d a 3s 3d | | | |
| Rangoon | Common to fine .. | 1s a 2s 4d | | | |
| Borneo | | | | | |

THE
AGRICULTURAL MAGAZINE,
COLOMBO.

Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."

The following pages include the Contents of the *Agricultural Magazine* for November:—

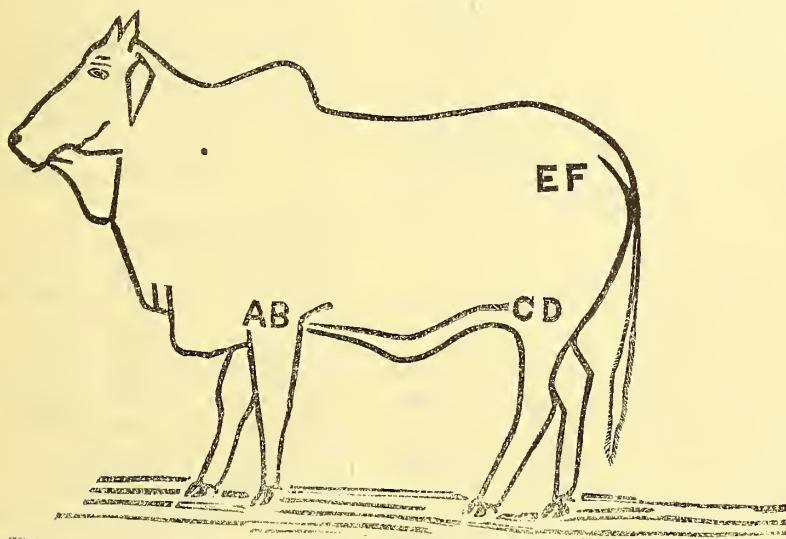
Vol. XII.]

NOVEMBER, 1900.

[No. 5.

THE BRANDING OF CATTLE.

(Continued from last number.)



PEAKING of the deterioration of hides, some years ago a letter was addressed by the London Chamber of Commerce drawing the attention of cattle owners to the reduction in the price of hides

caused by carelessness in branding cattle, and suggested the possibility of a distinctive mark

being made on the horns and hoofs of animals. This latter suggestion I consider unsatisfactory, for obvious reasons, in a country where the technicalities involved in the art of cattle stealing are so well understood. An Australian leather merchant went the length of inserting an illustration showing brands placed on inferior parts of the hide, with an announcement headed

important to stock owners, offering to give three shillings in advance of the market rates for hides not branded on the prime parts, the parts recommended being the thigh, upper arm, neck and cheek.* If cruelty is to be avoided and at the same time the commercial value of the hides is not to be depreciated, I consider the thigh and the upper arm the most suitable places, but I cannot give my support to branding on the cheek or neck. I have already given it as my opinion that the thigh and croop are the best places for branding and as a compromise with those who are anxious for the value of the hide I am so far prepared to modify my recommendation and join issues with them, as to consent to substitute the upper arm for the croop. Let these two places then—the thigh and the upper arm—be fixed upon as the most suitable on all grounds for branding for identification. The branding might commence at the upper arm, and if the space available is not sufficient it might be continued on to the thigh, and provided even these two places do not suffice, the croop might be included as a *dernier ressort*.

I have yet another suggestion to make, and that is that owners of stock should possess a branding instrument in which the initials of the owner, or any other selected letters or marks, should be designed in iron, so that the letters &c. might be of uniform size and conveniently impressed on the body by means of a handle to which the connected letters should be attached. That native blacksmiths are quite able to work out any design or initials in iron is evidenced by the fact that the Government Dairy branding iron representing the royal crown, and other irons representing initials, have been made by ordinary blacksmiths with no special qualification for the work. Such irons as I have referred to should not cost on an average more than R1. If owners of cattle are compelled to produce their branding irons, the design of which should be registered with an appointed village authority, who should perform the duties of an inspector of brands (an office which exists in some countries) it would be a great deterrent to cattle stealing.

III. BRANDING FOR ARTISTIC EFFECT.

Branding with this object in view is cruelty pure and simple, without any shroud of common-sense or humanity to recommend it. The man whose eye is pleased by artistic brandmarks must be put down as the product by a low state of civilization. The representations for artistic effect vary in design and magnificence. They are sometimes geometrical, sometimes floral, and sometimes representative of mythological deities, or symbolize supernatural influences. There should be no half measures in dealing with this inhuman form of the decorative art, and summary punishment should be meted out to those who practise it.

IV. BRANDING FOR CONCEALMENT OF THEFT.

It is by no means uncommon to hear of the brandmarks on stolen cattle being altered with the object of defying detection of the theft. These

alterations are generally done under the plea of therapeutic or artistic branding, and in some instances are very skillfully carried out. Let us, for purposes of illustration, suppose that a particular bull bears three branded letters which are disposed of as follows: $\text{\textcircled{M}}$ for Mullegama on the thigh, $\text{\textcircled{K}}$ for Kalu on the abdomen, $\text{\textcircled{B}}$ for Banda on the shoulder, and that the owner Mullegama Kalu Banda loses the animal. When the bull is found in the possession of the cattle lifter (by name Kiri Banda) the letter $\text{\textcircled{M}}$ standing for Mullegama is entirely disguised by a highly ornamental mythological design, and the necessary addition is made above the letter $\text{\textcircled{K}}$ to alter it into $\text{\textcircled{KB}}$, so that the initial of Kalu Banda becomes that of Kiri Banda. It requires expert knowledge to trace the difference between an old and recent brandmark, and very often it is quite impossible to make the distinction for there are ways and means of making new marks appear old. But if my recommendation that the possession of a branding iron with a specific design of letters or figures or marks be made compulsory, and the additional precaution enforced of having these brandmarks registered, two objects will be served, for both the pain of branding and the possibility of cattle thieving will be minimised. When the unlettered villager starts practising writing his initials with a hot iron, like a school boy at his first copy-book, one can imagine the slow torture that many of our dumb friends are put to. Now this torture would be practically absent and at the same time there will be no latitude for increasing the dimensions in length, breadth, height and thickness, or the artistic effect of the lettering.

In view of the fact that both therapeutic (so-called) branding and branding for artistic effect are used as a blind for the concealment of theft, there is all the more necessity for prohibiting cruelty to animals practised on these excuses.

OCCASIONAL NOTES.

The following are the references to agricultural matters in the Governor's speech at the opening of the new Session of the Legislative Council on the 18th October:—The Commission which I appointed in January, 1899, under the presidency of Mr. Justice Lawrie, to inquire into and report on the advisability of establishing a Department of Agriculture, reported on 31st October, 1899. A majority of the Commission recommended the appointment of a Director of Agriculture to be assisted by an advisory board, and that there should be attached to the Department of the Director of the Royal Botanic Gardens, a Mycologist, Agricultural Chemist, Entomologist, and Veterinary Surgeon. A majority also recommended that the Irrigation Department should be combined with the new Department. After careful consideration in Executive Council of this report, and also of the views expressed by Messrs. Willis and Ferguson and others, I decided that the time had not yet come when the appointment of a Director of Agriculture would be justified, but that the formation of an unpaid Central Board on the same lines as the Central Irrigation Board, and of Provincial Boards under the Government Agents

* [I am informed by a local authority that the loss on Ceylon hides due to depreciation on account of branding may be put down at two pence per pound.]

would be desirable. The suggestion that a Mycologist, Entomologist, and Agricultural Chemist should be attached to the staff of the Royal Botanic Gardens was approved, and has been carried out. In December last a Committee composed of the Hon. Messrs. Taylor and Ellis, the Director of the Royal Botanic Gardens, and the Director of Public Instruction were appointed to consider the suggestion that the Agricultural School should be transferred to Kandy and placed under the direction of the Director of the Royal Botanic Gardens. The Committee recommended that the existing school be closed at the earliest possible date, and the buildings for the present be left in the charge of the Director of Public Instruction, and that the land be sold for building sites. They also recommended that if Government contemplated the addition to the Royal Botanic Gardens of an experimental farm or garden, the Agricultural School should be transferred to Peradeniya and be established there as a part of the experimental garden. This proposal has been accepted by Government, and Mr. Willis has submitted a scheme, now under consideration, for acquiring land suitable for the purpose at a cost which it is hoped will be largely covered by the sale of the land adjoining the existing school at Colombo.

There has been a good deal of correspondence, in the local press, as to the advisability of manuring tea with Sulphate of Ammonia. We are not much in favour of using the more soluble artificial manures in perennial cultivation especially in the wetter districts and steep hill-sides, mainly owing to the fact that the practice is not to be recommended from an economical point of view; but we are far from saying that there is any positive harm to be feared—as some would make out—by the use of this fertilizer, if a due proportion of manures supplying the other important ingredients of plant food is also given to the plant. There is much harm done by the indiscriminate use of special manures without seeing that at the same time that the other concomitants of plant food are also placed at the disposal of the plant. The reason of so doing is obvious enough and needs no further elucidation.

We are again growing lucerne from seed kindly supplied by Mr. J. W. Mollison, Deputy Director of Agriculture, Bombay Presidency. Two varieties were sent us, viz., English seed and Poona seed. Lucerne is grown as a profitable crop in India where it is used as hay for horses. Its ash contains six times as much lime as ordinary grass and the plant therefore requires a good deal of lime in the soil. It is thus particularly useful for feeding young growing stock. The following is the composition of lucerne hay: Moisture, 14.3; ash, 6.3; Albuminoids, 14.7; Fibre, 33.7; Starch, Sugar, &c., 28.5; Fat, 2.6. Of these the following proportions are put down as "digestible":—Albuminoids, 9.6; Fibre, Starch, Sugar, &c., 28.9; and Fat, 1.0. Lucerne hay contains twice as much flesh formers as wheat and oat hay do, about the same amount of fat, but two-thirds the amount of digestible Starch, Sugar, and Fibre.

"COFFEE TEA" would appear to be "queer mixture," but it is really a "tea" (i.e., an infusion) of prepared coffee leaves. It is said to be used by the Sumatrans, who practically live on boiled rice and coffee tea, doing an immense amount of work and undergoing much exposure to the weather. It is reported to give "immediate relief to hunger and fatigue." The leaves and twigs are "roasted" over a smokeless fire, then rubbed by hand into a coarse powder in which form it is ready for use. The *Chemist* is quoted to prove that coffee tea contains all the characteristics of the bean while richer in theine. The Editor of the *Queenland Agricultural Journal* pronounces coffee tea as "a pleasant refreshing beverage." For ourselves we confess a partiality for "tea tea" (not that we have tasted any other) particularly when prepared from Ceylon leaf.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF OCTOBER, 1906.

| | | | |
|-----------------|------|-----------------|-------|
| 1 Monday .. | .57 | 19 Friday .. | .94 |
| 2 Tuesday .. | Nil | 20 Saturday .. | .61 |
| 3 Wednesday .. | Nil | 21 Sunday .. | 1.35 |
| 4 Thursday .. | .03 | 22 Monday .. | Nil |
| 5 Friday .. | .01 | 23 Tuesday .. | Nil |
| 6 Saturday .. | Nil | 24 Wednesday .. | Nil |
| 7 Sunday .. | .01 | 25 Thursday .. | Nil |
| 8 Monday .. | Nil | 26 Friday .. | Nil |
| 9 Tuesday .. | .03 | 27 Saturday .. | Nil |
| 10 Wednesday .. | .04 | 28 Sunday .. | .32 |
| 11 Thursday .. | Nil | 29 Monday .. | .85 |
| 12 Friday .. | .61 | 30 Tuesday .. | .11 |
| 13 Saturday .. | 3.50 | 31 Wednesday .. | .15 |
| 14 Sunday .. | .50 | 1 Thursday .. | Nil |
| 15 Monday .. | .49 | | |
| 16 Tuesday .. | .41 | | |
| 17 Wednesday .. | .87 | Total .. | 11.85 |
| 18 Thursday .. | 1.02 | Mean .. | .38 |

Greatest amount of rainfall in any 24 hours on the 13th Oct., 3.50 inches.

Recorded by Mr. C. DRIEBERG.

GRAFTING THE MANGO.

(Concluded.)

When the young shoots which have sprung from the grafts have ripened, the old wood projecting beyond the graft should be sawn off close at the base of the new growth. As the new wood continues to grow, it will cover up the entire end where it was sawn off.

To remove a section of the bark for grafting, first make a cut through the bark with a small saw at the two ends, then take a broad chisel, the level side being set towards the piece to come out, and give it a smart blow. Now turn the chisel over to the opposite side, repeat the blow, and the piece will fly out if the sap is at all active. Should the piece fail to come off, put the chisel into the saw cuts and raise gently. If it still sticks cut further into the original saw cuts, split out the wood with the bark adhering, and whittle the wood out of the section

that has been removed, by means of a sharp chisel, without injuring the bark. Do not be afraid of injuring your good tree by removal of pieces of bark; the wound will heal in twelve months' time, and instead of hurting, the process may make the tree more fruitful.

Apropos of this subject of making the mango fruitful, the writer of the paper from which we are making these notes, (Mr. Horace Knight) is led to conclude from his experience that root pruning rather than branch pruning is to be preferred. The object is obtained by checking the flow of sap underground, instead of mutilating the trunk and limbs. Of course root pruning would not apply to trees which have become barren through neglected cultivation, impoverished soil, or through any foreign agencies affecting the tree above ground.

The object of grafting a number of good (different) varieties on one stock, is to get a good "blend" by cross-fertilization, as the flower spikes of the different varieties being in close proximity to each other, the chances of getting a new type of fruit, combining the good qualities of the different varieties, are much more favorable than if the individual varieties grew at some distance apart as separate trees. When the seedling from the tree bearing the grafts fruited, this new fruit tree will be available for future grafting or budding.

We now possess fibreless fruits, which, while extremely handsome are almost tasteless, while others are full flavoured but uninviting while some have size though not flavour in their favour. Here is where skill and judgment are required, viz., to unite all the described qualities in one fruit.

SIR JOHN LAWES—HIS LIFE AND WORK.*

By the death of Sir John Lawes on the last day of July, 1900, Agriculture loses one of the greatest benefactors it has ever had.

Born in December 28th, 1814, in the old Manor-house at Rothamsted, Herts, where nearly 86 years later he died, the deceased baronet was the son of the late Mr. John Bennet Lawes, whom he succeeded in the paternal estates in 1822, at the early age of eight. After leaving Eton he proceeded to Oxford, and passed some time at Brasenose College. His inclinations, however, were not much in the direction of classical study, and he shortly found himself in more congenial surroundings in the chemical laboratory of Dr. Anthony Todd Thompson, at University College, London. On entering into possession of his hereditary property at Rothamsted in 1834, he at once began experiments upon plants growing in pots, the investigations being subsequently extended to the field. One of the most striking results observed in these early days was the excellent effect produced upon the turnip crop by dressing it with mineral phosphates that had been treated with sulphuric acid. At once grasping the importance of this discovery, Mr. Lawes, as he

was then, obtained in 1842 a patent for the manufacture of superphosphate, and thus laid the foundation of a great industry.

In the following year was taken the decisive step of establishing at Rothamsted a properly equipped agricultural experimental station.

Simultaneously, Mr. Lawes secured the co-operation of a young chemist, Dr. (now Sir) J. Henry Gilbert, and the association which was thus commenced fifty-seven years ago has been attended by the happiest results, as the numerous scientific memoirs that have issued year after year from Rothamsted amply testify.

Two main lines of inquiry have been followed, the one relating to plants, the other to animals. In the former case the method of procedure has been to grow some of the most important crops of rotation, each separately, year after year, for many years in succession on the same land, without manure, with farmyard manure, and with a great variety of chemical manures; the same description of manure being, as a rule, applied year after year on the same plot. Experiments on an actual course of rotation, without manure, and with different manures, have also been made. Wheat, barley, oats, beans, clover and other leguminous plants, turnips, sugar beet, mangels, potatoes, and grass crops have thus been experimented upon. Incidentally there have been extensive sampling and analysing of soils, investigations into rainfall and the composition of drainage waters, inquiries into the amount of water transpired by plants, and experiments on the assimilation of free nitrogen. Lest any misunderstanding should arise as to the attitude taken up concerning the last-named subject, it may be useful to quote the following from the Memoranda of the Rothamsted Experiments, 1900 (p 7):—Experiments were commenced in 1857, and conducted for several years in succession, to determine whether plants assimilate free or uncombined nitrogen, and also various collateral points. Plants of the gramineous, the leguminous, and of other families, were operated upon. The late Dr. Pugh took a prominent part in this inquiry. The conclusion arrived at was that our agricultural plants do not themselves directly assimilate the free nitrogen of the air by their leaves.

In recent years, however, the question has assumed quite a new aspect. It now is—whether the free nitrogen of the atmosphere is brought into combination under the influence of micro-organisms, or other low forms, either within the soil, or in symbiosis with a higher plant, thus serving indirectly as a source of nitrogen to plants of a higher order. Considering that the results of Hellriegel and Wilfarth on this point were, if confirmed, of great significance and importance, it was decided to make experiments at Rothamsted on somewhat similar lines. Accordingly, a preliminary series was undertaken in 1888; more extended series were conducted in 1889 and in 1890; and the investigation was continued up to the commencement of the year 1895. Further experiments relating to certain aspects of the subject were commenced in 1898, and are still in progress. The results have shown that, when a soil-growing leguminous plant is

*Abridged from a paper by Dr. Fream in the R.A.S.E. Journal.—Ed. A.M.

infected with appropriate organisms, there is a development of the so-called leguminous nodules on the roots of the plants, and, coincidentally, increased growth and gain of nitrogen.

The experiments with farm animals began in 1847, and have been continued at intervals nearly to the present time. Amongst the points that have been investigated are the following:—

1. The amount of food, and of its several constituents, consumed (*a*) in relation to a given live-weight of animal within a given time, (*b*) to produce a given amount of increase in live-weight.

2. The proportion and relative development of the different organs, or parts of different animals.

3. The proximate and ultimate composition of the animals in different conditions as to age and fatness, and probable composition of their increase in live weight during the fattening process.

4. The composition of the solid and liquid excreta (the manure) in relation to that of the food consumed.

5. The loss or expenditure of constituents by respiration and the cutaneous exhalations—that is, in the mere sustenance of the living meat—and manure-making machine.

6. The yield of milk in relation to the food consumed to produce it; and the influence of different descriptions of food on the quantity, and on the composition of the milk. Incidentally, the results obtained from the inquiries just enumerated have furnished data essential to the consideration of such problems as (*a*) the sources in the food of the fat produced in the animal body; (*b*) the characteristic demands of the animal—for nitrogenous or non-nitrogenous constituents of food—in the exercise of muscular power, (*c*) the comparative characters of animal and vegetable food in human dietaries.

Amongst the field experiments there is, perhaps, nothing of more universal interest than the field—known as Broadbalk Field—in which wheat has been grown for fifty-seven years in succession, without manure, with farmyard manure, and with various artificial manures. The results show that, unlike leguminous crops such as beans or clover, wheat may be successfully grown for many years in succession on ordinary arable land, provided suitable manures be applied, and the land be kept clean. Even without manure, the average produce over forty-six years, 1852-1897, was nearly thirteen bushels per acre, or more than the average yield of the whole of the United States of America, including their rich prairie lands—in fact, about the average yield per acre of the wheat lands of the whole world. Mineral manures alone give very little increase, nitrogenous manures alone considerably more than mineral manures alone, but the mixture of the two considerably more than either separately. In one case, indeed, the average produce by mixed mineral and nitrogenous manure was more than that by the annual application of farmyard manure; and in seven out of the ten cases in which such mixtures were used the average yield per acre was from over two to over eight bushels more than the average yield of the United Kingdom (which is rather less than twenty-eight bushels of

60 lbs. per bushel) under ordinary rotation. It is estimated that the reduction in yield of the unmanured plot over the forty years 1852—1891, after the growth of the crops without manure during the eight preceding years, was, provided it had been uniform throughout, equivalent to a decline of one-sixth of a bushel from year to year due to exhaustion—that is, irrespectively of fluctuations due to season. It is related that a visitor from beyond the Atlantic, talking to Sir John Lawes in Broadbalk Field, said, "Americans have learnt more from this field than from any other Agricultural experiment in the world."

Another field experiment of singular interest is that relating to the mixed herbage of permanent meadow, for which seven acres of old grass land were set apart in Rothamsted Park in 1856. Of the twenty plots into which this land is divided, two have been left without manure from the commencement, two have received ordinary farmyard manure continuously, whilst the remainder have each received a different description of artificial or chemical manure, the same being, except in special cases, applied year after year on the same plot. No one can inspect this field during the growing season without being impressed by the striking evidence it affords of the influence of different manurial dressings. So much, indeed, does the character of the herbage vary from plot to plot that the effect may fairly be described as kaleidoscopic. Repeated analyses have shown how greatly both the botanical constitution and the chemical composition of the mixed herbage vary according to the description of manure applied. They have further shown how dominant is the influence of season. To such an extent, it may be added, is this the case that a given quantity of gross produce of the mixed herbage may be one thing in one season, and quite another in another season, both as to the proportion of the different species composing it, and as to their condition of development and maturity.

(To be concluded.)

SOME BIBLE PLANTS OF CEYLON.

Another tree familiar enough in Ceylon gardens is the Pomegranate (*Punica granatum*). Its fruit is mentioned in Scripture under the name of *Rimmon*. The tree itself corresponds with the *Rhoa* of Dioscorus and the *Sida* of Homer. The pomegranate is a native of Asia and was common in Palestine. Moses, speaking of the Promised Land, calls it "a land of wheat and barley and vines, and fig-trees and pomegranates" (Deut. viii. 8), while the spies who searched the land are said to have "brought of the pomegranates and figs" (Num. iii. 23). Several towns and villages bore the name of Rimmon or pomegranate (see Josh. xv. 32; 1. Chron. iv. 32; vi. 77; Zech. xiv. 10). Saul tarried under a pomegranate tree (1 Sam. xiv. 2) and the prophets Joel and Haggai refer to the pomegranate (Joel. i. 12 Haggai ii. 19). The tree must have grown in Egypt during the time of the Israelites' sojourn there, for when in the wildness of Zin, they lamented the loss of the pomegranate (Num. xx. 5).

The pomegranate (the *Pomum granatum* or grained apple of the Romans) belongs to the natural order Myrtaceae or the myrtle family.

The fruit is made frequent mention of in the Songs of Solomon, iv. 3, 13; vi. 7, 11; vii. 12 and viii. 2).

The fact that it was a favourite fruit in past times is evidenced by the fact that models of the fruits were used to adorn the capitals of pillars (see 1 Kings vii. 18, 20, 42; 2 Kings xxv. 17; 2 Chron. iii. 16, and iv. 13; Jer. lii. 22), while the common pattern of embroidery work for the border of the high priests' blue robe and ephod consisted of pomegranates with golden bells between them. (See. Exod. xxviii. 33, 34; xxxix. 24-26.)

Besides the use of the fruit for its refreshing pulpy seeds, various parts of the tree are used medicinally, especially the root bark and rind of the fruit for tape worm. The latter is also used for tanning the finer kinds of leather.

MULCHING.

Mulching is done with more than one object. It is done to protect the roots of plants from injury caused by freezing and thawing and to keep the soil at as even a temperature as possible, and, secondly, it is carried on in hot weather to prevent evaporation of moisture from the surface of the soil.

All fruit trees, says the *Fruit Grower*, in an interesting article on Mulches and Mulching, are the better if properly mulched, as also newly-transplanted trees. Old straw and forest leaves will do for the purpose, or any coarse litter may be used, even to fresh straw and coarse manure, and if nothing else is available, fine soil or ashes can be applied. In the case of small crops grown over any extent, the whole surface of the soil should be protected, while in the case of trees a circle of at least 3 feet in diameter around the stem should on an average be covered—the size of the tree of course determining the extent of the mulching. In some soils mulching is of greater benefit than others, but as a rule it will be found profitable to mulch all small trees and newly-transplanted fruit trees.

But if mulching is not properly performed it might also do harm, and we would, therefore, quote the following passage from the *Fruit Grower* for the benefit of our readers, in order that errors might be avoided in carrying out this very useful operation of practical agriculture:—

It is as well to point out one or two things with regard to the operation of mulching in dry weather, as there is no doubt that its influence and efficiency are greatly misunderstood. The one great reason why mulches are applied in the summer months of the year is to prevent evaporation of moisture, as it is taken for granted pretty generally that in hot spells the damp nature of the surface soil is changed to dryness by the action of the sun. It is argued, as a rule, that the sun dries out the top layer of earth, and as the result the growing crops suffer. Therefore, these reasoners continue, we must keep the soil damp by the use of a damp or moisture-laden material, such as

stable manure, and it is piled on thickly around the stems and over the roots of fruit trees and bushes. Now, the argument does not meet our views, and we shall show that it is not the damp material that is needed, for a layer of any dry material will secure the desired end in a far more efficient manner. Have you not noticed that when the old stable manure mulch has been applied close up to the stems of the ordinary pea plants in rows, that mildew generally results from the application? We have again and again, and there can be no doubt that the hot, moist condition brought about by its use at the time referred to is generally attended with these results. This being so, the application must be taken to be a wrong one. We remember testing this method once on twice with sweet peas, treated as ordinary garden peas. We read that "the flowering period of sweet peas will be considerably prolonged by the application of a thick mulch of stable manure during the hot weather," and we followed out this suggestion just to prove that it was unsound. Within a few days of the mulch being given we found the mildew running up the stems, and it was worse where the manure rested against them. Peas of any kind are not likely to be improved by mildew, however slight the attack may be. Now what we want to point out is that if the grower wants to prevent evaporation, he can do so by using a supply of dry ashes of any kind, and that dampness in this respect is not a consideration. By the use of a dry material we not only prevent evaporation, but do so in a manner which prevents any injury whatever to the plants or trees treated. The layer of dry material coming, as it will when distributed, between the air and the earth prevents evaporation and is a clean and natural process compared to the use of manure as some advise. It is an error to suppose that wet damp grass, manure, cut vegetable growth, or wet leaves, are better than a dry material for retarding moisture evaporation from the soil. If it is put to the test it will be seen that the dry material is the best and most effective of all, and though at first sight it appears strange to argue thus, yet it is true. A dry mulch will do wonders in this respect, and the more it is used in hot spells the better, particularly when it replaces the old stable manure mulch.

TOMATOES.

The following notes are culled from an article on "The Tomato and its Culture" in *Garden and Field*:—

Raising Plants.—Procure a small shallow box, such as a blacking box, or the top four inches of a kerosene tin, or half a kerosene tin cut on the flat, or a six inch flower pot, according to the number of plants you want to raise. If the box be four inches deep put quite one inch of drainage. Broken brick, gravel or sifted cinders do well. Over these put a thin layer of coconut fibre, fine dry grass, or such material, and fill the box with a mixture consisting half and half of rotten leaves and sand, or half sand, quarter old rotted cowdung and quarter fine free soil. Moisten this thoroughly without

soaking it, with warm water, and sow the seeds one inch apart. See that the soil does not get dry. When the plants are two inches high, or have four leaves besides the seed leaves, they should be pricked out and transplanted into three inch pots (for a limited number) or put three inches apart in boxes or in a bed.

From here they are finally planted out as soon as they are found to have developed into sturdy plants, even up to the time they are 12 or 15 in. high with shortly stalks as thick as one's finger, and with crown blossoms and side branches.

The tomato does not require a very great supply of water, but it must have enough to sustain its health and vigour of vegetation. For preference, rich, warm, mellow, loamy soil is best, but with care the plant could be grown in almost any soil. For early crops a warm, well-drained soil and a sunny aspect, sheltered from the south, south-west and south-east are necessary. The land should be worked deeply and manured well, preferably with both cattle manure and artificial fertilizers. The Americans find that too rich a soil, or one which is highly fertilized is not desirable, such soils tending to produce a too rapid and too large growth of the vine, thus partially defeating the object in view, viz., a quick growth of the plant and a rapid development of fruit. The active fertilizing matter should be concentrated within the reach of the roots. A soil not naturally very poor, in which the added fertility may be provided both as to place and time, as will best serve the purpose, is most desirable. A light sandy loam high and well drained is perhaps the ideal for tomatoes, provided the proper nourishment is given from artificial sources.

The plants are best set four feet each way. A well-proved American practice is to apply 400 lbs. of Superphosphate and 200 lbs. of Potassium chloride per acre and thoroughly harrow it in when the plants are being set out, from 100 to 150 lbs. of nitrate of soda per acre are applied to the places where the plants are to stand. Three or four weeks later another dose of 100 to 150 lbs. nitrate of soda is given, the nitrate being mixed with very fine soil to ensure proper distribution. In this way the plants are in a position to readily make use of the nitrogenous manure and respond splendidly to the treatment. The soil should be well worked till the plants begin to cover the ground.

Local growers seem to fight shy of artificial manures, and appear to think that they will harm tomatoes, but it is time they took the hint as to the use of artificials from American cultivators who are such successful cultivators of the plant. In New Jersey, the average yield for 2,500 acres under tomatoes is given as six tons per acre, though 12 and 15 tons per acre have been gathered from large tracts in some parts. With such experience surely credit should be given to the Americans for a knowledge of how to manure the tomato. At the rate given per acre, the proportion of artificial manures required for the small plots generally found in vegetable gardens should not cost more than a trifle.

In getting out long stemmed plants it is best to bend down the length of the stem and bury it also, leaving the crown of the plant to come out perpendicularly from the ground.

CULTIVATION OF THE ARECANUT IN BOMBAY PRESIDENCY.

[A note by Mr. J. W. MOLLISON, Deputy Director of Agriculture, Poona.]

(Concluded.)

The bunches on a tree ripen unequally. the lowest bunch first, the uppermost last. Moreover, in the same bunch some nuts may be ripe and yellow and others unripe and more or less green. The ripe nuts are much the same size and shape as small apples. The outer skin is yellow, smooth, and shining. The inner husk is very fibrous and not easily removed. The first process in preparing for market is to remove the husk. This is done very deftly by means of the *hattigatti*. It is an implement like a sickle. It is fixed at the heel end of its blade securely into a hole near one end of a plank somewhat in the same way as if it were fixed in a handle. The back of the blade at the bent part rests in order to steady it in a notch in the plank. The blade of the sickle is presented in an upward position opposite to the workman. He sits on the other end of the plank. The plank is about 3 feet long, 1 foot wide and $1\frac{1}{2}$ inches thick. The husk from each nut is cut out in sections. A nut is grasped in the palm of the hand and pressed against the point and blades. The husk is thus cut through to the nut, then by leverage a section of husk is jerked off. The nut with remnant of husk is turned in the hand so quickly that to an onlooker the action appears involuntary, and another section of the husk is removed like the first. With four or five movements of this sort the whole husk is removed. A clever workman can husk 5,000 nuts per day, but 3,000 is nearer the average. The contract rate for the work is one anna per 1,000 with two or three meals per day. The husked nuts are scraped free of fibre also by the *matti-gatti*. The process is essentially a scraping process and costs at contract rates $1\frac{1}{2}$ to 2 annas per 1,000. The scraped nuts are next boiled for about two hours in fairly large copper pots. A handful of lime or of the ash of the bark of *matti* (*Terminalia tomentosa*) is added to the water. The presence of lime causes the water to become red or red-brown in colour as the boiling proceeds. The water also becomes thick with a resinous extract from the nuts. The boiling is continued until the eye-bud or germ of growth from each nut comes out or becomes absorbed in the extract. The nuts are removed by a long-handled ladle (*zraa*). The ladle has perforations in its bowl which allow the extract to drain from the nuts back into the pot. The extract is again and again used for boiling fresh supplies of nuts, pure water as required being added from time to time to prevent the decoction becoming too thick

and concentrated. The extract after being used for boiling repeatedly becomes deep red-brown and thick. It is then emptied into another broad-mouthed vessel which is placed under full exposure to the sun. The mass by evaporation thickens and areca catechu or *kossa* is the product. The nuts after boiling are dried in the sun and sorted into three kinds, *chikni*, *betta*, and *gotu*. *Chikni*.—These are unripe fruits got mostly from the upper unripe bunches of the tree. They become flat when boiled, and when cut are light coloured and agreeably flavoured. They sell by retail at a high price, but by the growers are usually mixed with other sorts to ensure a satisfactory sale of the produce. These nuts after exposure to the sun are again soaked in the red extract, a basketful being immersed at a time. They are again exposed daily to the sun for four or five days, but are gathered up at night, otherwise they get dark coloured. The nuts are exposed to the sun in cane matting spread on a *mandap*. Sometimes bamboos or other means of support are placed over the inner court of the household, and the matting spread over this framework. The nuts when dry are ready for market and should be shining and bright-red brown in colour.

Betta.—These are ripe nuts. They are dried after the first boiling and then hand-rubbed with fairly thick extracts to which 3 or 4 per cent of lime has been added. This tends to deepen the colour. The process may have to be repeated two or three times. The colour becomes fixed by drying in the sun after hand-rubbing. When ready for market they are somewhat lighter coloured than *Chikni* and not so glossy or shining. They are rounder and larger.

Gotu.—These are fully ripe or overripe nuts. They are usually fairly well coloured by the first boiling and after exposure to the sun for several days are ready for market. The colour may be deepened and improved by the same means as described for *betta*. The three varieties are usually packed together by the cultivators in sacks. Sirisi and Kumta are the chief markets.

Ordinary prices for three varieties are:—
Chikni R6 to R7 per maund of 48 seers of 20 tolas
Betta 3 to 4 ditto ditto
Gotu 2 to 2½ ditto ditto

Betel palms are not much affected with disease. A borer does considerable damage. The borers cut a tunnel from the root upwards and in time reach to the growing top. The damage there done is so considerable that the top withers and when wind blows breaks off and falls to the ground.

ARTIFICIAL CHANGES OF PHYSICAL PROPERTIES OF SOIL.

(Concluded.)

We thus see that not only the structure of the soil but also its temperature may be affected by mechanical means. Change from separate grain structure to crumbly structure generally improves, though to a small degree, the heat

conditions of a soil, principally by reducing evaporation. Rolling the soil is more effective because it increases the conductivity of the soil for heat, and therefore, under normal conditions of weather, raises the temperature of the soil. Loosening the surface of the soil by harrowing, boeing, &c., results, on the contrary, in a decrease in the temperature of the soil. By covering the ground with dead matter (mulching) the temperature of the soil is increased or decreased according to the behaviour of the covering toward heat. If, for example, a thin layer of black material (coal dust, black clay slate, &c.) is spread over the soil, the temperature of the soil rises to a considerable degree, and crops on soils so treated are accordingly benefitted. Although this process, for evident reasons, is not applicable to cultivation on a large scale, still with delicate plants, especially in horticulture, it may be used to advantage. Spreading a layer of sand or gravel over humus soils causes a rise in the temperature of the latter, and wholly or partially prevents the frequent night frosts which occur during spring in such soils. Mulching with dead organic matter (stable manure, straw, &c.) may be used to lower the temperature of the soil during the warm portion of the year. By the same means, the influence of the temperature of the air is diminished, and the soil protected from all excessive changes in temperature. This is due to the fact that all the materials mentioned are poor conductors of heat. Allowing stable manure to remain spread out during the warm months on the surface of the soil for some time before it is worked into the soil may unfavourably affect the moisture of the soil. In the colder portion of the year, however, it may be beneficial on account of its influence in raising the temperature of the soil. Under such conditions, however, the covering of manure may exercise a harmful influence on fine-grained clay soils rich in humus by preventing the loosening effect of frosts, which is so important for such soils. Beneficial results may be obtained by thinly spreading a mulch in the late fall over fields occupied by perennial forage plants, thus protecting the plants against low, and especially changeable winter temperatures. As, however, such a covering retards warming of the soil, the undecomposed remains of the mulch should be removed as soon as the temperature begins to rise in the spring. Keeping in mind the fact that covering the soil in this manner retards warming in spring, this practice may also be utilised to retard the blossoming of fruit trees, thus diminishing or preventing damage from late frost. If the ground surrounding the trunk is covered in spring with a heavy layer of straw the temperature is kept low, and in consequence the amount of water received through the roots is small, so that the development of the leaves and especially the blossom is retarded for several weeks, or until the organs of reproduction are then in little danger of freezing. Finally, the practice of keeping fields fallow (*i.e.*, without crops) is a means of increasing the temperature of the soil during the warm season. When the rise in the temperature is accompanied by an increase in the water content of the soil decomposition of organic materials is promoted,

and a greater or less quantity of plant food may be leached beyond the reach of the plants by heavy rains.

CHILLIES.

In discussing the possibilities of Chili cultivation in North-East Australia, the *Queensland Agricultural Journal* furnishes a good deal of useful information on the subject:—

Why should not Queensland enter upon the production of chillies on a commercial scale? The capsicums grow luxuriantly in all parts of the coast country, and bear fruit almost all the year round. Their cultivation affords far less labour than the cultivation of cereals, sugar-cane, or, indeed, of any other farm crop except Sisal hemp. The plants should be set at a distance of 4 feet in the rows, and from 5 to 6 feet between the rows. They will grow on almost any kind of soil, but prefer a dry, rocky soil with sandy loam, containing some lime. It is difficult to arrive at a correct estimate of the yield of the dried capsicums from a well-grown shrub during the year. Some estimate the annual return at 2 lbs., others say that 3 lbs. and even 4 lbs. may be reckoned on. The selling price of dried chillies in the London market varies from £18 to £34 per ton according to quality—for instance, in April, 1899, fair red Zanzibar sold at 29s. 9d.; good red Japan at 33s. 6d. to 34s. per cwt. The present wholesale price in Brisbane for dried chillies is 1s. per lb., equal to £112 per ton. A sample of capsicums grown in the West Indies, dull and uneven in colour, was valued at 20s. per cwt. What is evidently required is an article bright in colour, even in quality, and possessing great pungency.

The Government Botanist has received a sample of large red, sweet capsicum dried in such a manner that the skin is perfectly transparent and the seeds inside are quite dry, and can be shaken like the dried peas in a "rattle-pod." We have no information as to how the specimen was dried, whether naturally or artificially, but the pod was certainly not opened previous to drying.

A consignment of capsicums prepared in this manner would, no doubt, bring a good price in the English market. Another enticing method of preparing chillies for export is to bottle the long red variety in a solution of salt and water. This preserves the shape and colour of the fruit, and gives it a very attractive appearance.

The Bulletin of the Botanical Department, Jamaica, says on the subject of chillies:—"Pod peppers or capsicums, the fruits of *Capsicum annum* and allied species, are a well-known spice and condiment. They are an indispensable ingredient in curries, and are largely consumed in the fresh and dried state and in pickles. Some forms of capsicum known as Bell peppers are entirely free from the acrid and burning pungency so characteristic of these fruits, and may be eaten cooked as a vegetable or in salads.

Chillies, Bird or Guinea Peppers, the fruit of the shrubby *Capsicum minimum* (usually much smaller than the preceding) grow generally in tropical countries. These are in chief demand in commerce. When thoroughly dried and pounded, and afterwards passed through a hand-mill and sifted, they are the principal source of the well-known Cayenne pepper.

It is estimated that about 100 tons of dried chillies are annually received into England from the West Indies and the East and West Coasts of Africa.

In the *Kew Bulletin* (1892, p. 88) the following information respecting chillies was given in an article on the Agricultural resources of Zanzibar, contributed by Sir John Kirk:—

"The small red peppers, or chillies, are largely grown in the more dry and rocky part of the island, where the upheaved coal presents a honeycombed surface that favours the accumulation of rich soil in the crevices. The pods are picked when ripe, sun-dried, and packed in neat bags made of the split fronds of the *Hyphene* palm for shipment. This is an industry that has sprung up within the last thirty years."

Zanzibar chillies, as they appear in the market in a dry state, are small, red, thin, carrot-shaped fruits about 1 inch in length.

The following further particulars are contained in a report on the spice and other cultivation of Zanzibar and Pemba (F. O. Report, 1892, Misc. Series, No. 226):—

"The pepper plant growing in the island is *Capsicum minimum*, usually termed the 'shrubby capsicum,' and producing the bird's-eye chillies forming the basis of cayenne pepper. This is to be found in a small degree in every shamba, but the principal source from which the annual exports are derived is the eastern side of Zanzibar, and the cultivation here is chiefly in the hands of the Wahadinu people.

"Judging from observations made during my brief visit to this portion of the Island, east of Dunga, the chillie cultivation struck me as being of a very scattered nature, generally small isolated patches from half to 1 or 2 acres in extent, and combined with tobacco, tomato, pumpkins, &c. I regret my inability to quote the annual total exports, but I believe they are large, and an undoubted source of revenue. As the chillie is, as yet, the only product of any value grown in this less favoured portion of the island, I consider that this cultivation could be extended and that a little fostering care must be productive of much advantage. It is a cultivation easily carried on, and calling for no special trouble or skill, and the returns are certain and profitable. At present the people are so blind to their own interests as to purposely depreciate the value of this product. I understand, through fear of possible shortage by theft on the way down, owners actually damp the chillies before despatching, and it is often necessary, on their reaching the Government Customs godowus, to dry them as quickly as is possible as the only chance of saving them.

"Another variety of pepper (? *Capsicum annum*) bearing a larger red and yellow pod is

also cultivated, but the produce from this is all consumed locally."

The latest account of Zanzibar chillies is contained in the report of Mr. Consul Cave, on the trade and commerce of Zanzibar, for the year 1897 (Foreign Office, 1898, No. 2129 Annual Series):—"The production of chillies has risen from 16,336 frasilas in 1896 to 17,698 frasilas in 1897, an increase of 77,670 lb. The average price was 2 dollars 37 cents per frasila, as against 2 dollars 57 cents per frasila during the previous year.* A better price than this could doubtless be obtained for Zanzibar produce if a little more care and attention were devoted to its cultivation and harvesting, but up to the present time it has been allowed to grow almost wild on the coral outcrop which covers the eastern portion of the island, and the slight personal discomfort which attends the handling of pods prevents the native from exercising any care in its picking and subsequent preparation for market. Attempts have lately been made to obtain a better sample on ground which has been specially cleared and prepared for the purpose, but the results are not yet to hand."

JAPANESE CHILLIES.

In a note on Recent Additions to the Museum of the Pharmaceutical Society (*Pharm. Journal*, 11th December, 1897), Mr. E. M. Holmes, F.L.S., furnished the following interesting particulars, at an evening meeting of the Society, respecting Japanese and other chillies:—

"During the last three or four years there has been in commerce a very bright red variety of *Capsicum minimum*, Roxb. (*C. fastigiatum*, Bl.), said to be imported from Japan. In consequence of its clean, bright and attractive appearance, it has commanded a higher price than other varieties. Mr. J. C. Umney has recently directed my attention to the fact that this variety is less pungent than the Sierra Leone and Zanzibar varieties, although far superior to them in colour. On further inquiry I find that this fact is well known to drug and spice brokers. Mr. Umney points out that when an alcoholic tincture of either the Japanese or Zanzibar varieties is diluted with about 14 parts of water, the former gives a much clearer solution than the latter, indicating less oily matter. All the bright red Cayenne pepper until recently in commerce is said to have been imported from Natal in that state. The entire pod pepper imported from Natal is a variety of *Capsicum annum*, much larger than the chillies, and of a dark red colour and very pungent, whereas the powdered Japanese and Natal Cayenne peppers, placed side by side, are indistinguishable in point of colour. The other principal varieties of chillies, at present in English commerce are,

I am informed, those of Sierra Leone and Zanzibar, the former being of a yellowish-red tint, and the latter of a dull, dark red, and often of inferior quality, containing badly dried fruits, stalks, and foreign matter, but both are more pungent than the Japanese kind. The latter is, however, quite pungent enough for most people, although perhaps unsuitable, by reason of its lesser pungency, for medicinal purposes, as an outward application, &c. I am indebted to Mr. Young, of the firm of Messrs. Dalton and Young, for information concerning the different commercial varieties and for specimens illustrating them. My object in directing attention to these commercial varieties is to point out to students and to retail chemists that there are often differences in the qualities and appearance of the same drug, which are worthy of careful observation, not only from a scientific, but from a commercial point of view. Nepal Cayenne pepper is made from a small variety of *Capsicum annum*, and is remarkable for its violet odour. Neither this kind nor the Zanzibar gives a red, but a brownish, powder.

The following comments on Mr. Holmes' paper were made at the meeting by Mr. MacEwan:—

"The subject of cayenne pepper was interesting to many chemists quite apart from medicinal purposes, probably more capsicum being sold for feeding birds than for any other purpose. The pepper used in that way was tasteless, and seemed to contain a large amount of fatty matter. It was dark in colour, and the object was to lighten the colour of the feathers. It was supposed to come from *Capsicum annum*, and he should much like to know where it came from. It was only supplied by two or three houses, and attempts by others to obtain it had not been very successful. There was no doubt that the pepper as used was an untreated product. The late Dr. Brady, on his return from Japan, passing through Vienna, came across a comparatively tasteless pepper, which caused considerable discussion at the time, as there was a large amount of it on the market, but the substance had been pretty much lost sight of since. He thought it would well repay inquiry, as very little had been done on the subject of peppers since Dr. Thresh dealt with it about eighteen years ago."

According to a writer in Spens' "Encyclopædia," Div. V., p. 1803:—

"Several varieties of *C. annum* have little or no pungency; one of these is abundantly grown in Hungary, forming the paprika of the Magyars. Another variety, cultivated in Spain, is imported into this country in powder for giving to canaries, to improve the colour of their feathers. The Nepal capsicums, which have an odour and flavour resembling orris-root, are the most esteemed as a condiment."

* A frasila=35 lb. avoirdupois.

