



THOMAS DRANE, C.E.

Photo and Half-Tone Block by W. L. H. Skeel & Co., Colombo and Kandy.

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“PIONEERS OF THE PLANTING ENTERPRISE IN CEYLON.”

(Third Series.)

THOMAS DRANE, C.E.,

THE FIRST ENGINEER WHO SURVEYED AND DESIGNED A LINE FOR A
LOCOMOTIVE RAILWAY BETWEEN COLOMBO AND KANDY.



HE subject of our notice was the son of Thomas and Cecilia Drane, and was born at Bromley, Middlesex, on the 7th of January, 1818. He was educated at private schools; and subsequently graduated at Cambridge University. After completing his University career at Caius College, he became an articled pupil to Mr. James Walker, the Admiralty Engineer, and President of the Institute of Civil Engineers. After completing his term of pupilage, he was selected to go out to the Island of Ceylon, in the year 1844, to make a professional Survey of the direction to be taken of the proposed line of railway from Colombo to Kandy. This, after many months of hard and arduous work, he completed in the course of the year 1845, having to penetrate a comparatively unknown tract of country through almost impassable jungle, exposed to great risks from exposure to a malarious climate, and other difficulties and dangers, which only his great physical strength and excellent constitution enabled him successfully to accomplish. He won great credit for the admirable manner in which he succeeded in completing this task; and he had the satisfaction of learning long afterwards that his Survey and the information he afforded were of great service to the Engineers who

followed him: to Capt. Moorsom, Mr. Doyne and Mr. (now Sir Guilford) Molesworth. After returning from Ceylon, (the Railway project having collapsed owing to the financial crisis in the Colony of 1846-7.) Mr. Drane was appointed second Engineer to the South-Eastern Railway, and during the time he held this appointment, he constructed that part of the main line, eight miles in length, which runs from Folkestone to Dover, including the important viaduct constructed at the town of Folkestone. He resigned this appointment in order to become the Resident Engineer of the railways in Cumberland, under the control of the Earl of Lonsdale, including the line from Whitehaven to Cockermouth; and subsequently carried on to Keswick and Penrith, in the construction of which he played a leading part. After some years he resigned this and afterwards accepted the Managing Directorship of the West Cumberland Iron Works, taking up his residence at Cockermouth, where he lived for many years, building for himself a very attractive and commodious house in the town.

In consequence of the failure of his wife's health, he was at length induced to throw up his appointment in the North of England, and he retired to Torquay, in Devonshire, where he lived quietly for the remainder of his life, and died on 31st October, 1890. Mr. Drane left an only child—a daughter. His wife still survives him.

The foregoing succinct sketch of Mr. Drane's life was kindly penned at our request in November last by his brother-in-law, Sir Frederick Young, K.C.M.G., the founder of the Royal Colonial Institute, and we publish it, with some slight additions and alterations; but we may further add a few details of the first attempt made to lay out a locomotive railway between Colombo and Kandy.

Although Mr. Drane came out in 1844, it was not till after his Survey and Estimate were completed that, towards the end of 1845, a Ceylon Railway Company was formed, and it may be of interest to put the following on record here from the original document:—

CEYLON RAILWAY COMPANY.

Provisionally Registered 20 October 1845.

Capital £1,000,000, in 20,000 Shares
of £50 each.

London Provisional Committee.
Chairman.

PHILIP ANSTRUTHER Esq.
(late Colonial Secretary of Ceylon.)

Deputy Chairman.

JOHN STEWART Esq.—(late of Bombay.)

GEORGE ACKLAND Esq.

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(Messrs. A. & R. CROWE & Co. Colombo.)

J. G. FRITH Esq.

(Messrs. FRITH, WALLACE & Co.)

Colonel Sir F. HANKEY, G.C.M.G.

(Director of the Bank of Ceylon.)

Sir GEORGE LARPENT Bart.

(Messrs. COCKERELL & Co.)

Colonel MONTESOR—(Ceylon Rifles),

Captain ALEXANDER NAIRNE

(Formerly of the East India Company's Service.)

LAWRENCE PHILIPS Esq.

(Messrs. L. PHILIPS & SON.)

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J. S. WILSON Esq.

(Late Wilson, RITCHIE & Co. Colombo.)

S. B. WORMS Esq.

(Park Crescent.)

Bankers.

Messrs. GLYN HALLIFAX & Co.

(Messrs. HANKEYS & Co.)

Solicitors.

Messrs. WILSON & HARRISON.

(1, Cophthall Buildings.)

Secretary.

D. I. NOADS Esq.

TEMPORARY OFFICES No. 8.

Broad Street Buildings,—London.

CEYLON PROVISIONAL COMMITTEE.

Chairman.

Major GEORGE THOMAS PARKE,
(Deputy Commissary General.)

Deputy Chairman.

EDWARD JOSEPH DARLEY Esq., of
(Messrs. ACKLAND, BOYD & Co.

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DAVID WILSON Esq.

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Clerk.

Mr. J. A. LOOS.

Engineer and Surveyor.

THOMAS DRANE Esq.

Assistant Engineer and Surveyor.

C. I. WEBBE Esq.

Assistant Surveyors.

Mr. E. S. FALKNER.

„ HEW BAGSHAW.

Bankers.

The Ceylon Bank.

The Oriental Bank.

Temporary Office.

No. 24, Chatham Street, Fort, Colombo.

In the Ceylon Blue Book for 1846, the following reference was made to the Railway by the representative of the Ceylon Government:—

THE CEYLON RAILROAD.

The number of bullock carts employed on the Kandy road, although trebled within the last few years, are still found insufficient for the planters' wants; even whilst I write (May 1847) it is calculated that with all the available means of transport kept constantly at work on the main roads, it will still require a period of four months longer to bring the Coffee of 1846 from the interior to Colombo, whereas looking to the approaching unfavourable weather, the whole of it should have been long since in store here, and the greater part already shipped for Europe; many mercantile firms have still to ship two-thirds of their crops, and these two-thirds must necessarily be deteriorated by 5 to 10 per cent, in addition to the interest at 9 per cent, on the value of the produce thus detained, in addition to which as the season advances, shipping is becoming scarcer and freights rising day by day.

It was a foreshadowing of these coming embarrassments which led to the formation in 1845 of a provisional committee for the purpose of organizing a Railway Company for Ceylon.

Various lines of road have since been surveyed and a favourable one selected, along which it is stated by the Engineer of the Company, that a railway may be carried from the Coast of Colombo to the central capital at Kandy, in the heart of the Coffee districts, at a gross outlay of £800,000, including several costly bridges and an extensive viaduct. It is suggested, however, that the more expensive portion of the work at the Kandy extremity where the line begins to ascend, should be delayed, and only those portions more easily accomplished, finished in the first instance, so as to give about 65 out of 80 miles for an outlay of about £500,000, the remainder to be completed hereafter, and in the meantime the ordinary vehicles might be employed at both ends of the line.

The whole of the scrip is said to be taken up, but it is doubted if all the holders in England would at present respond to a call, though all those who have an interest in the Colony would assuredly come forward to complete the undertaking, as they are well aware that as a certain means of conveying produce from the interior to the port of shipment, as well as keeping the Central Province always regularly supplied with the staple articles of food, and thus ensuring cheap living to the labourers on the various estates, the Railway is of the first importance to the Colony.

In his speech to the Legislative Council in August 1847, Lord Torrington made the following reference :—

Not altogether unconnected with this subject is that of a projected railway communication between Colombo and the coffee districts. I have every reason to believe that such an undertaking, to the extent in the first instance of thirty-two miles, will be not long delayed. I have received the authority of the Right Hon'ble the Secretary of State to submit for your consideration an Ordinance having for its object the facilitating this desirable undertaking, and to give its projectors such privileges and powers as cannot fail to secure the ultimate accomplishment of the end in view, with advantage to the public and to the shareholders.

As soon as I have received information that the arrangements of the Company are sufficiently matured, and the requisite proportion of the subscribed capital has been paid up, I shall not fail to submit to you such an Ordinance as may be required for the purpose.

What followed next is succinctly related by Pridham whose volumes on Ceylon were published in 1849 :—

In 1845, a Railway, with a capital of one million sterling, was projected in England by the mercantile houses connected with the colony, between Colombo and Kandy in the first instance, but with the ultimate design of the connecting other districts wherever practicable. The illimitable expansion of railway enterprise had already sustained a check, when the attention of the public was called to this undertaking, and before its plans could be thoroughly matured, and a report be received from the surveyor of its practicability—a monetary pressure had set in, and the Directors found themselves unable to obtain the full call to which the shareholders had pledged themselves. A communication had already been made to the Colonial Department, which at once referred the matter for the consideration and report of the Local Government, whose reply was, as might have been expected, of a highly encouraging character.

Under these circumstances, and in consequence of its having been discovered, that the cost of construction would very considerably exceed the sum originally estimated per mile, and that the Government was indisposed to accede to any proposition *immediately* involving the revenue of the colony on the capital required for the *whole* line, the Company has been compelled to suspend its intention of proceeding with the entire line for the present, and has selected a part by way of experiment. On the line thus modified, the Government has sanctioned, by ordinance, a guarantee of five per cent. per annum, along with a free grant of the land required for the railway for a term of ninety-nine years, the Government having the right of purchase after the expiration of fifty years, and the reversion of the line, without purchase, at the end of ninety-nine years. The result of this modified plan is, that the old Company has been dissolved, the capital has been reduced to one-fourth, *viz.*, £300,000, under the new Company, and the holders of shares in the former are entitled to the same number of shares in the new company, as though it had been found possible to carry the original undertaking into effect. In addition, power has been reserved to increase the capital to the original amount when requisite, and the option of the additional stock will be given to the present subscribers.

Its claims to public notice are thus set forth by its promoters. "Ceylon is subject to no volcanic action; the soil is admirably adapted for the construction of railways, and the country through which the contemplated line will pass is not liable to be flooded during the monsoons, Labour is excessively

cheap in the island; and bricks, lime, and timber may be procured with facility." "The sources of revenue are a large goods traffic; considerable passenger intercourse, and the conveyance of troops and mails, &c." Under the first head, it is stated that the number of bullock bandies, with goods, passing between Colombo and Kandy, is about 79,000 annually, and the average hire about £2 10s each, shewing a cost for transport between Colombo and Kandy of £197,500 per annum. The carriage of goods by these carts is tedious and uncertain, and the expense is greatly increased by reason of the extensive mortality among the cattle employed; so much so, that natives, each bearing a load of merchandise, are occasionally dispatched from Colombo to Kandy, in preference to that mode of conveyance. The cost of transport by rail will be much less, but as the traffic by this means of conveyance will greatly increase, there can be little doubt that this branch of traffic would of itself be sufficient for the remuneration of the capital invested.

The present mail coaches in Ceylon are said to shew an annual return of upwards of £7,000, but it is clear, that it is on the first source of revenue that the Company must principally depend for support in the outset.

Over the division of the line* first to be undertaken, all the traffic between Colombo and Kandy will pass; and assuming that 40,000 tons are carried

* The line selected by the surveyor, commences at the east bank of the Kalane, about three miles from Colombo, and following for the first thirty-two miles the direction of the great military road to Kandy and Kurunaigalla, which the line crosses twice, enters the valley of the Maha-oya, which it follows for twenty-three miles, to the foot of the hill country at the Kaduganava Pass. At this point, it commences a rapid ascent to the summit on which Kandy is situated, and terminates about three miles short of that city, being a length of fourteen miles, and making the whole length of the railway sixty-nine miles. Over the first division of thirty two miles, the country is flat, the total rise not exceeding 170 feet in the whole length, and the highest land passed over between these points, not exceeding 240 feet. Flat, however, as this part of the country is, the surface is broken in many places by short hillocks, which, though capable of being avoided in some places, will render considerable earthworks occasionally necessary, and give a class of gradients of 1 in 150 to 1 in 200. Extensive and deep cuttings should be obviated wherever possible, lest they should become torrent beds in the rainy season. The second division involves heavier gradients and works than the first, as the country becomes more broken. For seventeen miles the gradient need not exceed 1 in 150 to 1 in 200, but beyond that, they might be so steep as 1 in 100 to 1 in 50 for the remaining five miles. The total rise of country on this division is 540 feet, without any intermediate summit. The third division, forming the ascent to Kandy, is an elevation of 1,100 feet to be overcome, but the gradients may, it seems, be so arranged, as not to exceed 1 in 50, the numerous mountain ravines admitting of a lengthening of the line, so as to accomplish that object. The termination of the first division, *i.e.*, the portion to be immediately constructed, is near the point of junction between the Kurunaigalla and Kandy road, and consequently where the streams of traffic on these two great military roads meet. The termination of the second is at the commencement of the hill country, and intersects the great military road only 13 miles from Kandy. The cost per mile, including stock, for the two first divisions of the line (which is to be single), has been estimated somewhat under £9,000 and of the third division from £21,000 to £22,000 per mile. The expense of crossing the Kalane, and entering Colombo, is avoided, as also of entering Kandy, when the time shall arrive for completing the whole line.

up the line at 1s. per ton per mile, and 22,500 tons are brought down the line at 4d. per ton per mile, the result will be on the former £54,000, on the latter £12,000=£76,000, from which deducting £19,000 for working expenses, £57,000, or a dividend of 19 per cent. will be received.

In reference to expenditure, I may venture to observe that the Company might have safely taken credit for the moderate cost of fuel to which they will be subject, any quantity of wood being procurable at the several stations at the most trifling expense: this item in the United States stands the several companies in at one-third of the cost of the same item in Great Britain, and the relative expense would be yet further diminished in Ceylon where labour is so cheap.

Although the Company continued to issue Annual Reports in London, nothing was done in Ceylon until Sir Henry Ward took the matter up, and after a further report and survey by Capt. Moorsom in 1856-7, the Company once more came to the front and made an agreement with the Ceylon Government (passed in the Legislative Council, 22nd Jan., 1857); and sent out (in 1858) Mr. Doyne and a staff of Europeans to construct the line. The cutting of the first sod was celebrated by a banquet, 600 persons attending it, with Sir Henry Ward as President on 3rd August. But by July, 1859, Mr. Doyne reported that the work could not be done under the system adopted by the Company for £2,214,000 in place of the £1,200,000 which was expected to be the maximum. He and his two Chief Assistants threw up their posts and went to Australia, and so it came about that Mr. (now Sir) Guilford Molesworth by a new route, which had been suggested as worthy of trial by Mr. Doyne, and with Mr. Faviell as a responsible Contractor, eventually constructed the Colombo-Kandy line 1863-1867, the total cost from first to last—including money wasted by the delay and in compensation to the Company—being £1,738,483. (The Company closed its career with a 19th Report in February 1861.) And such in brief is the history of the Railway originally surveyed and estimated for by Mr. THOS. DRANE, whose work as a pioneer engineer was always referred to with the greatest respect by his engineering successors who alone understood the great amount of arduous labour Mr. Drane must have undergone in performing so difficult a task as a Railway Survey between Colombo and Kandy so far back as 1844-5 and with only native assistance:

“Peace to the memory of a man of worth.”

SEEDLESS ORANGES IN CALIFORNIA.—An American lady travelling in Babia some thirty years since “happened” upon some fruits of this now world-renowned variety, and got some trees home. Two of these found their way to the River-side estate in California the proprietor of which is Mr. H. Tibbetts. They were then carrying some sixteen fruit's—the average annual shipment from this place has now reached 1,600,000 boxes.—*Gardeners' Chronicle.*

AGRICULTURAL EDUCATION IN GREATER BRITAIN.

PAPER READ BEFORE THE FOREIGN AND COLONIAL SECTION OF THE SOCIETY OF ARTS, ON TUESDAY FEBRUARY 27, 1900.

By R. HEDGER WALLACE.

(Continued from page 80.)

As regards the technical schools of the colony, agriculture, according to the report for 1899, was only taught at one institution, the students being examined in the subject under the English Science and Art regulations.

This colony further employs three dairy instructors, three fruit experts, and one poultry expert, and has a number of experimental stations, including two poultry farming stations; and the Department of Agriculture freely distributes leaflets and pamphlets of interest to agriculturists. This free distribution of information with the object of educating and assisting those settled on the land one might add is a feature common to all the colonies of the Australasian group. Before passing on from this group to the next, that is to the East Indian, I would note, so as to complete the Australasian group, that there is a botanic station in Fiji, and a technical school at Viti Levu where the native is taught the rudiments of agriculture, *i.e.*, how to propagate and grow food and economic plants.

Coming to the next group, the same change in the object of the agricultural education provided, has to be noted, as was remarked when passing from Canada to the West Indies. The agricultural education provided in the East Indies, is likewise intended for the benefit of the natives of the country, and no provision is made for those who represent the planting industry. The European must, therefore, learn by experience the details of his calling as a planter. The East Indian planters in some respects, I venture to think, differ from the planters of the West Indies. They can be roughly divided into two classes or groups. There are those, for instance (generally engaged in the tea or coffee industry), who have to manage a large estate, control a large number of native labourers, and be responsible for the economic plant grown from its nursery stage, till so to speak its produce is harvested, and then, still further, have to direct control and be responsible for the manufacture of this product into a commercial commodity. On the other hand, there are those who (usually engaged in the indigo or sugar industry) have under contract, the economic plant grown for them by native tenants or proprietors, and accept no responsibility till the natives harvest the produce, and place it in their hands to be manufactured into a commercial product. The former group, obviously is more in need of a good agricultural training than than the latter, and the question naturally arises why it has not been provided? Of course I assume that it will be granted that a training in temperate cultivation under temperate conditions is not suitable and that the system of pupilage which is practically that of apprenticeship, under a manager who might be good, bad, or indifferent, is not regarded as one capable of affording the best results.

Taking the Straits Settlements as the first of the East Indian group, I would note that, according to Mr. Moore, a Malay translation of an English book on the “Principles of Agriculture” is used as a reading-book in the native schools, while in the English schools, agriculture is one of the extra subjects of the Code.

In India and its dependencies a good deal of interest has been taken lately in agricultural education by the Supreme and Provincial Governments. I have been favoured, by the courtesy of the Under Secretary of State of the Government of India, Department

of Agriculture, with a copy of a resolution issued by the Department, which shows the progress of agricultural education in India up to 1896.

I will briefly note what has been done. In the Bombay Presidency there is, at Baroda College, an agricultural branch, and lectures on agriculture are given at the Poona College of Science by the superintendent of the Bombay Government Farms. There is also an agricultural class in connection with the High Schools at Belgaum and Naidad. The University of Bombay further offers a diploma in agriculture, but not a degree. In the Madras Presidency there is the Saidapet Agricultural College, which has been established for a number of years. In the Central Provinces there is an agricultural class at the Government Farm.

An agricultural class is also established at the Government Farm, Cawnpore, North-West Provinces. Both of the classes named are utilised by the educational department for the instruction of training School students and school-masters. The period of the agricultural course is in both places two years, but the course for schoolmasters at Nagpur is only for six months. The Allahabad University has also, so far, supported the Cawpore farm class, in the interests of a supply of agricultural teachers as to allow a special examination on science and agriculture students who go up for the "school trial" certificate. It may be added that one of the training schools for teachers in the Bombay Presidency has on its staff an agricultural teacher who has obtained a college diploma, and gives lectures to the students in training on agriculture.

The whole question of agricultural education in India has, I believe, lately been put on a new footing entirely, through the acceptance by the supreme Government of the view that a thorough and practical education in agriculture, ending in a high-class college diploma, or in an agricultural degree, develops the intelligence of students just as well as a literary course, and that it certainly fits them as well, if not better, for duties in the land revenue and cognate services. The Madras Government has given effect to this view by making the diploma in agriculture of the same value as a B.A. degree, as a qualification for higher Government service. The supreme Government of India has emphasised this view by placing on record the following conclusion, namely, that "agricultural degrees, diplomas or certificates should be placed on the same footing as corresponding literary or scientific degrees, &c., in qualifying for admission to Government appointments, and more particularly those connected with land revenue administration."

From the resolution of the supreme Government forwarded to me I learn that this Government has impressed upon the provincial Governments and the various educational departments the policy of "making instruction in the rudiments of agriculture part and parcel of the primary system of instruction in the country, rather than teaching it as a subject apart from the general educational programme." Perhaps the intention of the Government of India as regards agricultural education will be more fully indicated if I note three other conclusions that are recorded:—

"(1) That the practice of allowing schoolmasters either before or after appointment, to pass through a course of a few months on a Government farm is one which deserves consideration.

"(2) That a Special school course leading up to the agricultural diploma, degree, or certificate is required.

"(3) That the [agricultural] diploma should eventually be compulsory in the case of certain appointments, e.g., agricultural teachers at training schools, assistants to the director of agriculture, &c."

Before passing from India I may add that it does not suffer from a want of agricultural text-books, there being of late years quite a respectable number

published both in English and the vernacular. The Government agricultural publications are also many and of service not only to the native cultivator but to the European planter.

In Ceylon the elements of agriculture are taught as a specific subject in the Government schools, and a primer of agriculture has been published by the Director of Public Instruction. There is also a school of agriculture at Colombo which was opened in 1854, and has ten branch institutions. From this school, to which a dairy is attached, agricultural instructors are sent into remote rural districts to illustrate improved methods. The school for a number of years has also issued a monthly magazine and this along with the *Tropical Agriculturist* furnishes the agricultural literature of the colony, a colony, I may add, which has the reputation of being itself the best training ground for the tropical planter.

Our next group is the African. Here the first thing to be noted is, that following the example of the West Indies a number of Botanic stations have been established. The earliest was started in Lagos in 1888, the next being at Abari on the Gold Coast, the rest being located at Uganda, Gambia, Sierra Leone, and in the Niger Coast Protectorate. These African stations, along with the Fiji station already mentioned, have a different mission to fulfil from those in the West Indies. They are teaching stations, in fact, they are intended to instruct natives in the rudiments of what is for them, practically, an unknown art. In the West Indies, on the other hand, they are intended to assist the peasant population to put to profitable use an art they already know and possess. In British East Africa, besides the botanic station located in it, the European cultivation introduced by the missionaries may also be regarded as of educational value to the natives. Zanzibar, again, has a Director of Agriculture, and his work on the same basis may be regarded as educational. To British Central Africa the European planter has penetrated; and at Zomba there is a Scientific Department to assist in working out the problems in pioneer cultivation that incessantly arises. Passing to Mauritius, I have to refer to Mr. Moore, who states that an attempt to start agricultural schools, and to introduce the study of agriculture in the rural primary schools of this colony, fell through for want of funds.

I come now to the two self-governing colonies in South Africa. Natal has a Department of Agriculture, and employs both dairy and irrigation experts, but no school or college of agriculture has been established. Under the Natal system of school education, however, agriculture is to some degree studied. Field work on a farm or garden, for instance, is compulsory in all the native schools, and the last report of the Superintendent of Education (1893) shows that even in native girls' schools land is cultivated and garden work done by the girls. From this report I also learn that the principles of agriculture was taught in three European schools. In the Government school at Estcourt it was taught to the boys and girls in Standards VI. and VII. At the Government school at Verulam it was taught to the boys in the same standards, and in the Government school at Ixopo it was taught to the senior pupils. The examination is not colonial, but under the regulations of the English Science and Art Department. In South Africa some of the conditions differ from the other colonies, in America and Australia, for instance, native labour is available, and the native has to be taught to labour on a farm, that is, do field work, for usually he is too backward for any other kind of agricultural teaching. Again, the European farmer stands somewhat in a different position to the farmer, for example, in Australia, as he often has at his disposal, and can utilise, the labour of the natives.

Passing on to Cape Colony, I might just note that the Agent-General for the colony in London advises me that he is unable "to say precisely to what extent agriculture may be taught in the elemen-

tary schools, because many of these are not under official control." The Blue-books of the colony indicate that to some extent it is taught, and for some years it has been an optional science subject for teachers. In the Report of the Superintendent-General of Education for 1898, for instance, it is stated that not a single candidate had been presented for examination in agriculture, which Dr. Muir adds, "in view of the large total (318 as against 250 in 1897) is decidedly disappointing."

Placed under the control of the Education Department of Cape Colony are two agricultural schools—one at Elsenburg, the other at Somerest East. The latter school, the Superintendent-General of Education reports, "has been allowed to linger on without alteration." These agricultural schools, I may add, were formerly three in number, and under the Department of Agriculture, and have only lately been transferred the care of the Education Department. One of the three has, however, been given up for some time, and now it would seem that another will soon follow.

The Elsenburg School of Agriculture at Mulder's Vlei is, in a sense, a new venture, which was only opened in September, 1898; yet it represents the old Stellenbosch School of Agriculture which moved from there to this farm. The Principal, like the school, is also new, having been selected in England to start the new experiment. The school as remodelled, is intended for boys of the better class, and the entry test is the fifth standard of the ordinary school. The work done in the agricultural schools, formerly, was mainly theoretical. The school at Elsenburg is an admitted experiment to see if an institution, where practical instruction is given in farm work, gives better results than the former semi-theoretical and scientific schools. At Elsenburg, with this object in view, the students have now to devote their afternoons to practical farm work.

The Department of Agriculture at Cape Colony has a wine farm at Groot Constantia, employs experts and agricultural assistants, and issues an *Agricultural Journal*. This completes, I think, what the Cape furnishes in respect to agricultural education.

(To be continued.)

FRUIT CULTURE IN QUEENSLAND.

BY ALBERT H. BENSON.

THE COMPOSITION AND APPLICATION OF MANURES.

(Continued from page 131.)

Sulphate of Ammonia.—A good sample should contain at least 20½ per cent. of nitrogen, and be worth in round figures £10 per ton. This manure is very soluble, and consequently acts with great rapidity. It is used either as a top dressing by itself or is mixed with varying proportions of phosphoric acid and potash to form a complete fertiliser. When used alone it should be applied at the rate of 1 to 2 cwt. to the acre during a period of the plant's active growth. It has a marked effect on the growth of cereals, grasses, corn, sorghum, &c.; but is apt to produce too much straw or stalk at the expense of the grain. It is therefore most valuable for the growth of green fodder or hay, but not so valuable for grain production. It is of great value in the production of vegetables when rapid growth and quick returns are desirable, but in this case it is better to use it in conjunction with soluble phosphoric acid and potash in order to produce the best results. Used by itself, it is very apt to impoverish the land, as it stimulates such a vigorous growth that the plants are apt to exhaust the soil of other available plant foods. Its use, therefore, requires judgment, followed by judicious cropping, cultivation, and the application of farm manure or a complete fertiliser.

In the case of fruit trees that have been neglected and run down, a severe pruning, followed by a good dressing of sulphate of ammonia—say, 2 to 4 lb. to

the tree, according to its size—will often produce a vigorous growth, provided that the roots are healthy, but care must be taken, once this growth has been forced, that the trees have sufficiency of plant food given them in the form of farm manure or a complete fertiliser to sustain and continue such growth.

Nitrate of Soda.—Is similar in its action to sulphate of ammonia, but at its present price, as compared with other sources of nitrogen, it is too dear to use. It contains a little over 15 per cent. of nitrogen, worth about £7 5s. per ton, and its cost is about £15 per ton.

Sulphate of Potash.—This fertiliser is seldom used alone—in fact, its use is only to be recommended when combined with nitrogenous and phosphatic fertilisers. A good sample should contain at least 50 per cent. of potash, and is worth 5s. 4d. per unit, or about £13 to 10s. per ton. It is probably the best form of potash to use, as the general opinion is that the best results are obtained from its use.

Muriate of Potash.—Similar in its action to sulphate of potash, and used in place of the latter. A good sample contains about 60 per cent. of potash, and is worth about £15 per ton, as the potash is considered to be less readily available, and consequently of slightly less value, when in the form of muriate than in the form of sulphate.

Kainit.—A mixture of muriate of potash, muriate of soda (common salt), and muriate of magnesia. Its value is due to the potash it contains, which in a good sample amounts to 13 per cent., worth £3 9s. per ton, whereas the price charged is not less than £4 per ton. Kainit is therefore a dear form of potash as compared with the sulphate or muriate, as not only does the potash cost more per unit but the proportion is so small that a much larger amount—from four to five times—is required to produce the same result. This adds considerably to the freight and handling, and consequently renders this form of potash expensive to use.

There is one other form of potash now on the market known as "Australian potash," which contains 25 per cent. of potash and 4½ per cent. of insoluble phosphoric acid, which is worth about £7 per ton when estimated at its unit values. Its price is £6 per ton in Sydney, at which rate it is the cheapest form of potash on the market.

There are two other classes of commercial fertilisers—of which the first is superphosphate, and the other a complete or mixed fertiliser.

Superphosphate.—The manufacture and value of super or soluble phosphate was referred to in the previous part of this article, so I will only need to give its unit value, which is 5s. 4d. per unit for water soluble phosphoric acid, 4s. 6d. for citrate soluble phosphoric acid, and 2s. for insoluble. A good superphosphate contains about 17 per cent. of soluble phosphoric acid.

Complete or Mixed Fertilisers.—There are a number of manures of this type on the market, the composition and value of which are very variable, as they are made with a view of meeting the requirements of various soils and crops, both farm, garden, and orchard.

The bulk of these manures consist of a mixture of phosphatic, nitrogenous, and potash manures. The phosphatic portion is present either in the soluble or superphosphate condition or else in that of the insoluble or bone phosphate condition.

The nitrogen is present either in the form of sulphate of ammonia, or in that of blood, nippo, or other form of organic nitrogen—usually the former; and the potash is almost always present in the form of sulphate of potash. The so-called Colonial Sugar Company's manures are good examples of this type, and their composition can be relied upon, but there are others on the market equally as good.

In dealing with the question of complete or mixed fertilisers, I wish it to be clearly understood that the suggested composition of and quantity to be applied to any particular crop is not to be taken as absolutely binding on all classes of soils and under

all sorts of conditions of cropping and cultivation, but to refer to land of medium quality, well worked, in good condition, and preferably under a systematic rotation of crops. In the matter of manuring it is impossible to lay down any hard-and-fast rules, as, though we know that a certain crop will take so many pounds of nitrogen, phosphoric acid, and potash out of the soil, the mere fact of our adding this quantity of plant food to the soil will not be sufficient to secure such crop. The state of the land, heat, moisture, and many other factors have to be taken into consideration; but, at the same time, the knowledge of the essential plant foods required by individual crops, and the practical application of this knowledge, combined with sound common sense and judgment, will be found to be of great value. In the case of the application of commercial fertilisers, the agriculturist will learn as much, if not more, by careful observation of the habits of growth of various plants, and of the action of the various manures on same in his particular soil, and under the particular conditions of climate in which he is working, than he will from all the chemist can tell him of the analysis of his soil or of the plant foods extracted from it by various crops. The best results are obtained by a judicious combination of both the scientific knowledge of the chemist and the practical observation and knowledge of the agriculturist.

Composition of Mixed Fertilisers.—In estimating the value of commercial fertilisers I have taken the standard adopted by the New South Wales Department of Agriculture, viz:—

- 5s. 4d. per unit for water soluble phosphoric acid.
 - 4s. 6d. per unit for citrate soluble phosphoric acid.
 - 2s. per unit for insoluble phosphoric acid.
 - 5s. 4d. per unit for potash.
 - 10s. per unit for nitrogen in blood, nippo, offal, &c.
 - 9s. 6d. per unit for sulphate of ammonia.
- In the different mixtures recommended the individual fertilisers are assumed to be of the following composition, a high standard having been chosen:—
- Sulphate of ammonia, containing 20½ per cent. of nitrogen, worth £10 per ton.
 - Nippo, containing 12 per cent. of nitrogen, worth £6 per ton.
 - Dried blood, containing 12½ per cent. of nitrogen, worth £6 5s. per ton.
 - Superphosphate, containing 17 per cent. of water soluble phosphoric acid, worth £4 5s. per ton.
 - Bone phosphate, containing 27½ per cent. of insoluble phosphoric acid, worth £2 15s. per ton.
 - Meatworks manure, containing 6½ per cent. of nitrogen and 14 per cent. of insoluble phosphoric acid, worth £4 13s. per ton.
 - Sulphate of potash, containing 50 per cent. of potash, worth £13 10s. per ton.

Buyers should always insist on knowing the analysis of any fertiliser that they purchase, and not only that, but they should insist on the seller giving them a guarantee that the fertiliser as sold is up to such analysis. Given this, it is an easy matter to compare the value of any particular fertiliser with those given above.

FOR CITRUS TREES.

Citrus fruits remove a considerable amount of plant food from the soil, as will be seen by referring to the table at the end. They require large quantities of nitrogen and potash, but only a comparatively small proportion of phosphoric acid. It is not advisable to give the trees too soluble a manure, or to apply it in too large quantities, but the fertilisers should contain plant food in both a soluble and slowly available form. The following proportions will be found to suit many orchards:—

	Cwt.
Meatworks manure, blood, and bones ..	10
Superphosphate	4
Sulphate of potash	4
Sulphate of ammonia	2
	20

This fertiliser will contain about 5¼ per cent. of nitrogen, 10 per cent. of potash, 10½ per cent. of phosphoric acid, of which 3½ per cent. is water soluble, and be worth £7 per ton. Manuring is seldom required in young citrus orchards in this colony, provided they are planted in suitable soil; but if the land is poor, then from 4 to 6 lb. per trees up to five years of age, applied in two lots, will be sufficient, but for trees in bearing the amount should range from 10 to 20 lb. per tree according to size, applied in two lots. In making the above manure, blood or nippo may be substituted for the sulphate of ammonia, but it will be apt to render the fruit more acid and somewhat thicken the skin. The best way to apply this manure is to broadcast it round the tree and to either chip, harrow, or cultivate it in; spread the manure round the feeding roots of the trees, not right round the stem. Apply in July or August, and again in January. Experience may prove that in the case of rich scrub soil of volcanic or some soils of granitic origin it is not necessary to use so much potash, in which case it may be reduced, and the nitrogen and phosphoric acid increased.

In the case of sandy soils it may also be advisable to increase the proportion of potash, but this can only be determined by the orchardist carefully noting the result of the manuring.—*Queensland Agricultural Journal,*

(To be concluded).

PLANTING IN TOBAGO.

As is well known, Cacao is just now one of the most promising and useful crops that could be grown in Tobago. It will not grow everywhere. But there can be no doubt that there are some localities in the island that suit Cacao very well. What the cultivator must do is to carefully bear in mind what the Cacao tree requires and give it the best conditions for its growth and for producing good crops. In the following pages an attempt is made to give in simple language hints in regard to choosing and planting the land, caring for the trees, gathering the crop and preparing the Cacao ready for market. It is believed that if the directions here given are fully carried out the cultivators, both large and small, will have good returns from their labour. It must, however, be remembered "Where there is little labour, there is little gain."

PLANTING.—When planting cacao the following ten points should be observed:—

1. Choose porous land, not too dry, well sheltered from the wind and, if possible, facing west.
2. Leave all bushes on the ridges for 70 feet each side.
3. Clear the land well, burning all the wood and bush, on the surface, but not in heaps.
4. Mark out the ground in parallel rows, 12 to 15 feet apart, and, at the same distance apart, place along these rows, stakes so arranged that those of one row alternate with those of the next.
5. Turn up the soil, to a depth of one foot, for three feet around each stake.
6. Plant permanent shade trees in each third hole of each third row.
7. Plant the cacao during the moist weather of June or July.
8. Plant bananas halfway between each pair of cacao trees, and tannias between the bananas.
9. Mulch around the trees, but do not disturb the roots by forking. Scratch the surface lightly with hoe or rake previous to laying on the mulching.
10. Always keep the ground clean and free from weeds.

1. Choose porous land, not too dry, well sheltered from the wind and if possible facing west.

Suitable land will generally be found on the lower and more gentle slopes of ridges, where the soil is usually loose, open, sufficiently deep and well drained. On the steeper slopes of the ridges the soil is generally

thin and poor, and accordingly useless, whilst the level lands at the bottom of larger valleys will be found very rich and capable of growing excellent cacao if properly drained. Any aspect will do, provided the land is completely sheltered from the prevailing easterly winds by belts of timber or by higher ridges. Land which is not thus protected is utterly unfitted for cacao cultivation.

2. *Leave all bushes on the ridges for 70 feet each side.*

As the ridge-tops are as a rule useless for the growth of cacao, it is better to leave the natural forest upon them, for the following reasons:—

(1.) These belts of timber will protect the cacao on the lower ground from the wind.

(2.) They will assist to preserve the necessary humidity.

(3.) They will annually shed large quantities of leaves upon the lower lands, which are useful as manure or mulching for the cacao.

(4.) During heavy rains, they will prevent the water from running off the hill sides in streams sufficiently large to wash away the best soil from the cacao lands below.

3. *Clear the land well, burning all the wood and bush, on the surface, but not in heaps.*

Such portions of the land as are intended for cacao should be cleared of all vegetation. Some cultivators leave portions of the original forest standing for shade purposes, and meet with a good measure of success. As a general rule, however, it is better to clear the whole surface, for the following reasons:—

(1.) The trees left standing upon the ground will very rarely be in proper lines, and therefore cannot shade so perfectly as when regularly planted.

(2.) Such trees, having grown amongst a number of other high trees, will be tall and weak and therefore easily blown down.

(3.) Trees left in this way will prevent the cacao being planted symmetrically, which is of great importance to its well being.

(4.) Many of the forest trees are totally unsuitable for shade. Only the pod-bearing or leguminous kinds should in any case be left. Others will take from the cacao the nourishment it should obtain from the soil, and starve it to death for want of food and moisture.

If the planter can afford it, it is better that the whole surface of the ground should be thoroughly well turned over and exposed to the atmosphere, in order that the soil may be sweetened. The land so cultivated can be brought into use for growth of food supplies.

Burning the timber in heaps is a bad method, because by so doing, owing to the fierceness of the fire, the wood is reduced to ashes instead of remaining in the more useful form of charcoal.

4. *Mark out the ground in parallel rows 12 to 15 feet apart, and at the same distance apart place, along these rows, stakes so arranged that those of one row alternate with those of the next.*

If the lands is rich, 15 feet is a good distance, if poor, 12 feet would be more suitable.

Make the rows perfectly straight, and parallel with the boundary lines; the plants should be put at equal distances from each other in every direction. Trees planted too close together will choke each other, whilst, on the other hand, if planted too far apart, they will fail to give the requisite support and shade to one another. Again, when the trees are planted in regular rows, it is easier to walk through the field and give attention to the plants without missing any.

5. *Turn up the soil, to the depth of one foot, for three feet around each stake.*

This is best done with the pick axe some months before planting. Let the earth be thoroughly turned upside down, and afterwards mixed with good surface soil, leaf mould, or well rotted manure, if available.

6. *Plant permanent shade trees in each third hole, of each third row.*

There are several kinds of shade which may be used, but probably the most effectual and useful are the two "Immortelles" and the "Saman." The

"Immortelles," is almost exclusively used in Trinidad. The great object of the permanent shade trees is to temper the heat of the sun, by keeping its rays off the cacao during part of the day. If shade trees are planted at every third hole when 12 feet apart, they should also be put at every third hole when 15 feet is the distance adopted, as the quality of the land will regulate the growth of the shade trees, as well as of the cacao.

Shade trees should never be planted too closely, as cacao must have sufficient light, or it cannot bear good crops. If a shade tree is too close to one cacao tree, it must be too far away from others, and the latter will accordingly suffer from having too little shade.

A common objection to the plan of using a cacao hole for the shade tree is, that one cacao tree out of every nine is lost. This is perfectly true, but if a cacao planter is unwilling to make this sacrifice, he will undoubtedly lose more than one-ninth of his crop, for the nine improperly shaded trees will yield less than the eight well shaded ones.

7. *Plant cacao during the moist weather of June or July.*

There are two ways of planting. You can plant cacao seeds on the spot where the tree is to permanently remain, this is called "planting at stake;" or you can plant the seeds in bamboo joints or in seed beds, in nurseries, and afterwards transplant to the permanent position. The latter operation should be very carefully performed, the greatest care being taken not to place the plants too deep in the ground, as more deaths of young plants arise from this cause than from any other. The seed when planted should be placed at a depth equal to its own thickness, below the surface.

During the moist weather which usually occurs in June and July is a good season for planting, because at this time the rains usually commence to fall regularly and generally last to the end of the year. Plants can better endure the dry season which usually extends from February to April or May, if planted at the time indicated. Planting at stake causes an increased expenditure on supervision, as a larger area of ground has to be regularly attended to than is the case when the plants are raised in nurseries. The seed sown should be selected from trees in good health and which are known to bear regular crops of first class cacao. All other seed is comparatively worthless.

8. *Plant bananas at 6 to 7½ feet from every cacao tree (see section 4) and tannias between the bananas.*

This means that half way between every two cacao trees there is to be a banana, and half way between every banana and cacao tree, there is to be a tannia.

These plants will afford the necessary shade and protection to the young cacao, and the value of the crop will repay a large portion of the cost of growing the cacao trees. Should there be no means of getting ground provisions to market, the produce may be used for feeding pigs.

As soon as the permanent shade is sufficiently grown all the small shade should be removed and the plantation cleaned throughout. In no case should further mixed cultivation be continued.—*Imperial Department of Agriculture of the West Indies.*

(To be concluded)

THE PLANT DOCTOR.—The Royal Horticultural Society seems rolling in wealth, or very anxious to spend what it has—a correspondent says he knows an opening, viz., to provide the sinews for war to some plant-disease man, and send him to see on the spot what disease really looks like. The postal box is apt to mislead. We certainly think the time has arrived when the Royal Horticultural Society, or someone, should give an adequate salary to a competent plant doctor whose whole time should be devoted to the work. We are only editors, and have no time for the necessary research and cultivation, but we are swamped with enquiries and specimens.—*Gardeners' Chronicle.*

MR. O'CONNOR ON INDIAN TEA:
PLANTERS AND THE CURRENCY.

The Director-General of Statistics for the Indian Government is Mr. J. E. O'Connor, C.I.E., and he follows up the Customs tables for the year 1899-1900, with a fairly elaborate Report. We quote the portions referring to our staple, which are of general interest to our planting and mercantile community. It will be observed that Mr. O'Connor attributes the falling-off in the importation of (China and Ceylon) tea into India, to the disappearance of the re-export trade through Persia, and that this is due to the great efforts of Russia to place its overland trade with Eastern Asia, that is China, on a sound footing. For the moment this overland trade has undoubtedly met with a check, the full effects of which have not yet been realised. Turning to the Exports of Tea, Mr. O'Connor, as a loyal supporter of the Government and its Currency policy, has a strong deliverance against the critics, including Mr. R. H. Elhot, but more especially directed against grumblers among the tea planters themselves. It will be well for Ceylon tea-planters, who still harp on the currency, to note what is said and how effectively the case of Brazil is dragged in as an illustration of evils avoided. Be this example apposite or not, we have long been clear that the higher rupee stopped the rapid extension of tea planting, and so put a check on the (at present) one great and universally-admitted drawback to prosperity in tea, namely *overproduction*. Do not the Ceylon planters, therefore, owe this much to the Indian Currency authorities as something to balance the other side of the account? We are pleased to see how well the average for the Calcutta Tea Sales has kept up for the past five years and that the direct export of Indian tea, to Australasia, United States and Canada, is increasing. Mr. O'Connor's remarks are as follows:—

The importations of *Tea* have, as was anticipated, again fallen away. As late as 1896-97 the importations amounted to as much as 7,875,000 lb.; in the following year, concurrently with Russian measures taken in view to the fostering of direct trade between Eastern Asia and Russia, the transit trade through Persia into Turkistan was placed under serious disabilities, and the imports of tea fell to 3,515,000 lb. In 1898-99 there was a very small recovery to 3,659,000 lb., but last year there was again a decline to 3,203,000 lb., a quantity considerably less than half the trade which existed until the new arrangements came into operation. The importations of China tea are less than a third of what they were four years ago, but besides this decline in China tea must be noted a great reduction in Ceylon tea to about half the imports of the preceding year. That is not to be regretted, so far as Ceylon tea was consumed in India, but with the reduction of the imports of Ceylon tea into India there has happened an increase in the direct imports of that tea into Russia, the arrangements referred to favouring the trade in that tea, as was observed in reviewing the trade in tea in 1898-99.

EXPORTS:—*Tea*.—The very large quantity of 175 million pounds was shipped, an increase of 17½ million pounds, being at the rate of 11 per cent, on the shipments of 1898-99. In the seven years since the closure of the mints the exports have increased by as much as 39 per cent: and al-

though prices have not been able to maintain all along what owners of tea estates would regard as a satisfactory level in the face of the constantly increasing quantities shipped from India and Ceylon to what is, after all, a limited market—yet the industry has happily not been overtaken by the ruin and desolation which were so freely prophesied to be the consequence of placing the Indian currency system on a sound basis. Nor, happily, are there any indications that the industry is not likely to be even more solidly prosperous in the future than in the past. What a vicious currency system did in Brazil for coffee the unsound currency system of India was doing for tea. The temporary stimulus given by depreciated paper or depreciated silver led to rapid extensions of cultivation; the increasing supply led to a fall in prices; the fall in prices led to a demand for further depreciation in the currency, in order that the speculative planter might find from the taxpayers the profit which he could no longer find from consumers in an over-supplied market. In Brazil this vicious circle is still being travelled, and the issue can only be either the ruin of the planters, who are aghast at any suggestion for currency reform, or the complete and hopeless insolvency of the country. In India this road has been closed, and the capitalist will now place his money in tea with exclusive reference to the conditions of cultivation and consumption and without an eye to a depreciating currency. It is by no means improbable that in the result the near future may see a gradual restoration of the price-level, already initiated during the past year, to a level which will satisfy the producers and not restrict consumption.

PRICES IN CALCUTTA (annas and pie per pound.)

[We omit "Pekoe Fannings" and "Broken Souchong."—Ed. T.A.]

	Orange (& broken Orange) Pekoe.	Broken Pekoe.	Pekoe	Aver- Sou- chong.	age.
1895-96	. 11 1¼	9	7 3/4-7	5 11	8 9
1896-97	. 9 11½	8 7½	6 9-10	5 5½	8 8
1897-98	. 8 9½	7 5-7	6 0½	4 10¾	8 5
1898-99	. 8 12-5	7	5 8	4 7	8 1
1899-1900.	7 9 1-10	6 9¾	5 8¾	5 0¾	8 4

The exports of Indian tea to the United Kingdom amounted to 154,161,492 lb., being nine-tenths of the whole quantity exported. Some portion of the tea shipped to London is of course re-exported to other countries, but it is satisfactory to note an increase in direct shipments from India to markets outside the United Kingdom, especially to Australia, Canada, and the United States.

CHEETAHS ON THE PROWL.

A very handsome specimen, of the tiger tribe, was shot just below the Hakgalla Gardens, by a well-known native huntsman. The animal had been seen prowling about the previous day, and had taken away a dog belonging to him said to be of value, so watch was kept in the neighbourhood of the animal's haunts, when in broad daylight the brute pounced upon a dog which happened to be passing a low tree overhanging a stream, when the huntsman fired, mortally wounding the cheetah, but not before his would-be quarry was slightly mauled. The carcass was brought to Nuwara Eliya where it found ready sale, Mr. Laidlaw, Agent of the National Bank, being the purchaser. The following were the dimensions:—Length 7 ft., height 3 ft.—*Cor.*

IMPRESSIONS OF SOUTHERN INDIA.

[BY A CEYLON PLANTER.]

IRRIGATION

and ploughing are allied agricultural operations, and the Indian is as systematic in the one as in the other. With the exception of cotton, which, (as far as I could observe in a passing train) is not irrigated, every other product, even the young coconut plantation, (!) is regularly irrigated. Irrigation does not mean the free and easy letting out of water stored in tanks. No, it means the laborious and toilsome well-irrigation which is practised by the allied race of Tamils in the North of Ceylon. Agriculturists, who have given the subject of irrigation some thought and study, assert that well-irrigation is more beneficial than tank-irrigation, as the water of the former contains salts and other soluble manurial ingredients not to be found in the latter. However, the

PATIENT INDUSTRY OF THE TAMIL

was a cheering sight to one accustomed to the sloth and apathy of the Sinhalese generally. My condemnation of the Sinhalese is not sweeping. Nothing can excel the systematic toil and industry involved in tobacco cultivation (borrowed from the Tamil, I suppose) nor the attention he pays to his rice fields in the interval between ploughing and reaping. But at the best his agricultural industry is spasmodic, not continuous. Perhaps the fairness of his wants and the ease with which they can be met, have induced his proverbial apathy. In regard to irrigation, I noticed

TWO SYSTEMS OF RAISING WATER.

One by bullock power and other by means of the sweep or lift so familiar to the residents of old Colombo, who indulged in the luxury of baths in public bathing places. The former is a very interesting process. One side of a well is built up about three feet high. In this is fixed a beam with two curved uprights bending into the well. These support a grooved wheel in which runs the rope used in raising the water. From the top of the wall of the well a sloped embankment runs for a short distance into a scooped hollow in the ground. A large cow-hide stitched up, is used as a bucket. One end of the rope is fixed to it and the other to the yoke of a pair of oxen. These stand on the top of the slope with their back to the well and the bucket is filled. They are driven at a trot to the bottom of the slope and the bucket reaches the surface and is emptied into a trough by drawing in a piece of rope attached to the bottom of the bucket. By pulling the reins, the bullocks are backed to the top of the slope, and the process of filling the bucket and emptying it is repeated with machine-like regularity. In the Western and other parts of Ceylon, except the North, the "lift" is worked by a single man, who dips the bucket into the well and draws it out with comparative ease, owing to the weight attached to the other end of the "lift." In India the lift is notched by having steps or indentations cut into it. On it are five or six men with long balancing poles, who move up and down it to fill the bucket and draw it up. A big cauldron takes the place of a bucket.

The freshness and the dark green of all cultivated products were a refreshing sight

and in contrast with the aridity around. Water is led into the cultivated patches by means of drains. Plantain gardens, and as I said before, coconut gardens, are also watered by drains running between the rows.

PLANTAIN GARDENS

are so different to what one sees here. They are carefully tended. All the withered branches are cut and used to mulch the ground. The leaves are all dark green.

What a pity it is that no one seems interested in teaching the Indian ryot how to grow

COCONUTS.

The plants are put down six, eight or ten feet apart. From the railway one could see large trees in the villages and some only of these seemed to be bearing well. The nuts for sale at the railway stations were little larger in size than the Maldivian coconut. On the lower portion of the line,

COTTON

is met with. The shrubs are two or three feet high. The great cotton district is, of course, Tinnevely. The branch line to it diverts from the main line at a place called Manniachi, two stations out of Tuticorin. Along the main line the centre of a cotton district is Nirdunpatti, there can be seen large, stone-built cotton mills and the manager's residence on the top of an adjoining barren hill—by the way all the hills met with in the neighbourhood of the railway seemed to be barren.

The Indian ryot has not much to learn in the way of agriculture. His dry ploughing, involving as it does the thorough aëration and pulverising of the soil, the thoroughness of the operation as is seen by every bit of his land, being broken up and his systematic irrigation do not leave much to be desired. His methods are somewhat primitive and crude, but their results are satisfactory.

It will be remembered that some years ago, after the great famine, there was an attempt made at a revival of agriculture. It was argued that one of the causes of famine was defective methods of agriculture. Amateur Agriculturists condemned the Indian system as radically bad. Professor Voelker was commissioned to study the system on the spot and to suggest improvements. He studied it and the result was that the Agent had

VERY LITTLE TO BE TAUGHT.

His conclusions were that his methods were not in agreement with those in European countries, but the conditions of both were dissimilar. His system was the result of the traditional experience of many generations and should not be lightly or hastily disturbed. Like the Prophet of old he was sent to curse, but he blessed instead. On the railway journey till Madura is reached, I did not notice any rice fields; all was high and dry land cultivation.

THE RICE-FIELDS

are very like our own, with ridges and water. Of course, as is well-known, the Indian system of paddy cultivation is different for our sloven and wasteful system of broad-cast sowing. They sow in seed-beds and perform the laborious work of transplanting. Three-fourths of seed paddy is saved by this, a very large item in the aggregate. The benefits accruing from the mode involved in transplanting and from more room for the plants,

are the development of each individual plant into a bush and a larger yield. Weeding, too, is general.

A great deal of time was recently taken up over the deliberation of a Commission appointed to elaborate a scheme for the formation of

INDIA-RUBBER: EXTENDED CULTIVATION AND REPORTED SUBSTITUTE.

Below will be found some curious information in reference to the extended planting of rubber. Costa Rica is pronounced the best country in the world for this culture, and an estimate is furnished for an estate which is truly American in its grandeur, though it also reminds us of certain Ceylon "cinchona" estimates in the early "eighties." In short the estimate before us makes out the annual profit after seven years on 10,000 acres planted with rubber, to be 375,000 dollars, say £75,000 or £7 10s an acre. This is not too much per acre, but the risks over 10,000 acres would be considerable.—"The India-rubber World" to hand of July 1st, contains a great deal about substitutes for rubber. First, our old friend, the Rhea or Rannie plant, is to be exploited and we read:—

Patents cover the Corder method of manufacturing artificial rubber from the Rhea fibre. The capitalization of \$10,000,000 has all been underwritten for a Syndicate taking it up and no portion of it will be sold to the public for a number of months. Under the process controlled by the syndicate, a substance is produced which has the appearance, odor, and utility of crude rubber, and it is claimed that it can be manufactured at a fraction of the cost per pound of Para unwashed. The products will be manufactured in New Jersey. It costs, manufactured, as near as they can figure, 13 or 14 cents per pound, and as soon as possible they intend to discover exactly how much it is worth in all kinds of manufactured rubber goods. They do not expect it to take the place of Para rubber in elastic bands, for instance, but in many other lines where waterproof qualities, ductility, and a certain amount of resiliency are required, they believe that it will be found of great value. It is reported that Mr. Fred Lamprough, who came over to America with Mr. W J Corder in order to demonstrate the usefulness of the gum to the American purchasers, received a handsome fee for his services. Mr. Lamprough will be remembered as the inventor of a substitute for India rubber and Gatta percha known as "Volenite."

But this is not all. The next substitute is "Velvrl" of which we are told:—

The basis of "velvrl" is a drying or semidrying oil, which is nitrated by strong nitric acid. A nitro compound is formed, containing from 4 to 5 per cent of nitrogen, and this is thoroughly purified until all traces of free nitric acid are removed. In practice the oils used are linseed oil, and castor oil, but Mr. Reid states that, owing to the unstable nature of linseed oil, castor oil is preferred. The other ingredient used is nitro cellulose of a very low degree of nitration. Articles made of "velvrl" materials may be placed in boiling water without losing their shape, although with the higher temperature they become somewhat more supple. By great pressure and heat combined, however, these materials can be molded into any desired shape. Mr. Reid exhibited specimens of machine belting, made of "velvrl" material, such as had been running for more than two years under trying conditions, but without showing appreciable signs of wear. The fabric which forms the basis is a cotton canvas of special make. This is saturated and coated with a solution of "velvrl"

material, and is then folded over to the required thickness and cemented together by means of specially constructed machinery. Such belting is stated to have very great strength, is waterproof, and unaffected by oil or climatic changes. It has been found specially suitable for hot climates. The prepared canvas from which the belting is made can be used for a variety of other purposes. Trunks and portmanteaus made of it do not, like leather become moldy in a damp climate. Ground sheets of "velvrl" have been made for the British soldiers in camp in South Africa. It has also been used for horse covers, and, in a different mixture, for printers' blankets. Finally there is an alleged Mexican substitute:—

"A rubber factory is in course of construction in this city for the extensive preparation of rubber from a Mexican weed by a newly discovered process. The plant is valued at \$100,000 and is owned by a stock company, the principal stockholders of which are the Messrs. Soberon."

"Twentieth Century Gum" is the name given to this last new material; but the success of it as of the other substitutes has not yet been fully tested: and planters of rubber trees in Ceylon and elsewhere may take comfort in the fact that there is nothing equal to the real article.

CRUDE RUBBER AND PLANTING INTERESTS.

AN EXPERIMENT IN COSTA RICA.

The Indiana Rubber Co. (Goshen, Ind.), mentioned in the last *India Rubber World* as having been incorporated under Nevada laws, with \$1,000,000 capital, were organized early in this year. They own 10,000 acres of land on the east coast of Costa Rica, purchased after four years' investigation in Central America by Lester C Singer, of Goshen, Ind., who becomes the company's assistant manager. In a letter to *The India Rubber World* Mr. Singer writes:

"I was two years in Costa Rica, and decided that country to be the best for planting rubber, for the reason that there is no dry season on the Atlantic coast of Costa Rica as there is in Nicaragua and Honduras. I have planted over 300 acres of rubber in Costa Rica, and it is doing splendidly. My system of planting is to select rich, well drained soil where there is a heavy rainfall and no decided dry season. I plant the seed in a nursery and transplant in from six months to one year. I underbrush the land and thin out the timber enough to let in the light and air, and afterwards keep the plants clear of the undergrowth. I have associated myself with the Indiana Rubber Co., whose capital stock is \$1,000,000. Three hundred thousand dollars of the stock of the company will be sold at par for working capital. We expect to commence active operations soon, for which I shall return to Central America." Mr. Singer's address for a time will be in care of the United States consul, San José, Costa Rica.

The company, in their prospectus, state that their estate has a water front of seven miles along a river, which affords means of ready communication with the different districts of the plantation and with the coast. "The land is as valuable as any in Costa Rica, where land similarly situated is easily sold for \$100 per acre. . . Sufficient planting has been done to prove that the land is well adapted to the growth of rubber trees, chocolate, and other tropical plants. Some excellent specimens of rubber trees, which were planted by a former owner, are going on the land." Mr. Singer is referred to as "a pioneer in the planting and an expert in the culture of rubber trees. He has received the commendation of officials and others who are interested in the development of the resources of Costa Rica. His plantations have gone through the experimental stage and have proven

most excellent investments." The officers of the company are: Dr. Irvin J Becknell, president; B B Brothers, vice president; L M Latta, secretary; Luther E Bartholomew, treasurer; A S Zook, attorney; Clark Bruce, manager; L C Singer, assistant manager; and Eva Peck Bruce and Orville L Simmons trustees.

The secretary of the company, in sending a copy of their prospectus to *The India Rubber World*, writes: "In view of your article on page 206 of your issue of May 1, we beg to call your attention to the statements we make, as we believe we have in every case been conservative. Should you find any statement that is at variance with your knowledge of the rubber industry we should be glad to have you call our attention to it." The prospectus embraces the following estimate of—

EXPENSE.

Planting and bringing to production and marketing 1 acre (100 trees) at the end of 7 years ..	\$40
10,000 acres will cost ..	\$400,000
10,000 acres will produce at $\frac{1}{2}$ pound per tree, in seventh year ..	500,000 pounds.
At New York price of \$1 per pound, would be ..	\$500,000
Less cost of planting, etc., as above	400,000
Profit at end of seventh year	\$100,000
The production each year after the seventh year, being 100,000 pounds at \$1 per pound, will be ..	\$500,000
Caring and marketing at 25 cents per pound each year ..	125,000
Annual profit ..	\$375,000

The *India Rubber World* cannot undertake, in the present undeveloped state of the rubber planting industry, to pass upon the merits of the estimates of planting companies. It may be proper to suggest, however, that there nowhere exists, to our knowledge, data to justify any particular calculation of the cost of planting a given area in rubber and bringing the trees to the productive age. It might be more or less than \$40 an acre, and accurate statements based upon experience would be welcome by the editor. Another point is that 100 trees to the acre would seem an unnecessarily small number, as this would allow them to be planted 66 feet apart each way, and closer planting is advised by most authorities. Finally, the "New York price of \$1 per pound" is misleading. This is the price of fine Para rubber, but "Centrals," which grades are obtained from the *Castilloa elastica*, the rubber tree of Costa Rica, cannot be expected to bring nearly so much money. We are informed, however, that 65 cents has now been substituted for \$1 in these estimates. The yield per tree is, indeed, estimated conservatively. We shall look for the results of this experiment with much interest.

RUBBER TREES IN SALVADOR.

Writing from Santa Ana, Salvador—which is near the Pacific coast and also near the eastern boundary of Guatemala—Mr. J Hill informs *The India Rubber World*: "I have *Castilloa elastica* growing on all my farms upon the Volcan here, so that I know it will grow, but it is in very small numbers, and up to now I cannot size up its age. But I know that a pound of rubber can be had from a tree, because the men get it out and use it. These trees have grown up here and there, unnoticed and uncared for, among the shade covering coffee plantations. I intend planting some 100,000 trees this year, in order to give rubber a trial. The rubber grows wild along the coast and up to our place."

RUBBER IN THE PHILIPPINES.

A correspondent of *The India Rubber World* writes from San Francisco that a friend in Manila informs him that the plant known as the *Willoughbeia firma*—the kind of rubber plant native to the Malaysian peninsula and the Sunda islands, a creeper which

grows to very large dimensions—is found growing wild in marshy sections of the island of Luzon, in the Philippines.

RUBBER PLANTING IN TRINIDAD.

In the thirteenth annual report on the royal botanic gardens of Trinidad, for the year 1899, the superintendent, John H Hart, F.L.S., gives some notes of interest on the progress under cultivation of *Castilloa elastica*, *Hevea Brasiliensis*, *Kickxia Africana*, and other rubber yielding species. One Para rubber tree has a girth, three feet above ground, of 58 inches, and is 40 feet high. Experiments to date do not promise a large yield of latex. One-fifth of an acre has been planted, in *Kickxia* (Lagos rubber), some of the specimens being now 8 feet high, and apparently thriving in the Trinidad climate "*Castilloa* promises the best of any of the rubbers, so far, for local cultivation. A tree planted in 1885 is over 40 feet in height, and 51 inches in girth at 3 feet from the ground. It yields abundant latex."

THE RUBBER OUTLOOK IN EAST AFRICA.

Mr. Louis Sgal, of Liverpool, who is interested in more than one company engaged in the exploitation of Indian rubber in Africa, said recently to a representative of *The India Rubber World*:—"As regards the development of Africa as a rubber-producing continent *par excellence*—I mean as a field for the investment of capital in handling rubber—a satisfactory settlement of the trouble in South Africa would no doubt beneficially affect the whole of the rubber districts in the east of Africa. If England should gain possession of the Transvaal and Orange Free State, an enormous impetus would no doubt be given to capital to Africa in railway enterprises, and it may be, in such a case, that very speedy progress would be made with the Cape to Cairo railway, which at present is not far from Portuguese East Africa. As it is, the country around the Central African lakes is improving, and the native population is getting over the disastrous effects of the failure of last year's crops. It is a strange thing that in central Africa the rubber trade should be in so few hands comparatively. Two or three of the trading companies have a few steamers plying on the rivers and up to the lakes, and although possessing only a very limited capital, they have trade over an area where there should be sufficient room for twenty more companies."

The English companies operating in Africa above referred to have no connection with the Belgian companies engaged in the Congo country, but are located further east. Good profits are reported to have been made in bartering goods of English manufacture with the natives for rubber collected by them. Mr. Sgal is of the opinion that American capital might be invested profitably in a similar way.

THE MANGABEIRA AND MANICOBIA RUBBERS.

In the Brazilian state of Sao Paulo in 1899 a law was passed to encourage the cultivation of mangabeira rubber (*Iancornia speciosa*), and premiums offered for the acclimatization of other good rubber species, and for better processes of extracting the latex. The mangabeira tree grows native in the states of Pernambuco, Bahia, Goyaz, Espirito Santo, Sao Paulo, Minas Geraes, and Rio de Janeiro. There are many of the trees in the last three states. A recent report from the Belgian legation at Rio de Janeiro states that attempts to grow mangabeira trees from seeds have thus far failed, the planting having been done in lands exposed to the sun. Many native trees growing on plantations in Sao Paulo have failed to yield a profit to the owners, because of having been tapped surreptitiously by the natives. The government is now distributing seeds of the manicoba or Ceara rubber tree (*Manihot Glaziovii*), and large quantities have been planted, the quality of this rubber being superior to the mangabeira. Many manicoba trees have been planted, on coffee estates, but one planter reports scarcely one of a thousand young trees surviving the attacks of ants and other

insects. The government of the state of Bahia is also encouraging the growth of maniocoba, distributing a pamphlet of instructions. A discouraging report is to the effect that "lately the entire cargo of Ceara [maniocoba] rubber shipped in an English steamer was refused in London, under pretext that this gum was of too inferior a quality."

RUBBER EXPEDITION TO THE SOUTH SEAS.

In pursuit of its object--the greatest possible independence of Germany in regard to the importation of tropical products from foreign countries--the colonial industrial committee, at Berlin, have decided to send a "Gutta-percha and Caoutchouc Expedition" to the South-sea colonies," for the purpose of--

1. The study of the Gutta-percha and Caoutchouc culture and exploitation, in Dutch and British Indies (Sumatra, Borneo, Java, and Straits Settlements);

2. Planting and increasing the Gutta-percha yielding *Sapotacees*, and the caoutchouc yielding *Ficus* trees and *Apocynace* vines of New Guinea and the South-sea isles;

3. The sending of large quantities of seeds and plant material to New Guinea, the South-sea colonies and Kamerun, to introduce a regular culture of Gutta-percha and Caoutchouc on a large scale;

4. Transporting larger quantities of Gutta-percha leaves and bark to Germany for experimentation, to produce Gutta-percha suited for manufacture.

Rudolf Schlechter, the botanist, has signified his willingness to carry out the expedition. Herr Schlechter should be especially qualified for this important undertaking, in consequence of his rich experience gained as leader of the Caoutchouc expedition to Inhambane and West Africa; he also carried out, successfully, the expedition to West Africa in behalf of the colonial industrial committee, introducing the culture of Caoutchouc plantations in Kamerun.

The cost has been estimated at 60,000 marks, 30,000 of which have been placed at the disposition of the committee, with the proviso that it obtain the remainder from interested parties.

The Caoutchouc and cable industries have every reason to willingly and materially assist the committee to carry out its plan of sending a "Gutta-percha and Caoutchouc expedition" to the South-sea islands. An authority in our industry once said: "The Caoutchouc goods manufacturers must manifest the same interest in the agricultural side of their industry as the sugar manufacturers accord the beet culture!" The truth contained in these words stands today without a doubt, and the sharper the condition of the Caoutchouc market becomes, the nearer a possible Caoutchouc famine approaches, and the more we notice on the other side how the industries of other countries are actively employed in the cultivation of Gutta-percha and Caoutchouc plantations, the more energetic should we be to transform this object to a fact indeed. It is sowing seed into the future, but some day it is bound to bear abundant fruit, and repay generously the sacrifices made.—*Die Gummi-Zeitung (Dresden)*.

GREEN TEA IN THE KANGRA VALLEY.

(To the Editor, *Indian Planters' Gazette*.)

Dear Sir,—It may be of interest at the present time, when attention is being called to the advisability of making green tea instead of black in some proportions, that the system of manufacture of green tea in the Kangra Valley should be made known. It is obvious that this system has its defects, but the same should be useful as a base upon which to make experiments and improvements. There are few tea districts in India where greens are still made, but as this one district produces annually nearly two million pounds of this class of tea as against about one

million pounds of black tea, it may rather be classed as a green than a black tea producing district. The whole green tea crop is purchased, I believe, locally, and exported *via* Ladakh to Central Asia, or shipped to the Persian Gulf.

In order to make green tea the leaf is allowed to "run out" considerably, four or five leaves being plucked on one shoot, the consequence is that the quality of the tea would probably be too inferior to compete with China or Japan greens in European or American markets. There is no doubt that really good green tea could be made if more care were taken as to the quality of leaf used and more attention paid to cleanliness in manufacture. The *kutch* leaf is taken immediately from the plantation, and without any withering operation is thrown into iron, horizontally placed pans which are built over brick *chulas* fed by wood fires. Each pan takes about 12 pounds of green leaf at a time and is kept from a high temperature to red heat, the leaf being stirred and turned briskly in it for one minute for dry to seven or eight for wet leaf, some skill being required to prevent it from being scorched. Two wooden forked sticks are used to toss the leaf continually in the pan, and when it is sufficiently flaccid, it is thrown out on to a table, which is placed nearly level with the pan itself, and vigorously hand-rolled while still hot. The rolled leaf is left in balls of about six inches in diameter, but these are carried off almost immediately to be broken up again and spread thinly upon bamboo mats in the sun. Here the rolled leaf remains until the juice which has exuded from it and is upon its outer surface becomes sticky, and the leaf becomes slightly darker in appearance. It is then hand-rolled a second time (these last two processes being sometimes repeated) and the rolled leaf is made up into larger balls, which are then taken to the facing pans. These pans are built in *chulas* at an angle of 30° to 45°, two generally being placed back-to-back over one *chula*. The heat of these must not be nearly so great as that of the withering pans and not sufficient to burn the hand if quickly passed over them. One of the large balls is thrown into a pan and moved about quickly for some time until it has become heated, when it is broken up and stirred from side to side with a piece of wood until the tea has become dry and has obtained a grayish gloss. Each leaf of tea produced in this way has the appearance of a little twisted ball.

The only sorting done by the growers is to take out the dust by means of a No. 18 bamboo or wire sieve, and to hand sort the flat or Bohea leaf. The remaining bulk obtains a local price of from As. 12 to Re. 1 per *butti* (4lb.), equal to As. 3 to As. 4-3 per lb., the dust and Bohea fetching about As. 4 to 5 per *butti*, equal to As. 1 to As. 1-3 per lb.

Many of the green teas manufactured in the Kangra Valley are coloured with soapstone by which they acquire a fine silky grey appearance. Teas coloured in this way seem to be in rather greater demand than the uncoloured ones. The coating of soapstone is, I believe, supposed to preserve the teas to some extent. So-called soapstone which appears to be the same as the clay slate found in the Eastern Himalayas, can be purchased in the local bazaars. It is applied to the dried tea, about 10lb. of the latter being put into a warmed pan with four ounces of the stone and the whole stirred backwards and forwards until the required colour has been obtained,

As in the manufacture of black tea variations of the above process are found everywhere, and I do not presume to say that the one mentioned here is better than any other. In the first withering in the pans the leaf is steamed in the moisture given off from itself, and in the case of wet leaf the steam arises in clouds from the pans so that any application for a patent for the use of steam in the withering of green leaf cannot seemingly stand. The aroma given off by the steamed leaf is quite different from any obtained in the manufacture of black tea and is an extremely pleasant one.—Yours, &c.,
Holta, 24th July. G. C. DUDGEON.

CAMPHOR-TREES IN CALIFORNIA.

According to the *New York Commercial* the camphor-tree has been grown in California for many years as a shade and ornamental tree, but no effort has been made to produce camphor commercially. At the State University some years ago a small sample of camphor was made from the twigs and foliage, and was exhibited at the fairs. The trees are widely distributed over the State of California, both along the coast and in the interior, and everywhere are much admired for their thrifty growth and natural beauty. These trees are probably nearly forty years of age, sixty feet in height, and three feet in diameter at the base.

COFFEE AND CACAO IN THE CAMEROONS.

It appears that coffee growing has practically had to be abandoned in the German colony of the Cameroons owing to the ravages of a beetle which attacked the roots of the trees, but that cacao cultivation has succeeded admirably, and most satisfactory progress has been made by the industry. At the present moment all the southern and western slopes of the mountains are studded with plantations, on which about 4,000 labourers are employed, as against 2,000 last year—3,000 of these are natives of the colony. About 150 labourers were imported from Togoland by State aid, and a hope is expressed that labourers from that colony will by degrees take the place of the Liberian labor which has had to be imported hitherto. The labour question remains an important one, more especially in view of the late troubles in the Rio del Rey district, since the increased requirements of the plantations will demand at least 6,000 labourers for the present season. The cacao plantations produced a crop of the value of about £15,600 in 1898-99, and it is expected that this will be largely increased, although the amount is already over £9,000 more than the value of the crop brought to the market in 1895-96.—*Home and Colonial Mail*.

THE PRICKLY PEAR AS FODDER.

Poverty, one has been told, makes strange bed-fellows, but that the famine should drive cattle to the prickly pear for food is a new development. We read in an Indian paper that the following instructions regarding the use of prickly pear as food for cattle have been published by the Political Agent at Kathiawar for general information under the orders of the Bombay Government:—"The instructions how to prepare the leaves are as follows:—The instruments consists of a

knife, a pair of tongs, and a pincer. The tongs are intended to hold the leaf and the knife to cut it, and the pincers to pluck out the thorns. After this is done, the leaf should be washed in water, to remove any stray thorns that may be sticking to the gummy matter in the leaves, and then have the leaves cut into pieces of one inch square, and sprinkle a handful of horse-grass or chenna-grass flour mixed with a little salt over the pieces, when the cattle usually will take to it without any difficulty. But in the case of such cattle which do not take to it willingly, a few pieces may put into their mouth, and the two lips be held together, till they chew the pieces and acquire a taste for them. By this means even new cattle can be accustomed to this fodder within two or three days. An ordinary woman cooly for a payment of two annas can bring prepared leaves of about 100 lbs. which can feed three or four starving cattle to keep them alive till prosperous times occur."

BRAZIL COFFEE NOTES.

The planters in various São Paulo districts are still publishing unfavourable reports of the new crop, and are advising the holding of coffee for higher prices.

A S. Paulo telegram of the 27th ultimo says, the commercial firm of Leite Ribeiro is about to be transformed into an association composed of planters for the purpose of extending the coffee propaganda in Europe.

Naturally the rise in exchange means lower currency prices for coffee, which will be unfavourable to the planter as the costs of production will not be reduced for some time to come. We may therefore expect protests against forcing up exchange before we are many weeks older.

The negotiations between the minister of foreign affairs and the ministers of France and Italy in regard to the import duty on coffee in those countries terminated on the 27th ult. The two countries concede a reduction of twenty francs and twenty liras per one hundred kilogrammes in the duties now levied in their custom houses on Brazilian coffee while Brazil engages not to impose maximum rates on their products imported into this country. The accord can be terminated only by six months notice. Though less than what she claimed, the accord is a victory for Brazil, for she secures a reduction of about thirteen per cent on the French tariff rate without the cost of a single concession.—From the *Rio News*, July 3rd.

COCONUT CULTIVATION IN S. AFRICA.

Mr. Hulley, magistrate, Unilalazi, in his district, report to the *Natal Agricultural Journal*, says:—It is surprising that no attempt has been made to cultivate the coconut palm on the Coast lands. The reason probably is that the tree is said to take very many years to come to maturity. It would be interesting to know the age of the one on the Tongaat estate, the only one I believe in the country which I think I was told, bore fruit this year for the first time. The Dutch, when Ceylon was in their possession, compelled the villagers to plant tracts of country with the palm from Colombo southwards, and since then the Sinhalese, alive to its value, have kept opening up fresh coconut land, until now there are about 600,000 acres under cultivation. It is said that only one-third of the crop, which in good years is worth £1,000,000, is exported in the shape of coir fibre, oil, nuts, &c., the rest is used as food, and for other purposes by the people.—*Natal Mercury*, July 23.

PLANTING NOTES.

PEPPER IN INDIA.—The Coorg Correspondent of the *Madras Mail* writes:—"The planting of pepper is being attended to on a larger scale than I was aware of when writing on the last occasion. Some local ryots have gone in for it largely. I hear one man having put out 50,000 cuttings this season."

PLANTING IN TOBAGO.—The Imperial Department of Agriculture for the West Indies has published some hints and suggestions for planting Cacao in Tobago. According to the preface, by Dr. Morris, these notes were prepared many years ago by Mr. Edward R. Smart, and were published in a Tobago journal that no longer exists. Mr. Smart, however, being still in the island, lately offered these notes for reproduction, and they have been revised by Mr. J. Hart, and issued in their present form. Other notes on other plants included in this little pamphlet were prepared by Sir Robert Llewelyn, formerly administrator of Tobago at present Administrator of the Gambia, West Africa.—*Gardeners' Chronicle*,

A HINT: WHY NOT JAFFNA MANGOES TOO?—An effort is being made (says the *Daily Mail* of July 14,) to bring the Bombay mangoes to England, and, indeed, for a few hours this week a small show of this fruit made an unwonted sight in a Bond street fruiterer's window. "But they were all snapped up as soon as the Anglo-Indians got to know of it," said Mr. George Adam, who had exhibited them. He showed our representative a letter he had received from Katliawar, India, proposing to export Bombay mangoes to London as a regular article of commerce.

A BRAZILIAN COMMITTEE OF AGRICULTURE.—In Campinas (Brazil) a municipal committee of agriculture is about to be formed, consisting of three planters, whose duties will be: To report to the Government of the State everything of interest regarding agriculture in the municipality; to collect information for the assistance of the district inspector of agriculture, and his guidance in estimating the probable crop; to summon, and preside at meetings of the planters of the locality, with the same object; and to indent on the Government for seeds and "slips" for transplanting, where such are required.—*Planting Opinion*, July 28.

AGRICULTURE IN WESTERN AUSTRALIA.—We have received some copies of the monthly journal of the Department of Agriculture for Western Australia from March to July of the present year. The contents are interesting, though chiefly dealing with live-stock and farming. The regulations for analyses of soils strikes us as rather peculiar:—

The Department of Agriculture is now prepared to make analyses of soils, and furnish a full report on same for the sum of £3 13s 6d for each analysis, one half of which will be paid by the Department of Agriculture. All samples to be delivered free at the offices of the Department, West Australian Chambers, St. George's Terrace, Perth accompanied by the above-named fee.

We suppose this means that the farmer must deposit £3 13s 6d with his samples of soils; but that he will get back not only the required analyses, but also £1 16s 9d half the fee, *pour encourager les autres!*

PARA RUBBER: GOOD PRICES.—This product seems likely to be a very good paying one for proprietors, who are able to grow it on their estates, as by the last mail an advice was received of the sale of some rubber grown and prepared on Culloden estate in the district of Kalutara at 3s 7½d per lb. Well done!

AGRICULTURAL BULLETIN OF THE MALAY PENINSULA.—The *May Bulletin of the Gardens and Forest Departments, Straits Settlements*, contains some valuable papers upon "Native Rubbers of the Malay Peninsula," "Insect Pests," "Bee-hawk Moth Caterpillars," "Para Rubber," "Kickxia africana," and "Injurious Fungi." There is also a plate illustrating certain insects.—*Gardeners' Chronicle*.

AGRICULTURAL SHOW IN WEST AFRICA.—The exhibition recently held at Dakar, West Africa, is probably the first of its kind in tropical Africa. The exhibits were chiefly native articles and products. The show was held in the public park, and to encourage the natives no entrance fee was charged. The Government of the Colony are trying to introduce the cultivation of Brazilian rubber, and they supply seeds without a charge.—*Globe*, July 20.

SUPERIORITY OF ORANGES.—A well informed writer on oranges pays the following tribute to Florida oranges: "If the Californians could only furnish us with an orange that had less skin and more juice—well, then consumers of the country would have nothing more to say. How highly these virtues in the orange are appreciated is shown in the magnificent prices paid for Florida oranges—figures about double paid for the California product."—*Planters' Monthly*.

INDIAN TURPENTINE.—The production of turpentine in India is likely before long, to become an important industry. The Punjab Government have recently sanctioned the establishment of a factory for the distillation of the crude resin, the experiments conducted in the Dehra-Doon Laboratory and in Kangra having convinced the Forest Department that production on a very considerable scale is possible. In the Kangra Valley forests alone, last season, some twelve hundred maunds of resin were collected.—*Pioneer*, Aug. 4.

JAPANESE TEA AT THE EXHIBITION.—Writing of the Japanese pavilion at the Paris Exhibition, the Paris correspondent of *Truth* says:—"The only tea drunk and sold at the pavilion is from Formosa. It tastes like strong pekoe. I cannot say I like it, but the Japs. do. They drink very weak and lukewarm. There is a kind of Formosa tea that costs three francs a cup, and is only drunk in Japan on occasions of high ceremony. The tea-house at the Exhibition is subsidised by the Imperial Government and run by two gentlemanly little Japs."

BRAZILIAN COFFEE FACTORY IN LONDON.—The new factory which has recently been opened by Motta's Brazilian Coffee Company (Limited), at 178, Goswell-road, E.C., is in all respects eminently suitable for the preparation of Motta pure coffee under the best conditions (writes a representative). Machinery and other appliances of the most modern type have been installed. There is room for the coffee trade to develop, and Motta's Brazilian Coffee Company (Limited)—whose head offices are at 116, Bishopsgate-street Without E.C.—evidently intend to do all in their power to foster the demand.—*Grocers' Journal*, July 14.

MALACCA TEA: WHAT NEXT?—We gather that tea is now being cultivated and made in Malacca and an expert in Singapore declares it to be “most excellent tea in flavour and quality”—capable of holding its own against Indian tea, at a dearer price.

BAMBOOS—In Madras as usual a number of experiments were made with the bamboo; in Kistna six hundreds bamboo plants were put out in the Weld reserve and they are doing well. In South Malabar several kinds of bamboos artificially introduced on the banks of the rivers in Pokote and Mutatimanna are doing well. Arundinaira Brandisii (the giant bamboo), planted in Ay-ravallikava in 18797 have now some of them a girth of twenty-two inches.—*Indian Agriculturist*, Aug. 1.

SHADE TREES FOR PLANTATIONS.—Mr Charles Gibbon gives his brother planters the result of his prolonged experience in a very sensible way in his letter elsewhere, which is well-worth careful consideration. It used to be said that no shade could be required above 4,000 feet, for there was nearly always a canopy of cloud available. But even in Dimbula, the benefits of grevilleas among tea—if not for shade, at any rate as breakwinds and for their leaves as manure—have been appreciated.

TEA MACHINERY.—Messrs. Thacker, Spink & Co., Calcutta, will shortly receive an entirely original work of the first importance to planters and to all concerned in the tea industry. “Tea Machinery and Tea Factories” by A. J. Wallis-Taylor, a work concerned with the machinery and mechanical appliances required upon a tea plantation, and with the buildings and material arrangements which have to be provided for dealing with the leaf as it is taken from the plant until it is ready for transport. There are over 200 illustrations, for the most part specially drawn for the book.—*Planting Opinion*, August 4.

THE HIGHEST POINT at which flowering plants have been found, according to a recent paper to the London Linnean Society, was in Tibet at 19,200 feet. Nine species recorded to 19,000 feet or higher. The plants were mostly of the order compositæ, and deep-rooting perennial herbs having a rosette of leaves close to the ground with the flowers closely nestled in the centre, are characteristic of these attitudes. In the Bolivian Andes Sir Martin Conway found two species of flowering plants at 18,700 feet and thirty-nine above 14,000 feet, the latter belonging to thirty-four general and twenty-one natural orders.—*Indian Agriculturist*, Aug. 1.

THE SEA FISHERIES of Malabar and South Canara with seven plates (chiefly photographs of fishing villages and boats) by Edgar Thurston, of the Madras Government Museum, is a useful *brochure* of some 166 pages with statistical appendix, in which are given abundant particulars of a great variety of fish caught, contents of stomach, hauls, sale price, &c. In one table we find the exports of salt fish from Mangalore to Colombo for seven years; and in 1898-9 a maximum export was attained in 2,635,990 lb. valued at R287,817. It is certainly very strange that Ceylon fishermen cannot retain this industry and salt enough fish for local demand. But we suppose nothing now remains of the experiment set going by the late Mr. Ravenscroft, Auditor-General,

CHINESE TEA IN RUSSIA.—As far back a June a meeting of Russian tea dealers was held at St. Petersburg, we learn from the Allahabad journal, to consider the position of the tea trade and the probable result of the disturbances in China. It was resolved that the price of tea should be gradually increased.

THE “CHIN BARA TEA.”—We are indebted to the correspondent who brings Mr. Harcourt Skrine's enterprise in respect of “Tea for Chemists” under our notice—see elsewhere. Surely his “cold process” is more or less identical with that patented by Mr. Armitage, although the latter has taken no credit for producing an article of special value to chemists who retail tea.

MOCHA TEA COMPANY.—We heartily congratulate the shareholders upon the flourishing condition of this Company and trust that the working may long continue to be such as to warrant an annual dividend of 15 per cent. The whole history of this Company (notwithstanding the purchase of fresh estates!) is a wonderful illustration of what “tea” can do under favourable circumstances and good management; but then the capitalisation per acre of tea was low to begin with.

NEW MARKETS FOR TEA AND COFFEE.—Perhaps the most interesting subject and certainly one of the most important, discussed at the Annual Meeting of the United Planters Association of Southern India was that entitled “New Markets”:

The Hon. Mr. Acworth's remarks about tea point to an object lesson for planters of coffee as well as tea. Some critics may urge that the enhanced demand for Ceylon and Indian teas, coming together with the expenditure of huge sums on the exploiting of old and new markets, is but a coincidence. Even if so, says the *Madras Mail*, it is a curious coincidence that Ceylon, which has spent the more freely, has made the more rapid progress. We cannot overlook the possibility that a great deal of trade that was formerly done through London now takes place among the statistics of direct trade with America, Russia and other countries. But the gross total has expanded; and it is remarkable that the expansion of this direct foreign trade has been so much greater with Colombo than with Calcutta. In both markets there are buyers representing English, American and Russian firms. There are as good opportunities for buying in Calcutta as in Colombo. We cannot, therefore, be surprised if the inference be drawn that the more rapid progress of the one, as compared with the other, is mainly due to the more liberal way in which “the wheels have been greased” in the case of Ceylon. At any rate, the suggestions that are made, based upon this inference, would appear to be worth a trial. Let India try advertising and canvassing on a scale proportionate to that of Ceylon. Let her expenditure in this direction be increased for a year or two. The results would soon show whether there was a strong probability that the growth of demand turned upon the degree of “push” applied by planters, or if we must seek some other explanation of the fact that Ceylon's superior success has been coincident with Ceylon's more liberal expenditure in efforts to make her teas known and appreciated throughout the world. There is, we fear, little chance of India adopting a quasi-voluntary cess such as this which Ceylon planters have had made compulsory upon themselves. There remains, however, another course open, the course of voluntary subscriptions to such a Fund as that of the American and Foreign Market Fund of the Indian Tea Association. This appears to be the course suggested during the proceedings of the U. P. A. S. I., and the future must largely depend upon the extent to which, and the manner in which South Indian planters follow this course,

THE INDIAN TEA ASSOCIATION (LONDON).

The report of the general committee for the year 1899-1900, presented at the meeting held on Thursday, is a record of the work performed by the Association and its able secretary, Mr. E Tye, in the interests of the Indian tea industry.

Under the heading

INDIAN TEA CROP OF 1899,

the report says, "It is interesting to note the growth of the direct shipments to outside markets in view of the increased production both in India and Ceylon, and the continued efforts which must be made to absorb as large a proportion of the crop as possible by pushing consumption in foreign countries." Under "Ocean freights," the report states that owing to the dissatisfaction felt for some time past with regard to the high rates of freight charged on tea by the Steam Conference liners, repeated representations have been addressed to the Conference asking for a reduction of one half in the present rate, but with no result. A circular has, therefore, been distributed inviting shippers to terminate the existing agreement with the Conference. The committee records that it has been successful in its efforts to reduce the warehouse charges. Under this heading an account is given of the work performed by the Association, in conjunction with the Ceylon Association in London, in securing the 10 per cent reduction that was ultimately obtained, and which represents a considerable gain to the industry. It has, however, one drawback, viz., that in the case of the building and taring charges the full reduction previously conceded has not been continued. A very interesting feature of the report is the description of the enterprising efforts being made to push Indian teas on the Continent through the medium of the Paris Exhibition. Tea samples are being displayed, and a tea room has been established under the management of Mr. E F Langdale, who was in charge of similar work at the Health Exhibition at Earl's Court; and who, it is satisfactory to note, reports that the business is steadily improving. Samples are also being distributed, and a stall has been fitted up at which teas are sold in packets.

Reference is made to the fact that on the recommendation of Dr. Voelcker, Mr. H H Mann, B.Sc., F.I.C., was appointed as

SCIENTIFIC OFFICER TO THE ASSOCIATION,

and has submitted an interesting report on a short visit he paid to Ceylon on his way out. The Labour Bill, to which special objection has been taken by all interested in tea in Assam, who consider that no good or sufficient reason has been shown for the proposed increase of wages, was considered by a special sub-committee, and their report sent to Calcutta, and embodied in the representations laid before the Indian Government. The Bill was referred to a special committee of the council, but the consideration of same was afterwards postponed to next season. The next item of interest is an account of the one pound draft dispute, which describes the compromise ultimately effected as "entirely satisfactory to no one except the Treasury." We may here mention that the report states that the question of the revision of the Public Sale Conditions has been under discussion between representatives of sellers and buyers, but that difficulty is experienced in deciding on alterations which will satisfy both parties. Strong opposition was offered by the London Chamber of Commerce to the bills to be brought before Parliament by the dock companies regarding the imposition of extra dock charges, &c., and they requested the Association to appoint a member of their committee to represent their interests. Mr. F A Roberts, on being requested, had consented to represent the Association. The Bill was thrown out on being brought before Parliament, and a Royal Commission is being appointed to consider the whole dock question. The advisability of a Dock Trust is still engaging the attention of the London Chamber of Commerce. With regard to the increased duty on tea, the report points out that although no doubt the Chancellor of the Exchequer intended that this special tax should

be paid by consumers of tea in the United Kingdom, it is felt that it will fall chiefly upon producers, who were already sufficiently hampered by the increase in the exchange. It also comments upon the injustice of tea paying 6d per lb. duty, while coffee and cocoa, which directly compete with tea, only pay 1½d and 1d per lb respectively, although the average price of all three, excluding duty, is about 8d per lb. The committee contemplate making a representation to the Chancellor of the Exchequer with a view to the more equitable adjustment of taxation on these articles, the early removal of the war tax on tea, and a further reduction of the duty, which imposes a heavy burden on the industry.

It is satisfactory to note that

THE REGULATION OF SALES

which was in operation throughout last season worked smoothly, and that the committee intend to take the matter up again this season. As the report points out, Ceylon teas are imported more or less all the year round, and therefore practically regulate themselves, whereas Indian teas are nearly all imported within eight or nine months, and even in regard to these certain months, are heavy, others light, while the consumption varies very little all the year round. As most importers know by now, the committee have decided to offer a bonus on green tea shipped direct from India in order to encourage planters to meet the large demand existing for it in America. As a further effort to exploit foreign markets, a circular was issued in April last inviting tea growers to support a levy for the current year on a similar scale to that raised in former years, and it is hoped that an equally good response will be made as for last year. It is proposed to apply the new levy not only to the American but to Continental markets, concerning which special inquiries are being made. Useful work has been done during the past year with regard to the joint advertising of Indian and Ceylon tea in the United States, and the committee express their obligation to Mr. Mackenzie, the Ceylon Commissioner, who has superintended the business generally. The committee comment upon the officiousness of the Post Office in ruling against the delivery of samples closed against inspection. As everybody knows, it is absolutely essential that the samples should be sent in hermetically sealed boxes, as they have hitherto been done, and which is not objected to in India, in order that they should reach England in a fresh condition. The Postmaster-General has been appealed to in vain, and a deputation was refused, but the committee will again address the above mentioned official as it is a matter of great importance to the industry. Finally the committee report that upwards of £2,080 has been generously subscribed in response to the appeal of the Viceroy and Governor-General of India on behalf of the inhabitants of the famine stricken districts of India, and also that £400 was subscribed in conjunction with Ceylon for the relief of the sufferers by the fire in Ottawa. Some interesting statistics concerning the quantities and value of the tea imported for home consumption in various Continental countries, kindly supplied by the Intelligence Branch of the Commercial Department of the Board of Trade, are attached to the report.

The annual general meeting of the Association was held yesterday. A full report of the proceedings will be given in next week's issue.—*Home and Colonial Mail*, July 27.

BAMBOO GUM: A MODERN MIRACLE.

Probably no modern discovery in natural history has been more seemingly miraculous (says "Science Siftings") than the finding of an edible gum exuding from the bamboos of Central India at a time when the people are suffering from their greatest famine. This substance is pleasantly sweet, occurs in white or brown rods about an inch long, and is found by Mr. David Hooper, of the Indian Museum at Calcutta, to consist mainly of a sugar related to, if not identical with, cane sugar.—*Globe*, July 26.

MICA AND ITS USES.

Bengal is the chief seat of mica mining in the world. Calcutta exports more mica than all the other ports of the world put together. Its brokers have handled and sold more mica than the brokers of any other city. Its scientific men have personal acquaintance with the mines and mining men. Its merchants own the mines, and from constant dealing with the material know the best markets, and the mercantile value of any sample that could be submitted to them. Yet we find the Reporter on Economic Products ignore the valuable opinion available near at home in order to obtain a report which is erroneous, misleading, and likely to do harm. Professor Windham R Dunstan says: "The mica experts report that the samples are quite worthless, their chief defect being that they are striated or cross-grained and much cracked. *This kind of mica is only adapted for electrical purposes.*" [The italics are mine.] Cracked, striated, and cross-grained mica is wholly unsuited for electrical purposes. Any electrical engineer would have told Professor Dunstan this and I cannot conceive where he could have got this wholly incorrect information. On the strength of this report, coming from the source it does, miners, new to the business, may send home cracked cross-grained, striated mica, for electrical purposes, and find they have been "sold" since such mica is utterly worthless for dynamos. For electrical purposes the mica must be in perfectly even plates, free from huckling or corrugation. It must not be perforated or cracked in any way. In another part of this report Professor Dunstan says: "They (the plates of mica) should be roughly trimmed square or oblong, no piece to have more than five sides." This is incorrect Bengal mica is seldom, or never, cut square or oblong. It is roughly sickle-dressed to any shape the plate will give, round, zigzag, or polygonal. Again: "Care should also be exercised not to pack in the same case plates of mica varying more than one inch, in either length or breadth." Mica shipped from Calcutta varies far more than this. "Specials" are packed in the same case, and there may be anything from 36 square inches to 100 square inches. Number 1 are plates from 24 square inches to 36 square inches, and all of these go in the same case. "There is practically no sale for plates for less than 2 inches in width." A reference to any electrical mica dealer's price-list will show that high prices are asked for 'steeps' 1½ inch wide and 6 inches long.—*Indian Agriculturist.*

PRODUCE AND PLANTING.

TEA CRILL.—According to the latest report of the British Consul-General for Chili there should be a market for the increased supply of Indian and Ceylon teas in that Republic. The consumption of tea, the Consul-General says, appears to be on the increase if one may judge from the great number of brands advertised on all sides. Most of the tea sold is of poor quality, notwithstanding that the public are charged exorbitant prices. The import duty is one dollar per kilo, or about 83 per lb. Ceylon teas of good to fine quality, he adds, are unobtainable, and there should be a good and increasing market for them if once introduced. During 1898, which was a year in which all imports were much restricted, 639 tons of tea were imported, and although the figures for 1899 are not yet wholly procurable, they show that the imports of tea have largely increased. The value of the increase amounts to £20,000. In 1898 the British Empire sent to Chili 461 tons of tea, China coming next with 120 tons.

RUBBISH ABOUT TEA.—A correspondent calls our attention to an article on tea recently published in a paper, presumably circulating in the household, in which statements are made about tea, culled from various sources, which are really funny. We do not know whether they are intended to read as fact or fiction, but there is certainly nothing humorous in the style of the writer. After dealing most seriously

with tea and the tea trade generally, a warning is given against excessive tea-drinking, and then the old story about the increase of idiocy and lunacy due to tea-drinking, especially in Ireland, is trotted out. But the gem of the collection is in the simple statement that "not long ago the papers contained an account of a woman who had died, so it was supposed from the effects of excessive tea-drinking after turning a dark green colour." Whether the poor woman turned green with envy, or tea, before or after death, or whether she drank black tea or green by the cup or by the pailful, or how long since this awful thing happened, who the coroner was, and which newspapers reported it, we offer as conundrums to those interested. The idea that tea will, if indulged in too freely, change our colour at some stage of our earthly pilgrimage is distinctly embarrassing, and if such stories were freely circulated and believed they might have some effect on the consumption.—*Home and Colonial Mail*, Aug. 3.

BRITISH NORTH BORNEO.
RAILWAY PROGRESS AND DEVELOPMENT:

200,000 ACRES OF LAND AVAILABLE FOR TOBACCO.

The 35th half-yearly meeting was held yesterday at the Cannon-street Hotel. Mr. Richard B. Martin, M.P., presided. He stated:—The tobacco industry was flourishing in four districts—Kudat, Sandakan, Lahad-Datu, and Tawao. These districts produced estate tobacco—that was tobacco grown under European supervision for export to the markets of Europe; but from Province Keppel, there was a considerable trade in native tobacco. The actual length of railway under construction was about 110 miles, and the whole of the rails were on the spot. Starting from two points on the west coast—namely Weston and Jesselton—the line ran for about 20 miles in a north-easterly direction and 58 miles in a south-westerly direction, meeting at Beaufort, on the Padas River. From Beaufort it ran almost due south-east, skirting the Padas River and the Penotal Gorge till it reached Tenom, in the interior. Within two years it was hoped that the railway would have opened up the company's territory to a point from which the interior trade could be developed and the people controlled. The sections now under construction would form the key to the vast interior of North Borneo. The line would traverse and open up some of the richest country in the territory, and with the facilities which the railway would afford a great development in the general trade of the country might be expected. By laying portable rails up the many valleys between Beaufort and Tenom, numerous artificial feeders to the main line could be formed, and timber cutters would be enabled to handle large trees and transport them both expeditiously and cheaply, without breaking bulk, to the fine harbour of Gaya, where it could be shipped from the jetty which was being built there. To the east, north and south of Tenom, the interior terminus of the railway, there was a very extensive country, where all tropical and many sub-tropical products could be grown. The whole trade of the hitherto inaccessible interior would be exclusively carried by the railway. Apart altogether from the indirect benefits which the line would confer upon the Government and the country generally, there was a fair prospect in the near future of the railway becoming in itself a profitable undertaking. The sales of land not only along the route but at the different termini would undoubtedly be considerable. In his 'Forest of the Far East,' published nearly 50 years ago, Sir Spencer St. John drew attention to

Gaya Bay, which he described as a noble harbour; and it would be difficult to conceive any place in Borneo better adapted to an important trade centre. It was practically on the high way of steamers passing between Europe and all the intervening ports, and China, as well as the Philippines and Japan. It was felt that the trade which would be developed by the 110 miles of railway terminating at Jesselton could not fail to attract the passing steamers to a port which was not only easy of access, but safe for all classes of vessels. Reverting to the subject of exports, he stated that more than one-half was under the head of tobacco. The first crop of tobacco exported in 1887 was valued at only £471, whereas the crop exported in the past year was valued at £186,454. The initial difficulties of management, climate and labour had been overcome, and the cost of the production of tobacco in Borneo compared most favourably with that of Sumatra. It was estimated that the railway would open up something like 200,000 acres of land suitable for the growth of tobacco. The telegraph system was still being extended, about 350 miles were working, and another 100 miles were in course of construction. The traffic so far had not been great, but the telegraph was invaluable to the Government, and more than paid for itself as a utilitarian and economic work.—*London Times*, Aug. 1.

SUGAR CULTIVATION IN THE STRAITS.

With reference to sugar cultivation in Perak, this form of cultivation is confined to the three coast districts of Krian, Matang and Lower Perak, which I will deal with *seriatim*:

KRIAN.—The total area of land alienated for the cultivation of sugar in this district amounts to 35,359 acres. Many applications for land for sugar cultivation were received during the year, but, owing to the proclamation of irrigation areas, in connection with the irrigation scheme for fostering the cultivation of rice, little, if any, more sugar land remains available in this district. The amount of sugar (brown and white) exported during the year was 276,689 pikuls, valued at \$1,282,237. There are 26 sugar estates in Krian, of which the largest is Gula, belonging to an European Company, and comprising an area of 9,512 acres, while there is a Chinese-owned estate of 4,500 acres, and there are four other estates, also owned by Chinese, comprising an approximate area of 2,000 acres each: the total area under actual cultivation is estimated at 15,779 acres. Ten of the estates have mills worked by steam-power, and the machinery at Gula is of the best and latest description: the remaining mills are worked by buffaloes, but, in two cases, cattle will shortly be replaced by steam power. The labour force employed consists of 4,121 Chinese coolies partly working on wages and partly on a system of sub-leases, and 3,597 Indians, of whom about half are indentured immigrants, and the remainder free labourers.

MATANG.—There are 12 sugar estates in the Matang District, of which the largest comprises an area of 1,854 acres. The total area of land alienated for sugar cultivation in this district amounts to 6,500 acres, and it is unlikely that this area will be largely increased, as most of the available sugar land has been included in an irrigation area, in connection with the cultivation of rice. The cultivation of sugar in the Matang district only began in 1897, and consequently little of the produce has yet been exported: the total quantity last year amounted to 2,056 pikuls. A complete factory capable of dealing with 24,000 tons of sugar-cane is being erected on an estate owned by Sir J. W. Ramsden, and it is probable that most of the cane produced in Matang will be sent to this factory.

LOWER PERAK.—The cultivation of sugar-cane in Lower Perak is still in its infancy, but it is probable that, within the next few years, the area of land under

this form of cultivation will be larger than that of any district in Perak, as there are vast tracts of available State land still unalienated, approximately estimated by the District Magistrate at 180,000 acres, lying between the Perak and Bernam rivers, all of which is more or less suitable for sugar cultivation. An European Company, of which Sir J. W. Ramsden is the principal shareholder, and whose local representative is Mr. John Turner, General Manager of the Penang Sugar Estates Company, has recently acquired 11,000 acres of land from the Government, and has commenced operations on a large scale, the staff consisting of three Europeans, under whom about 600 labourers, Tamils and Javaese, are now employed. Very complete machinery has been ordered, and will shortly be sent out from England, and the factory erected on this estate will probably serve as a centre to which most of the smaller planters, both European and Chinese, will send their raw produce.—*Official Report*

PROPOSED BOUNTY ON GREEN TEA.

THE INDIAN TEA ASSOCIATION.

The following circular has been issued to members by the Indian Tea Association, Royal Exchange Building, dated Calcutta, 7th August 1900:—

Dear Sir,—I am directed by the General Committee of the Indian Tea Association to address you respecting the following resolution which has been unanimously adopted by the Committee of the Association in London, viz.:—

“That 1½ anna per lb. up to a maximum of 200,000 lbs. to be manufactured this season, be allowed out of the funds of the levy (American and Foreign Market Fund) on shipments of green tea for the American market and shipped there direct from India, such funds to be distributed as a bounty at the discretion of the Calcutta Committee.”

The General Committee have been asked by the London Committee to make all necessary arrangements for carrying this resolution into effect. They have considered the nature of these arrangements, and have come to the following conclusions:—(a) That as a first step all Tea Estates in the membership of the Association, desirous of making green tea in consideration of the bounty, be asked to furnish the Committee with four ounces samples of the teas they propose to manufacture; at the same time stating the quantity they intend to make this season. (b) Such samples, when received by the Committee, will be submitted to one or more experts in green tea for opinion as to their suitability for the American market. (In giving their opinion the experts will have regard to standard samples of the green teas now used in America. These samples are shortly to be received from London.) (c) On receiving the report of the experts on all the samples submitted to them the Committee will proceed to allot the bounty on account of those teas the samples of which are declared suitable; and will make known the allotment to those interested. (d) When the teas manufactured by those Companies or Estates whose samples have been accepted, have arrived in Calcutta, the Committee will require to be informed of the fact; and it will be necessary for samples of the teas to be drawn in Calcutta for submission to the experts for comparison with the original samples. (e) On the Committee receiving a satisfactory report from the experts upon these further samples, and also proof that the teas have been shipped to

America, the bounty will be paid. (f) There is no objection to the teas being sold on the Calcutta market if the producer so desires; but payment of the bounty to him can only be made on proof that the tea has been shipped to America. (g) It must be clearly understood that all teas upon which the bounty will be paid will be for the American market only. (h) The Association will not undertake, or be in any way responsible for, the shipment of the teas.

In the foregoing paragraph the Committee have, they think, embodied all the arrangements it is necessary to make at present to carry out the resolution. They would, however, remark, regarding the quality of the tea required, that anything in the nature of "dust or fannings" is, it is understood, entirely unsuited to the American market. This should be borne in mind by all Garden Managers who purpose to manufacture green teas.

The Committee propose to put the resolution into practice immediately. They therefore now invite those members of the Association who are desirous of manufacturing green teas, to favour them, if possible, by the 31st inst., with samples of the teas they propose to make, and information as to the quantity. On receiving these the further action above indicated will be taken.—Yours faithfully,
W. PARSONS, Secretary.
—*The Planter*, Aug. 11th.

PEARLS FROM FISH SCALES.

FRANCE.—I have had an interview with Mr. Leuret, the manufacturer of artificial pearls from fish scales. He will go to the United States and erect works there as soon as he hears of a locality where the right kind of scales can be had in large quantities. I suggest that a suitable place might be found on the St. Lawrence River, among the Thousand Islands. Some years ago, the State or national authorities cast quantities of spawn into Lake Ontario, among which was the spawn of some salt-water fish. The latter die before maturity, as soon as the water becomes warm. Every summer, many thousands of them are cast upon the shores of the river and islands. They are called by two names—menhaden and alewives. If these were tried and found suitable, works could be built and put in operation there in a short time. The scales should be small and have a silvery sheen. The brighter they are, the higher price they will command. The scales should be removed while the fish are alive, if possible. They should be packed with slime, very little salt being used (about five grams per pound of scales). All organic matter that may cause decay should be removed and the scales left suspended in a mosquito netting until the surplus slime oozes off; then packed in a zinc can of 10 or 12 pounds capacity. Tin oxidises where zinc will not. Scales will rust tin, but not zinc. The opening in the top of the can should not be larger than half a dollar. If larger, the scales will suffer from the heat of the soldering iron. Twenty-five thousand pounds of these scales can be used per year. It is anticipated that twice that quantity may be used in a few years. The price paid will be 80 cents to \$1.25 per pound, according to quality and the amount of shiny matter on the scales. The present supply is from a fish called the bleak or blay. Mr. Leuret thinks that a child twelve years old can easily remove four or five pounds of scales per day.—*United States Consul at Lyons*.

CALIFORNIA ORANGE AND LEMON CROPS.

The President of the Southern California Fruit Exchange, gives figures to the *Los Angeles Herald*, from which the following interesting review of the citrus fruit is prepared:—

Oranges and lemons shipped to date (end of May) since October 1st	...	Cars,	13,000
Oranges yet on the trees	...	...	2,000
Lemons yet on the trees	..	..	2,000

Total Season's production ... 17,000 Boxes.

17,000 cars of 362 boxes each	...	6,154,000
Highest previous record (1898-9)	...	5,000,000
Production last season	...	3,500,000

Average price obtained this year about a duplicate of that of two years ago and very satisfactory. Such is the citrus fruit industry as it stands today.

PLANTING NOTES,

INDIAN TEA COMPANIES' RESULTS.—The *Financial Times* of August 3rd has been reviewing the Indian Tea Companies and we quote as follows:—

Turning to the results attained by individual companies, we find that out of forty-three whose reports have been issued, twelve have declared dividends ranging from 10 to 15 per cent, thirteen dividends ranging from 5 to 8½ per cent, and ten dividends ranging from 2½ to 4½ per cent, while eight have failed to make a distribution. This cannot be called a bad showing, especially when it is considered that several of the companies not making a return on Ordinary capital, are in the earlier stages of development, and may be expected later on to pay fair interest. The exhibit is rendered still more satisfactory when the large sums carried forward and placed to reserve by many companies are taken into consideration. A bird's-eye view of the main results attained by the leading concerns is given in the following table, for the statistics contained in which we are indebted to Mr. George Seton, of the Indian Tea Share Exchange:—

Company.	Ratio of expenses to receipts		Dividends		Reserve and balance forward.			
					1898.		1899.	
	1898	1899	1898	1899	Am't.	p.c. on capital.	Am't.	p.c. on capital.
Assam	88	89	12½	10	53,907	28.8	53,524	28.6
Frontier	82	77	4	8	461	0.2	2,837	1.0
Brahmapootra	74	77	15	15	28,490	24.9	25,694	22.4
Chargola	91	78	nil	7	4,618	3.0	4,404	2.9
Chubwa	92	86	6	7	10,272	9.7	10,367	9.8
Darjeeling	78	79	5	4	4,151	3.0	4,423	3.3
Dooras	75	78	12½	10	51,057	22.7	50,561	22.5
Dooma	73	70	12½	13	47,772	27.0	54,496	27.0
Empire of India	84	85	4½	4½	14,646	3.4	14,560	3.5
Jhanzi	92	89	5	5	15,301	17.0	15,502	16.3
Jokai	81	82	10	8	60,639	17.3	60,789	17.4
Jorehaut	84	85	11	10	35,812	35.8	35,550	35.5
Lebong	80	77	10	8½	7,298	11.1	7,236	11.1
Nedeem	77	71	2½	4	11,941	2.9	19,040	4.7

The ratio of expenses to receipts varies, of course, with the price obtained for tea, but it will be seen that in several cases the percentage has been very considerably reduced, while the increases recorded are only slight. Comparing the dividends declared by the above fourteen companies with those for 1898, we find that four companies have increased their distributions, three have maintained them at the previous level, and six have reduced them.

ROYAL BOTANIC GARDEN, PERADENIYA.—Our Supplementary illustration shows another view in the famous Ceylon garden, which in many points rivals the garden at Buitenzorg in Java. The present director, Mr. Willis, is anxious to offer as great facilities for scientific research, and the study of economic plants as are afforded in the celebrated Javanese garden. The photograph was kindly forwarded by Mr. H. F. Macmillan, the curator. A descriptive account of the garden is given in our columns June 23rd, of the present year.—*Gardeners' Chronicle*, Aug. 4.

BRAZIL AND COFFEE.—Says Messrs. I A Rucker & Bencraft in their report of (August 2nd):—"In various papers we have read articles on the financial situation in the Brazils, and amongst them, one, a column long, in the *Times*. Three impressions remain:—1.—The enormous size of the Brazilian National Debt, viz. 1,969,077,000 milreis. 2.—The unanimous opinion amongst experts that the rise in Exchange is based on genuine improvement in revenue. 3.—Cost of production, say, of 3/5ths of the World's Coffee crop, is being rapidly and materially increased. The natural deductions from the above, our friends can draw for themselves."

GROW YOUR OWN ORANGES.—A writer in the *Gardener* advises ladies who admire foliage and have an interest in growing their own plants that they cannot do better than rear an Orange plant from a pip. Such plants are comparatively easy to rear, and although the blossom will not be so fine as that of a plant grown in heat, yet the foliage is good, and can be easily kept clean. A fine, large Orange should be chosen, having good seeds. Sow five or six pips in a 6-inch pot, with good drainage, filling the pot with leaf-mould and good sandy loam. Set the pot in a warm place with a piece of glass over it. The seedlings will soon appear, and when they have made a new leaf they may be potted singly into 3-inch pots. Water sufficient to keep the soil moist is enough. A wet and sodden soil will kill the plants. If a frame or case can be used, so much the better, the chief aim being to keep the plant clean and growing. In winter the Orange must be kept free from frost and rather dry at the root. Strong shoots should be pinched back to make the plant bushy. In about four years a handsome plant fit to adorn any room will result.

PEACH.—Nothing is now more universally accepted than that the peach is an improved variety of the almond. The almond has a thin shell around the stone which splits open and exposes the stone when mature. This outer skin has simply become flesh in the peach, so that is all that gives it its specific character. It seems now clear from investigation in the history of ancient Babylon, that in their gardens—now nearly four thousand years ago—the peach was cultivated as it is now. It must have been many years before this that the peach was improved upon the almond, and this fact goes to show the great antiquity of the fruit. Possibly, gardening in some respects, at least so far as it relates to many of our cultivated fruits, was as far advanced six, or perhaps eight or ten thousand years back as it is to-day. Phœnicians, as is proved by the records, had in their gardens almonds, apricots, bananas, citrons, grapes, olives, peaches, and pomegranates; and even sugarcane was in extensive cultivation. Certainly this shows how very far advanced these nations were in garden culture these many years ago.—*Journal of the Jamaica Agricultural Society*.

MOCHA TEA COMPANY, LIMITED.

The ordinary general meeting of shareholders of the Mocha Tea Company, Ltd., was held at noon today at the registered office in Prince Street, Fort. The Hon. Mr. J N Campbell presided and the others present were Messrs. F W Bois, H G Bois, and C E Haslop. Mr. F W Bois read the notice calling the meeting, and the minutes of the meeting held on the 22nd August, 1899, were read and confirmed.

ANNUAL REPORT.

The following report of the Directors was then submitted:—

Your directors have the pleasure to submit their report and accounts for the season ending 30th June 1900.

The total quantity of Tea made on the Company's Estates was 444,030 lb which cost 28 13-100 cents per pound delivered in Colombo, including 3 65-100 cts per pound for manuring, the net average price realized being 44 89-100 cents per pound, compared with 46 87-100 cents last season.

The price of the Mocha Tea was well maintained and improved, whilst that for Glentilt, Lanka and Craighill receded owing to a largely increased yield.

The nett profit for the year (after providing R2,000 bonus to Managers, and R812'36 cost of Extension) is R81,443'82, which is equal to fully 20 per cent on the capital of the company.

From this a sum of R10,000 has been written off to Depreciation Fund and an interim dividend of 5 per cent has been paid, and it is proposed to deal with the balance amounting to R51,243'82 as follows:—

To Reserve Fund ..	R10,000
To pay a final Dividend of 10 per cent (making 15 per cent for season) ...	R40,400
To carry forward ...	R843'82

The Company's properties now consist of:—

1,046 Acres Tea in bearing
33 do Tea 3 years old
52 do Grassland
92 do Forest and fuel trees
43 do Buildings, Rivers, Roads, etc.

1,266 Acres.

The estimated crops for season 1900-1901 amount to 438,000 lb to cost R121,155'50 in Colombo, from which must be deducted the receipts from Glentilt Bazaar.

Mr. Giles F. Walker retires in accordance with the Articles of Association, but being eligible offers himself for re-election.

The meeting will have to elect an Auditor for season 1900-1901.

The CHAIRMAN, in moving the adoption of the report, stated that the Directors suggested a final dividend of 10 per cent, in addition to the interim dividend of five per cent, making a total of 15 per cent for the season. The Directors had further proposed to write off R10,000 to Depreciation and R10,000 to be placed to the Reserve Fund. He said he wished to call attention to certain figures which had been prepared showing the state of the company during the period of its existence—eight years. It was formed in 1892 and up to now it had paid dividends amounting to 124 per cent. That was 24 per cent over the capital. During the period of eight years, R64,000 had been placed to the reserve fund, including what was proposed to be placed to that fund now. During the same period R67,888'46 had been written off for depreciation. Including these amounts, the profits had amounted to 156½ per cent. The average annual dividend declared and paid to shareholders was 15½ per cent. Almost twelve per cent of the earnings had been written off for

depreciation, and 20 per cent had been placed to the reserve fund. The last season compared very favorably with the previous season's. The cost of the tea of

MOCHA ESTATE

was 28.55 cts. per lb. with manure, excluding manure 24.27 cts. as against 24.35 and 27.38 cts. per lb respectively for the previous year. The average sale per lb was 51.31 cts. as against 47.38 cts. the previous year. The profit per pound was 22.66 cts. as against 20 cts. the previous year. The yield had increased from 345.69 lb per acre to 374 lb. On Glentilt estate also the cost of tea had been reduced from 31 cts. per lb to 27.28 per lb, the expenditure for manuring was also reduced. Average sale price was 40.29 per lb. as against 49.95 per lb. the previous year, and the profit had been increased from 14 cts. to 15.89 cents per lb. The yield had been increased from 346 lb. per acre to 496 per acre. On Lanka and Craighill estates the cost of tea had also been reduced from 28 cents per lb. to 24 cents per lb. and the average price had been increased from 48 cents per lb. to 51 cents. The total cost on the estates had been reduced from 33.67 cents to 28.91. The average sale price of Glentilt estate tea had reduced the profits, but the yield had increased from 319 to 424 lb. per acre, which made good the profits. The Company was now in possession of 1,046 acres in full bearing and 33 acres in partial bearing. The capital value of the estates, taking off the depreciation written off, &c. stood at R373 per acre, equal to about £25 sterling pe acre of tea. As a large depreciation had been written off the capital account, as well as off the cost of the machinery, &c., he thought the time would come soon when there might be no necessity to write off any further depreciation. The Chairman visited the estates lately and found them in exceedingly good condition promising good results for the future. Mr. Dunbar, who visited the estates had favorably reported them. He hoped by continued good cultivation the success already achieved might be still increased. He moved the adoption of the report.

On a question from Mr. HASLOP, regarding the debt of R10,000 for the purchase of Lanka and Craighill estates,

Mr. F W BOIS replied that in the last year's accounts, the debt was R30,000 and it was reduced to R10,000 which appeared in this year's account, but this balance had also been paid now.

Mr. HASLOP seconded the adoption of the report and the motion was carried.

DIVIDEND.

On the motion of Mr. HASLOP, seconded by Mr. H G BOIS, as attorney of Mr. Henry Bois, a final dividend of 10 per cent was declared payable forthwith.

DIRECTOR.

On the motion of Mr. HASLOP, seconded by the CHAIRMAN, the Hon. Mr. Giles F Walker, was re-elected as a Director.

AUDITOR.

On the motion of Mr. H G BOIS, seconded by Mr. HASLOP, Mr. J Guthrie was elected auditor on the usual fee of R75.

The meeting then concluded with a vote of thanks to the Chair.

HAPUGAHALANDA TEA COMPANY, LTD.

THE REPORT.

ACREAGE.

	A	R	P
Tea in full bearing	235	0	0
New clearings	150	0	0
Jungle &c.	369	1	3

Total Estate .. 754 1 3

Your Directors beg to submit their annual report and accounts for the twelve months ending 30th June 1900, which they trust may be considered satisfactory.

The quantity of Tea manufactured for the season (including estate and bought leaf, but exclusive of that manufactured for other estates) was 136,900 lb.

Estimating the unsold tea at a safe valuation, the net amount realised for this product has been R44,865.07, equal to an average of 32.77 cents per lb.

An interim dividend of five per cent absorbing R8,500 was paid on 31st March last, and after setting aside R3,293.53 for depreciation on buildings and machinery, the amount available for distribution (including R2,734.41 brought forward from last account) is R10,361.14. This sum the Directors recommend being dealt with as follows, viz:—

In payment of a final dividend of five per cent	R8,500 00
Leaving to be carried to next account	
a balance of	1,861 14

R10,361 14

In terms of the articles of Association Mr. Wm. Milne retires from the Board of Directors, but being eligible offers himself for re-election. The appointment of an Auditor for the current season will rest with the meeting. By order of the Directors,
LEWIS BROWN & Co., Agents and Secretaries.

WANARAJAH TEA COMPANY.

THE REPORT

of the directors was submitted as follows:—

DIRECTORS:—Messrs. Alex. Cantlay (Chairman), H. Creasy, J W Vanderstraaten and J C Dunbar.

ACREAGE.

	Ares.	Acres.
Tea in bearing	1028	
1896..	12	
1898..	20	
	—	1060 in tea
Timber trees	20	
Forest	27	
Grass not available	27	
Total	1184	acres.

The Directors have the pleasure of presenting to the shareholders the report, balance sheet, and profit and loss account for the year ending 30th June, 1900.

The crop harvested amounted to 447,235 lb., against an estimate of 370,000 lb. The crop for 1899 was 336,692 lb. and the increase in crop is due to the very satisfactory results of manuring and to the favorable weather that has been experienced during the past season. 310,953 lb. have been sold in London at an average of 52.92 cents nett, and it is hoped that the balance of the crop will fetch equally good rates.

MANURE.—The area completed during season amounts to 311 acres, at a cost of R16,118.63, including application. All expenditure during the past season has been debited to crop account.

The amount at the credit of the profit and loss account is R102,906.24, including a balance brought forward of R22,621.34.

After payment of an Interim Dividend of five per cent, there remains a sum of R33,061.24 available, which the Directors recommend be applied as follows:—

To a Final Dividend of 12 per cent, making a total of 17 per cent for the year	R15,360.00
To be carried forward.. ..	37,701.24
	<hr/>
	R33,061.24

The estimated crop for the season 1900-1911 is 420,000 lb. of made tea, at an expenditure of R131,700, including all expenditure on young clearings not in bearing.

The Visiting Agent's reports can be seen by shareholders at the Company's office.

Messrs. H Creasy and J W Vanderstraaten retire from the board by rotation, but are eligible for re-election.

The shareholders are invited to elect an Auditor for the ensuing year.—By order of the Board,
BAKER & HALL, Agents and Secretaries.

PENRHOS ESTATES COMPANY.

THE REPORT

was as follows:—

DIRECTORS.—Messrs. W Kingsbury and E M Shattock.

The Directors have pleasure in laying before the Shareholders their Reports and Accounts for the year ended 30th June 1900.

The amount of Tea secured was 212,841 lb.—196,554 lb. on Estate account, as against an estimate of 165,000 lb, shewing an increase over last season of 33,418 lb and 46,287 lb manufactured from bought leaf, an increase over last Season of 3,373 lb. The Comparative table for the past four seasons will be found of interest:—

	Crop in lb.	Cost laid down in Colombo in cents.	Or without Manure.	Net Average Price.
1896-97	155,625	27.52	26.31	36.42
1897-98	145,250	26.23	25.65	39.12
1898-99	158,106	25.41	24.05	41.03
1899-1900	196,554	23.74	22.32	37.46

These figures refer to the Estate Tea only, and the Superintendent, Mr. J E Martin, deserves every credit for the way he has carried on the working of the Estates, which are in excellent order. Prices were considerably below those of the previous two seasons, but this was due to a low market and to no fault in manufacture, and it will be noticed that the cost of production has again been very materially reduced.

The total Crop secured cost, including Manure cts. 24.58 per lb laid down in Colombo, as against cts. 26.43 the previous Season and realised a net average price of cts. 36.96, as against cts. 40.27 in 1898/99.

Included in the proceeds of Tea is a sum of R436.26, being balance proceeds of Tea unsold at 30th June, 1899, and estimated for.

It will be noticed that a large sum has been spent during the year under review on Buildings and Machinery. This was absolutely necessary, as the Factory was really only capable of turning out some 15,000 lb. of Tea per mensem, whereas, in the busy months, 25/30,000 have to be manufactured.

An addition of 50' x 25' has been made to the factory, making it now 150' long by sections 25' to 75' broad, whilst a Turbine, a new Roller, Desiccator and Sifter have been erected and are working satisfactorily. Previous to the erection of the Turbine, considerable difficulty was experienced in getting sufficient water power during the dry months, but no further trouble is anticipated in future.

After payment of the Interest on Debentures, namely R3,030.00, the amount earned for the year (including R237.52 brought forward from last account) comes to R25,285.99 which is equal to nearly 17 per cent. on the Capital of the Company, as against 15½ per cent. last Season. Of this sum R4,500.00 was

absorbed by the payment of an Interim Dividend of 3 per cent. to the 31st of December last, and the Directors recommend that the balance, namely R20,785.99, be apportioned as follows:—

By the payment of a final dividend of 7 per cent, making 10 per cent for the Year	R10,500.00
By the payment of a Bonus to the Superintendent	1,000.00
By placing to Reserve Fund	9,000.00
By carrying forward to the next account	285.00
The Acreage of the Company's Estate is as follows:—	
Old Tea	508 Acres
Tea over 4 years	25 "
Tea not in bearing.. ..	24 "
Forest.. ..	51 "
	<hr/>
Total Acreage	608 Acres.

In terms of the Articles of Association, Mr. E M Shattock retires from the Board of Directors but, being eligible offers himself for re-election.

It will also be necessary to appoint an Auditor for Season 1900/1901.

THE TEA CESS AND GREEN TEA.

As an old Ceylon planter, and one of the first to start tea manufacture, it was cheering to read your vigorous article headed a "Tea Cess for India." Since I have become an Indian planter for the last two years I have consistently agitated in our local Planters' Association for a "tea cess" for Southern India, and though meeting with generous support here, the proposal when laid before the U.P.A.S.I. is invariably shelved as not being feasible, and all sorts of "bugbears," such as difficulty of collecting the cess, and enormous expense that would be involved in so doing, are conjured up by the powers that run that august assembly. With the cess, there would, of course, be appointed a Committee similar to the Thirty Committee in Ceylon to administer the fund, and I take it that one Committee would represent Southern India and be centralised at 'Madras' in touch with an official or two of the Madras Government, and one at Calcutta on the same lines. That the tax would be difficult to collect, I deny; it would be very easy to notify the authorities at each shipping port that, with every Bill of Lading for tea a "cess" receipt must be attached. If planters chose to sell over the border, say Persia, Siam, or other adjoining countries, let them do so by all means free of "cess," as that helps to relieve the strain on the London market. With the "cess" fund started, it would be, of course, most advisable to secure a well-paid energetic Secretary who would not be above pushing our interests in every way. I mention this as it is the rule among Indian papers, as far as I have seen it, to sneer at the "push" and "energy" with which Ceylon men advertise their teas. The consequence is that we get left behind in the swim. Take for instance, the Paris Exhibition. As far as "Southern India" is concerned we might just as well have never exhibited, as have done so in the poor way that we did. No information was available to this district as to private exhibits until too late to ship them, and no effort made to show up the intrinsic merits of our teas; which exist to a far larger extent than the British public are aware of. Indeed, I know it as a fact, that most, if not all, the teas made in this district for instance, have the same flavour and character as high grown Ceylons, yet we get as a

rule poor prices for want of pushing our goods by means of advertisement. Take the average British public, what do they know of Indian tea? After all these years hardly anything. They know there is a strong tea which comes from a place called "Assam," and perhaps a few people know that a fine flavoured tea comes from "Darjeeling," but other districts are practically unknown to the public, and their produce therefore is only bought by the wholesale blender for his blend. With a tea cess fund carefully administered much might be taught (not only the British public, but foreign nations) about the largest tea industry in the world.

I, for one, object to the foreign market fund and shall not continue to subscribe to it. It is a happy-go-lucky system which falls hard on individuals. For instance, take an estate of 500 acres, giving, say, on to 350 lb. per acre: it can hardly, make ends meet, while an estate of 250 acres giving say 600 lb. an acre, and making good profits, would, under the present system of an acreage taxation, pay less where it can afford to pay more. That the "cess" will be hard on all planters at first in these days of poor prices, goes without saying, but with an energetic Committee and a working Secretary, helped by Government, without more "red tape" than is necessary, I feel sure in a year or two we should find our reward in the shape of increased consumption and better prices.

Before closing this letter I will add a line in reply to A.C.'s letter to yourselves on "green tea." I do not think the method he suggests a good one, as he would start by making an inferior priced green tea, viz, an "Oolong," which is, as far as I am aware, the only kind of green tea yet made in India in any quantity. What I would suggest as a commencement, where two or three can be got to work together, is for one factory, on which there must be a steam engine, to get a steaming machine from Ceylon (the largest size only costs £650, the smaller £450, including all the information necessary for the manufacture of choice "Mo-yune," or pure Japan green teas) and for that factory to undertake the manufacture of a percentage of two or three neighbours' leaf, as well as a percentage of its own, bulking the teas together and shipping under one mark. For a factory equipped with two or three rollers and two firing machines this could easily be done without in any way interfering in the manufacture of its black tea.

It is known by actual experiment and sales that teas made on this method do suit the American market, and this process has been adopted lately by 8 to 12 large concerns in Ceylon, the Ceylon Tea Plantations Company showing the way. Therefore, if A.C. and his friends make their teas on this principle, they ensure themselves being put in the same class as the bulk of the Ceylon green teas, which have hitherto in a small way proved suitable to the market they are intended for.

Green teas may be divided into two classes—Oologs or semi-green teas, which are partially fermented, and true green teas, which are wholly unfermented. These latter are the most popular class of teas in America, as shown by the fact that out of a total export of some 51,000,000 lb. of China and Japan teas to the United States, some 14,000,000 lb. are Oologs and of the unfermented class, while over 30,000,000 lb. are of the unfermented class, which are the true green teas of commerce.

Oologs consists of tea leaves withered either artificially or naturally by hot air, pans, or on hot plates sufficiently to enable them to be rolled; the result of this process is that the effect called by some fermentation and by others oxidation is partially produced, and this effect prevents the infused leaves from being uniform in colour and causes them to vary from an olive green to alight brown.

True green teas are made of leaf which has never been fermented or oxidised, and when infused should show a uniform yellowish green colour, which could never be obtained had fermentation or oxidation taken place.

If, Sir, you think it advisable to cut out this discourse on green tea as savouring too much of an advertisement, do so. My only object in mentioning the above facts is to prevent men from coming to grief by sending teas not quite suitable for the American market.—H. DRUMMOND DEANE, *Stagbrook Estate, Peermad, Travancore.*—*Indian Gardening and Planting*, August 16.

PLANTING NOTES.

FLORIDA PINEAPPLE CROP.—E. P. Porcher, general agent of the Indian River and Lake Worth Pineapple Growers' Association, has gathered exhaustive statistics relative to the Florida pineapple crop, and from them he estimates it at 135,000 crates for the mainland. Last year's crop was about 16,000 crates which netted an average of \$2.35 per crate. Another report says that the size of the fruit being extra large this year, 150,000 crates will be the minimum of the Florida pineapple crop.—*Journal of the Jamaica Agricultural Society.*

"MANURING WITH BRAINS"—is the title of pamphlet sent us by Messrs. Freudenberg & Co. (Sole agents in Ceylon for the Syndicate of Potash Works and German-Austrian Thomas Phosphate Syndicate) which takes for its motto this saying of the Marquis of Salisbury:—

"If farmers would only manure their land with brains, as the painter mixes his paints, there would be much less heard about agricultural depression." Very useful information is given, more especially adapted, of course, to farmers in Europe; and it is shown how "potash" is not only the dominant manure for leguminous crops, for potatoes and for grain crops; but is also valuable for the prevention of Clover-Sickness, Tulip-Root and other Crop Pests.

BOMBAY MANGOES FOR LONDON.—An effort is being made to bring the Bombay mango to England, and, indeed, for a few hours a small show of this fruit recently made an unwonted sight in a Bond Street fruiterer's window. "But they were all snapped up as soon as the Anglo-Indian got to know of it," said Mr. George Adam, who had exhibited them. He showed a *Daily Mail* representative a letter he had received from Kathiawar, India, proposing to export Bombay mangoes to London as a regular article of commerce. Messrs. Adam and Company hope to import them in quantities. It was a *Daily Mail* representative who described it as of "a green colour," and then wrote: "Smell it, and visions of Eucalyptus and influenza, benzine, and motor-cars, with a distant suggestion of a half-decayed pear float across your mind. This compound fruit is the mango." Looks as if mangoes were going to be popular in London, now that a beginning has been made.—*Indian Gardening and Planting*, Aug. 16.

Correspondence.

To the Editor.

GREEN TEAS AND MR. DRUMMOND

DEANE.

Stagbrook, Peermaad,

Travancore, July 28.

DEAR SIR,—In *re* your remarks *re* "Pale liquor being a desideratum for green tea" I can assure you that I am not at all "mixed" on the subject as your planting friend suggests. But there is "Pale liquor" and "Pale liquor." What I was always told to strive for was a *pale straw color*, and if you refer to Mr. Street's report and valuations published in *Tropical Agriculturist*, 21st January, 1890, you will see that I about hit the mark. I may add that the valuations in that report turned out about 2d below the prices fetched. The only interest in publishing these old valuations will be when some of the newly-made greens on my system are reported alongside of them.

But with that report and all subsequent reports I was always asked to get a *little more color into the liquor if possible* as they were a *trifle too pale in appearance*, though the flavour was excellent and infusion all that it should be.

This I failed to do with the "Kintyre" leaf, but with a few small experiments with "Ruanwella" leaf made by hand, I got the darker liquor, and at the same time a favourable report from America on the sample, which report unfortunately I have not preserved—as just at that time I gave up the manufacture. "Oologs" always draw a much darker liquor more of an amber color owing to a *certain amount of fermentation* taking place when the leaf is rendered pliable for rolling by "hot air;" and though the outturn is more or less green, yet some signs of fermentation will be apparent.

I have quoted from your letter under reply, to Mr. Street, and asked him to reply to it through your paper if he will be so kind. I do not profess to be a green tea expert, but a manufacturer, who has made teas that at that time apparently satisfied the trade requirements.

If Mr. W. MacKenzie is correct in saying that the liquors *cannot be too pale* to suit the American taste, then it will be pretty certain that high grown Ceylon teas are sure to "boom";—for *pale* they will assuredly be.

I tancy only about a dozen men are at present going in for this new departure. But I feel pretty confident that if care is taken in the sorting and in get-up of the packages to suit American ideas, remunerative prices will be the result.

And it must be remembered there being no draft allowance in America, the planter has the price of a pound of tea in hand which will go a long way towards extra cost of packing the finest teas in neatly marked small hessian or mat covered packages.—I am, yours truly,

HORACE DRUMMOND DEANE.

GREEN TEAS:—THEIR COLOUR AND QUALITY: THE NEED OF EXPERT ADVICE.

Colombo, August 3.

DEAR SIR,—Mr. Deane has asked me to hand you the enclosed letter* and to reply through your columns.

The "well-known planter" referred to has made the mistake of taking Mr. W Mackenzie's remark that Green Tea liquors "cannot be too pale" too literally. Of course the liquor color may be too pale, just in the same way as it may be too dark. Mr. Deane in a recent letter to the *Observer* rightly says there is a paleness and a paleness or literally that there are degrees of paleness, *due to manufacture*, one of which would be perfection and the other degrees of faultiness and uselessness from a Green Tea point of view.

It is not necessary to refer to color from degree of elevation as this is simply a question of quality. The quality of Green Tea varies with elevation as with Black. I am not going to lay myself open to be misunderstood by entering into a description of what Green Tea should or should not be. The proper and safe medium for such description is between the individual planter and the expert *in connection with his own estate teas*. I cannot too strongly emphasize, and I would also wish you to add to the emphasis, that an enormous amount of harm may, and I fear some will, be done to the future reputation of Ceylon Greens *made without expert advice*. Although the revival of Green Tea making in Ceylon is only a few weeks old, I have had several samples sent to me which clearly indicate the *absolute necessity* of expert criticism and advice. I need hardly say that all the faults which have come under my notice can be corrected by changes in manufacture. I strongly advise Planters not to begin manufacturing bulk until their experimental manufacture is entirely approved of by an expert. They would do well to remember that the future success or otherwise of Ceylon Greens depends upon the individual excellence of their manufacture *particularly at first*.

Apologizing for having taken up so much of your valuable space, which I should not have occupied at all had not Mr. Deane asked me to reply through you,—Yours faithfully,

F. F. STREET.

RAINFALL AT TELlichERRY, WEST COAST OF INDIA—ROADS, &c.

Tellicherry, Aug. 13.

DEAR MR. EDITOR,—In accordance with your editorial foot-note to a recent communication of mine, I have pleasure in handing you a memo of the Tellicherry rainfall from 1st January, 1899, to date, which I trust may be of interest. It is pouring as I write, and every thing is more or less damp and nasty. However, we are getting fairly good news now from the famine-affected areas; so must not grumble. The road at the top of the Tambercherry

* This is very much the preceding letter.—ED. T.A.

Ghât, between Calicut and South Wynaad, has been badly breached and washed away in parts, and, it is reported, may take some four or five months to repair for wheeled traffic again. This is serious for the estates in South Wynaad, the other Ghât roads being very circuitous routes to the Coast. I am sorry I am not yet in a position to send you my Annual Statistics of Exports of Coffee and Pepper from Southern India. There are still two Ports from which I have to receive information; but I should receive these any day now.—Truly yours,

RALPH TATHAM.

RAINFALL AT TELlichERRY, W. COAST OF INDIA,—FROM 1889 TO 1900.

Months.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
January	—	—	2.43	—	.5	—	.70	—	2.50	—	—	—
February	—	.67	.85	0.4	.10	4.45	—	—	3.90	—	—	3.07
March	3.75	3.02	4.17	6.02	.87	4.69	3.22	3.22	5.71	3.29	11.70	6.83
April	2.06	5.54	1.86	24.95	8.82	4.58	4.95	4.95	45.45	6.79	6.83	1.00
May	—	30.38	29.12	15.79	35.39	40.14	45.12	45.27	46.40	35.65	36.95	45.27
June	52.20	32.69	33.51	69.85	19.91	29.58	37.09	28.82	38.84	34.55	15.68	31.32
July	19.37	13.10	12.35	24.47	18.86	24.08	15.29	30.94	38.84	7.16	4.94	19.36*
August	21.10	3.39	3.58	6.25	3.31	7.09	8.38	9.68	8.38	8.38	3.94	—
September	17.39	8.39	6.27	13.76	7.56	4.58	3.60	3.60	8.86	6.59	7.97	—
October	—	—	3.54	3.60	2.09	1.10	3.55	3.55	1.01	6.07	.30	—
November	—	.30	—	.10	—	—	2.17	2.17	—	—	—	—
December	4.36	—	—	—	—	—	—	—	—	—	—	—
Total	129.39	93.55	97.68	164.83	95.77	120.29	118.11	126.53	162.35	108.83	87.31	100.02

*Up to 13th Aug.

N.B.—Average for 11 Years 118.60 inches.
Tellicherry, Malabar,
13th August, 1900.

RALPH TATHAM,
Agent, ARBUTHNOT & Co.

USEFUL AUSTRALIAN BOOKS.

Public Library, Museums, and National Gallery of Victoria, Melbourne. Aug. 8th, 1900.

SIR,—I have the honour to inform you that I have, by direction of the Trustees, this day forwarded by post for your acceptance a copy of each of the undermentioned works:—1. McAlpine—Fungus Diseases of Citrus Trees in Australia. 2. Roos—Wine-making in hot climates.—I have the honour to be, sir, your obedient servant,

THE LIBRARIAN.

["Wine-making in hot climates" is a translation from the French and has been published by the Victorian Government for the benefit of Viticulturists whose industry is of importance in most of the Australian Colonies. The second book, is also published officially and the coloured plates are splendidly executed. This little guide may be of use to us locally in connection with the culture of orange and lime trees. We return thanks for both publications.—ED. T.A.]

CHIN BARA TEA AND MR. HARCOURT SKRINE.

August 16.

DEAR SIR,—I enclose an extract from the *Chemist and Druggist* which I think will interest your readers.—Yours faithfully,

CHEMIST.

TEA FOR CHEMISTS.

(Extract from the *Chemist and Druggist*, July 28th, 1900.)

It stands to reason that if chemists and druggists are to do business in tea, they must have an article to offer different from what their neighbour the grocer sells. We have pleasure in calling attention to an entirely new tea which is being introduced to the public through chemists. It is called the Chin Bara tea, and the process for its production has been devised by Mr. E Harcourt Skrine. Chemists may not be aware that the method of manufacturing tea adopted in Ceylon and India is intended to yield dividends to shareholders rather than the finest teas and the plucked leaf is allowed to go through a fermentation process before it is dried. Mr. Skrine finds that this is entirely unnecessary for the development of the flavour of the tea. The finest Chinese teas of old were made slowly and carefully. Mr. Skrine finds that fermentation is detrimental, in so far as it produces certain organic acids which disturb the digestion. He has therefore devised a process, and machinery for carrying it out, whereby the plucked leaves are gradually dried and rolled without undergoing fermentation; this he recalls the "cold process" to distinguish it from the other. Moreover, he takes very great care in the harvesting of the tea, and from the plucking to the final presentation of the tea, every stage of the process is supervised and expedited by a staff of skilled managers. The teas are not blended, but in the three qualities offered by the Chin Bara Chino-Ceylon Pure Tea Depot, 5 Victoria Avenue, Bishopsgate Street, E. C., we have only the difference in the grade of leaf to recognise. The tea neither produces indigestion nor favours nervousness when taken in large quantity, so that it is just the thing for chemists to sell. It is put up in packets ready for selling, and is offered on P. A. T. A. principles for retail by chemists, whom we would recommend to apply to the Company for a copy of a pamphlet entitled "A History of Tea."

BRITISH NORTH BORNEO.

Kandy, Aug. 18.

DEAR SIR,—I send you copy of report presented at the meeting of the shareholders on 31st July by the Court of Directors of British North Borneo Co. The noticeable items are that the receipts for 1899 exceeded the expenditure by £17,372 8s 9d, and that a dividend of two per cent. to shareholders for the year was recommended :—

In 1893 the revenue was only \$289,220.
In 1899 do. do. \$542,919.

Very nearly double. The comparative results in the more important items of receipts are :—

	1899.	1898.
	\$	\$
Farms ..	201,967	180,255
Customs ..	193,254	184,069
Land Revenue .	26,410	24,081

Comparative statement of principal exports for—

	1899.	1898.
	\$	\$
Bird Nests ..	47,465	47,160
Camphor ..	39,084	37,047
Copra ..	19,161	12,840
Coffee ..	30,185	28,620
Cuteh ..	146,690	267,536
Gutta ..	122,588	125,280
Hemp ..	61,803	24,590
India Rubber ..	69,777	79,600
Tobacco ..	1,862,455	1,316,660
Sundries ..	299,689	147,416
Timber ..	189,027	214,346
&c.	&c.	&c.

Total .. \$3,439,560 \$2,839,844

The imports are stationary :—

\$2,455,968 \$2,419,087

—Yours truly, W. D. GIBBON.

SIR JOHN LAWES AND MANURING.

Aug. 22.

SIR,—Depend upon it, there is again some big blunder over the interpretation of Sir John Lawes' views by Mr. Talbot— or rather by the Ceylon "Times" and its correspondent. The wish is father to the thought in some quarters, in trying to get manuring checked. But those will score who keep on their way, guided by

EXPERIENCE AND SCIENCE.

THE LATEST AND BIGGEST BOOK
ON "TEA."

"Tea Machinery and Tea Factories: A Descriptive Treatise on the Mechanical Appliances required in the cultivation of the Tea Plant and the Preparation of Tea for the Market. By A. J. Wallis-Taylor, C.E., Assoc. Memb. Inst. C.E. (London: Crosby Lockwood & Son; Calcutta: Thacker Spink & Co.)."

We have just received from Messrs: Thacker Spink & Co., of Calcutta, a copy of this well printed, profusely illustrated and generally handsome volume of 468 pages octavo. There are 218 diagrams and illustrations, mainly of machinery or mechanical appliances; for, although the cultivation and preparation of tea are specially dealt with, there can be no doubt this is an Engineer's book, and one based chiefly on Indian experience and modes of working. We cannot

see that Mr. T. C. Owen's, or any Ceylon, tea manual or essay is referred to and we suppose Mr. Wallis-Taylor has never visited Ceylon to note the widely different and differing conditions of our tea country. Nevertheless, the volume is full of interest to all tea planters and in the section on "transport," illustrations are given of the wire rope or aerial tramway erected by Messrs. Walker Sons & Co., Limited, on the Goorookelle estate of the Galaha Co. Justice is done to the tea machinery of "Jackson" and some other patentees; but the author says nothing of certain other machines which are well-known and much appreciated in Ceylon. The book is divided into seventeen chapters, the first of which treats of the mechanical cultivation and tillage of the soil; the second of various methods of plucking or gathering the leaf; whilst the ten next succeeding chapters are devoted to descriptions of the factory and of the various machines and apparatus employed therein. The next two chapters deal with the means of transport on the plantation; one chapter is taken up with the miscellaneous machinery and apparatus used in and about tea factories; another with machines for the final handling of the tea—such as mixing, blending, or bulking machines, and packeting or parcelling machines; and in the concluding chapter of the work we have a number of tables and memoranda likely to be found useful by those engaged in the tea industry. The principal aim of the book cannot be better indicated than by quoting what Mr. Wallis-Taylor says at the conclusion of his preface:—"It should be remembered that whilst the possession of a good plant of machinery, and of a well-designed factory, will enable good tea to be made from an inferior quality of leaf, on the other hand, a good jat, suitability of soil and climate, and the most efficient possible cultivation, will be all thrown away if such means be not at hand to facilitate the preparation or manufacture of the tea from the green leaf." There is much truth in this; and altogether the volume is one that should be in the hands of all who can afford the cost which the Calcutta publishers have now fixed at the special cash price of R20 net; the previous rate being R22½.

PLANTING IN PERAK.

SUGAR.

The planting community suffers from the competition of mine-owners in the labour market, but until recently, this competition has not been severely felt, as the labour employed on plantations, excepting those owned by Chinese sugar growers, has been almost exclusively Indian, while that employed in the mines has been Chinese; recently, however, the supply of Chinese labourers has been so disproportionate to the demand, mainly owing to the quarantine restrictions imposed in connection with bubonic plague, that both Chinese planters and mine-owners have supplemented it by the employment of Indians. Judging from the demand for sugar land, and the success which has attended the majority of planters in Perak, there is every reason to predict a considerable extension of this form of cultivation in the immediate future; and the local conditions of the Federated Malay States, which are easily accessible both from India and China, and in which the labour rates are still comparatively low, should render it possible for them

to compete on advantageous terms with the great sugar-producing districts in America, the West Indies and Mauritius, which are all situated at a much greater distance from any source of cheap labour supply and which all have a local "gold" standard. It is difficult to deal with this subject without some allusion to the vexed question of currency, but it is probable, if not certain, that the most earnest advocates of bi-metallism, or of an exclusively gold standard, would admit that the depreciation in the exchange value of silver has hitherto had the effect of reducing the rates of wages and local commodities in those countries having a silver standard, as compared with those in which the standard is based on gold.

COFFEE.

Among European planters only those connected with the sugar industry have been successful, as the price of Liberian coffee, the chief agricultural product hitherto cultivated by Europeans, has been low throughout the year, although it improved towards the end, the price ranging from \$16 per pikul (133 pounds) in July to \$20.50 per pikul in December.

GUTTA AND RUBBER.

The attention of planters has been drawn to the great demand for gutta and rubber, and a portion of nearly all estates owned by Europeans is now being planted with trees producing rubber. The variety usually cultivated is Para (*Hevea brasiliensis*), but considerable numbers of Rambong trees (*Ficus elastica*) are also being planted and, having regard to the insect and other pests which almost invariably attack exotic plants with special virulence, it is not unlikely that Rambong, a hardly indigenous tree, will eventually be preferred to Para, a tree imported from Brazil. Special attention was called by the Secretary of State, when forwarding copies of correspondence with the Director of the Royal Gardens at Kew, to the importance of preserving and cultivating the trees yielding Gutta Percha in the Malay Peninsula. It would appear that there are only two trees which yield the true Gutta Percha, and these are locally known as *Taban* and *Sundek*; scientifically *Dicliopsis gutta* and *Payena leeri*. They are both slow-growing trees which do not come to maturity for at least 30 years, and consequently it is scarcely to be expected that they will be cultivated to any large extent by private individuals; but Gutta Percha is so valuable, in connection with submarine cables, that no effort should be spared by Government, both to preserve the young trees still remaining in our jungles, and to provide for planting others in suitable localities. Rubber, as distinguished from Gutta, is produced in all tropical countries, and there is therefore no probability of any deficiency in the supply, but true Gutta Percha is said to be confined to the Malay Peninsula and Archipelago.

COCONUTS.

A controversy was raised, or rather renewed, during the year as to the possibility of successfully cultivating sugar and coconuts in the same neighbourhood. The planter of coconuts, especially the native planters, contend that the beetles which infest their trees are mainly bred in the heaps of cane refuse connected with sugar mills. This contention, although denied by the sugar planters, probably contains a considerable substratum of truth; but, on the other hand, the Malay owners of coconut plantations pay insufficient attention to the care and cultivation of their trees, and neglect many obvious precautions against the attack of beetles. On the whole it may be said that the result of the controversy has been to shew that sugar and coconut plantations, when both are properly cared for, can be successfully cultivated in the same neighbourhood; but that, when owned by Asiatics, it is advisable that these two methods of cultivation should be kept apart. A more difficult question has been to decide between the relative claims of *padi* and sugar planters, especially in the Krian District. The same description of land is the most suitable for both these forms of cultivation; but, unfortunately, the amount of water required for the cultivation of

RICE

is entirely disproportionate to that required of sugar. It has accordingly been necessary, in order to protect Malay *padi* planters, and to ensure the permanency of sufficient land for the cultivation of rice, the one absolutely essential article of food in the far East, to proclaim irrigation areas within which the Government reserves the entire control and distribution of the supply of water. The Agricultural Department of Western Australia has recently made enquiry as to the possibility of obtaining a regular supply of

BANANAS

from Malaya, to supplement the supplies from Ceylon and Fiji, and this may afford a new and profitable market for the "catch crops" cultivated by European as well as Native planters, while awaiting a return from their more permanent agricultural products.—*Official Report.*

STIMULATING THE GERMINATION OF TEAK SEED.

Experiments to accelerate the germination of teak seed have been undertaken in various divisions of the Bombay Presidency, and with excellent results. The teak seeds are placed in a shallow pit $\frac{1}{2}$ feet deep, which is afterwards filled with water to soak them. Subsequently the seeds are kept moist by being watered every four days. Seeds so treated show signs of germination in another five days. A second experiment was made in which the seeds were at first soaked in warm water for 24 hours, and the Divisional Forest Officer, Surat, Mr. Hodgson, writes as follows regarding the results obtained:—"I consider it would be a waste of time to grow seedlings in such a way that they take three months to appear above ground, for the seed invariably germinated in 12 to 24 hours in this Division by soaking in luke warm water, and plants show above ground in a few days."—*Indian Forester.*

TRADE IN TERMINALIA BELLERICA NUTS.

Mr. G M Ryan, Deputy Conservator of Forests, Northern Circle, Bombay, has lately issued a memorandum on the subject of *Terminalia bellerica* nuts in which he draws attention to a vast source of hitherto untapped wealth in the Northern Forests of Bombay; for it is difficult to believe that the matter has not already received considerable attention elsewhere. Mr. Ryan writes as follows:—"A report on the nuts of *Terminalia bellerica*, a tree common in all the Thana Divisions, was submitted by the Divisional Forest Officer, South Thana, in which he showed that in 1889 the value of these nuts in the English market was reported to be £7 to £8 per ton, a price even higher than that of some myrabolams. Messrs. Killick Nixon and & Co., Bombay, have agreed to undertake the shipment of a consignment of these nuts from India, to ascertain their present value in England. If they (the nuts) approaching anything like the price quoted for them in 1884, every likelihood presents itself of a new source of revenue springing up, for in addition to this Presidency, the Central Provinces also, it is found, contain *Terminalia bellerica* in large quantities. The annual export of the nuts under favourable conditions would, it is estimated, amount to about 1,000 tons from the Bombay Presidency alone."

As Mr. Ryan correctly implies, the *Terminalia bellerica* tree is common in the plains and lower hills throughout India and Burmah, and also in the Oudh sal forests; and the fruit has long been known as one of the myrabolams of com-

merce, and is exported as such. Myrabolams were recently quoted in the London market at about £1 per ton, and we shall be glad to hear of the financial results of the undertaking.—*Indian Forester*.

NATIONAL TEA UNION, LIMITED.

NOT SO PROSPEROUS.

The Directors in submitting their report and balance-sheet for the year ended June 30th, 1900, state that the net profits derived from the Company's transactions for the year, after making provision for bad debts, writing off all advertising charges and losses stated in following paragraphs, amounts to £1,514 10s. 5d., inclusive of £364 10s. 10d. dividends on investments. About three years ago the Company opened a Bonus Tea Department at Manchester for the convenience of members in Lancashire and adjoining counties. This department having proved unprofitable was closed a few months ago, having resulted in a loss during the year of £502 6s. 3d. The trading of the Continental Branch opened at Amsterdam in February, 1899, shows a loss on the year of £370 19s. 5d. This need not be a cause of discouragement, seeing that the foreign business is an entirely new departure. Owing to the reduction of the ordinary dividend for 1899, partially the result of the re-instatement of the reserve fund, many of the trading members were much dissatisfied and temporarily withdrew or reduced their purchases from the Company, which resulted in a considerable decrease in the business for the first half of the financial year. The directors are, however, pleased to report that the trade for the second half of the year, ending June 30th, shows a respectable increase on the corresponding period of 1899, but not sufficient to compensate for the set-back of the previous half year. The demand during the year has run mainly on low and cheap teas, much of which has been sold at prices which do not yield any profit, or even contribute their fair quota towards working expenses. The proportion of medium and fine teas now sold is much smaller than hitherto. The effect of the addition to the tea duty appears to have nearly disappeared in consequence of the demand for teas to retail at similar prices to those which obtained previous to its increase, thus the reduction in the average wholesale price of tea (excluding the duty), has had the effect of decreasing the already narrow margins on which the Company supplies its goods to members and customers. During the day preceding and the day on which the Budget was declared, an enormous rush took place to buy and clear tea at the then current duty rate, which transactions embraced blended and packed goods. The Company's available duty-paid stocks were disposed of to all members and customers at the 4d rate, with the proviso that half of their orders should be taken at the new (6d) rate. This arrangement met with general approval. An interim dividend for six months on the preference shares was paid on January 1st, 1900, absorbing £500. The directors remit herewith the remaining six months' preference dividend absorbing a further £500 and leaving a balance of £514 10s 5d, subject to the payment of directors' remuneration and managing directors' proportion of profits, amounting to £311 16s., but which they have agreed to reduce to £250, leaving the sum of £264 10s. 5d. to carry forward to next account. The directors regret their inability to recommend or pay any dividend on ordinary shares this year, but trust that members generally will recognise the Wisdom of giving their Company the fullest possible measure of support during the present year. Members will call to mind the very congested nature of the traffic and consequent growing disadvantages of the Mark Lane (Manchester) premises, which were disposed of in February. The sale resulted in a profit of £2,119 1s. 3s., after making provision for considerable alterations to the Caunon-street premises, fitting up, removal, etc. The directors recommend that the amount be dealt with thus—Add to general reserve

fund, £1,500; add to reserve for depreciations £500; leaving in suspense, £119 1s. 1d; total, £2,119 1s. 3d. Members will note that the financial years closes free of trading liabilities, against £3,151 14s. 5d. twelve months ago.—*Grocers' Journal*, Aug. 4.

PARA RUBBER IN THE STRAITS: A PROMISING OUTLOOK.

To the Editor of the *India-Rubber and Gutta-Percha Journal*.

Dear Sir,—I have been asked by the Committee of the United Planters' Association F. M. S. to let it be widely known that a strong feeling exists amongst planters that the time is fast approaching when we should send a representative to Para, and from thence to the different seats of the rubber industry, in order that when this country is ready to put its own rubber upon the market, we may be in full possession of all the most up-to-date methods of tapping, of obtaining the maximum output with the minimum of damage to the tree, and of curing our produce in such a manner that it will fetch as high a price as any in the markets of the world. It is already been demonstrated that we can grow Para rubber, that we can get a heavy yield, and that the quality of our produce is equal in value to the best Brazilian. These are now proved facts, and there is no doubt that if we avoid all initial mistakes when cultivating and producing on a large scale, are thoroughly coached in our business when we first make our bow to the public, and so gain straight off a reputation for quality, a very prosperous agricultural future lies before the Malay Peninsula.

I believe I am right in stating that the rubber zone is approximately confined to 15 deg. north and 5 deg. south of the Equator, and a glance at a map of the world will very soon show how exceptionally well situated we are in every respect by comparison with other rubber-producing countries. Easy transport, a labour supply that can be developed until it is sufficient for our fullest requirements, a healthy climate where the white man and the coolie alike can thrive, all these advantages are ours; and I maintain that it rests with us whether we make a success of the great industry which we have inaugurated here or whether by carelessness and ignorance in our initial methods we find ourselves saddled with a reputation which it may take us years to live down.

The Resident-General with characteristic sympathy, has promised the planters the assistance of an expert from Kew, and a substantial sum has been provided for that purpose on the Federal estimates; no one doubts that the result of this officer's researches will be of enormous benefit to Malayan agriculture generally, but, with respect to rubber, we believe that much additional good may be done by sending over to Para one of our own men, a thoroughly practical and energetic planter, and, making his experience the basis of our own methods, by steadily endeavouring to improve from that point. In Selangor during the year 1898, no less than 389,500 Para rubber trees were planted and in 1899 the S. P. A. annual report shows a return of 1,600,000. Previous to 1898 a fair number were planted too. Taking 1,000,000 then as likely to arrive at maturity and with a yield of 1½ lb. per tree which we may put at 2s, or say \$1 to allow for a possible fall of 50 per cent in value, we have in this State alone sufficient Para planted to give us an annual return of \$1,500,000. Double this for the rest of the Malay Peninsula, and it is abundantly clear that we have already laid the foundations of what may with luck and care become an enormous trade.

It will no doubt be objected that what answers in Brazil may not by any means apply here, but surely it is folly to assume this? We know next

to nothing about our subject at present, and very soon most planters will be wanting to begin tapping on a small scale. Let us find out then as soon as possible all that there is to be learnt and apply that knowledge to suit local conditions.

It has been estimated that to send a good man to Brazil with "carte blanche" to travel as he thinks best and to extend his inquiries, if he got the opportunity, to other rubbers besides Para, will cost in all probability not less than \$10,000. In these hard times this is a large sum to raise, and my object in writing is to invite public opinion upon the question. If those interested will communicate their views to the press much good may result, and when the time comes for us to take definite action, the skeleton of the scheme will already have been framed.—I am, dear sir, yours faithfully E. V. CAREY, Chairman, United Planters' Association.

SPORT IN SEISTAN, EASTERN PERSIA

REPORT BY CAPTAIN CHENEVIX-TRENCH.

The British Officer in India, Civil or Military, will go far afield for sport, and if he be particularly fond of using his smoothbore he may hereafter be tempted to try Seistan in spite of the difficulties of getting there. Taking Captain Chenevix-Trench, British Consul in that part of Eastern Persia, as our authority, we may give some description of the country and of the game birds to be found therein. Seistan, then, is a fertile plain about fifty miles square, watered by canals from the Helmand. That river forms the eastern boundary of the province and marks the local division between Persia and Afghanistan. The waters of the Helmand, instead of finding their way to the sea, spread themselves out over miles of plain and form a huge lagoon, seven or eight feet deep, called in the vernacular "Naisar." In the summer when the river is in flood, due to the melting of the snows in the far-away Koh-i-Baba, this shallow lake extends its borders for miles; but in the winter the water recedes, leaving a wide margin of grass and reeds. Then wild duck, teal and water-fowl generally come in enormous numbers from Central Asia, and the shooting would be unrivalled—if sportsmen were there. There are no boats in Seistan, but an excellent substitute is found in the native *tutin*. This is made by binding together dry reeds into a solid mass, having the shape of a pointed raft with rather a high prow. The *tutin* is pointed along and makes a very comfortable form of duck-punt. Besides the "Naisar," there are many other smaller lagoons, and all give good cover. But Seistan has other game than water-fowl. In the Report of the 1871 Boundary Commission, the following entry occurs in the diary under date February, 26th: "The land swarms with game and partridges, sand-grouse, quail, teal, duck, geese and pigeon were to be seen in every direction." Captain Trench states that the sportsman who adventures into Seistan will find villages everywhere with supplies in abundance; milk, eggs, and chickens are cheap, barley about one rupee per maund, *ata* 18 seers for a rupee. The people of the country are most friendly and are anxious to sell. Camels can be hired for transport and ponies can be bought at an average of R60 to R70 each. The Seistanis all talk Persian, very few knowing Hindustani, while Baluchis on the border speak Baluchi in addition to Persian. There is an Indian shop at Nasratabad, the chief town, and it bears the name of "Mahomed Ali Brothers," familiar enough in Quetta. This enterprising firm

supplies stores and will shortly furnish soda-water also, a welcome drink in a dry land during the summer months. The enthusiastic sportsman may inquire how he is to get to Seistan: he will have to march from Quetta to Nushki and then across the desert, which Captain Webb-Ware has opened out as a caravan route. He will find rest-houses conveniently placed, and if he wishes to see a new country, which may some day rise into importance owing to its strategic position west of Afghanistan, he will take his guns and an unlimited supply of cartridges and hurry off to Quetta next winter.—*Pioneer*, August 17.

TRADE IN DRIED LEAVES AND FLOWERS.

Mr. E Rudowsky, Commission Agent, 14, Weingligstrasse, Dresden, Germany, asks us to draw the attention of our readers to the great possibilities there exist of opening up, between India and Europe, a remunerative trade in dried leaves and flowers such as are extensively used in Europe for decorative purposes. Mr. E Rudowsky, in his letter, states:—"Our selection at the present time is very limited, and the steady growing demand in Europe compels us to seek for fresh fields to make up deficiencies, and as India has plenty to offer in that direction, there is a good way of opening new and profitable markets for such produce, and thus helping the colony. To give you an idea of the possibilities of the trade, I will only mention that the so-called "Cape-flower," a small dried flower, is imported from South Africa in hundred-weights and tons, and I do not see why similar results should not be achieved gradually from India as well. Articles of this kind should be gathered with about three to four inches stem, as the case may be, so as to fasten to wreaths, bouquets, etc., well dried and packed in ten pound boxes (the limit the postal authorities carry), and sent by post. As they are light in weight a ten pound box would hold several thousand. Any dried leaves, flowers, etc., which are attractive enough to lend themselves for decorative purposes, would certainly be well appreciated here. Mr. E Rudowsky informs us that he will be glad to answer any further questions; to receive samples; and to give quotations. His address is given above.—*Indian Forester*.

RUBBER PLANTING EXPERIENCES IN NICARAGUA.

(To the Editor of the *India Rubber World*.)

In the March number of your journal appears a very erroneous article, made up, it seems, of surmises and hearsay, written by Charles D. Scott, of San Juan Del Norte, Nicaragua, in regard to rubber culture in Nicaragua. For fear that his statements may be believed by readers of your journal, I take the liberty of writing to you to contradict Mr. Scott's rash article. I am sorry he did not make a thorough search for information.

There are a number of good rubber plantations in this district. One planter is Mr. G. G. Cossitt, who gives his experience in rubber culture for the past three years, which is no hearsay or surmise, but reality. Mr. Cossitt says: "After years of exploration of Nicaragua, I decided to locate near here for rubber planting, on account of the rich land, healthy location, and proximity to market. In June, 1897, I planted my nursery of rubber seed, and in January, 1898, I began cutting the timber on the Tennessee plantation. Everything was cut clean and burnt off in April, and the rows for rubber laid off. On the 19th of May, 1898, as the rainy season began, I commenced transplanting from the nursery, and finished in July. Since then I have kept the

plantation cleaned and well cared for. At this date I have many trees from five to six inches in diameter and from 12 to 16 feet high, and two-thirds of my trees are large enough to take care of themselves with little or no more attention. These facts can be corroborated by many, or what is better by coming to the plantation and seeing for one's self."

Mr. Scott speaks of the probable short life of the trees after bleeding begins, but from my observation, there is no tree that has greater tenacity for life and can stand such rough usage. There are trees on my place that were there when I began work that are 16 to 18 inches in diameter and must have been bled for ten or twelve years and they are yet growing well. It is true that the trunks show a rough scarred appearance, but that is due to the ruthless bleeding done by the natives with the only tool used by them, "the machette." Formerly they always cut the trees down. I have been told by old men living here that rubber trees formerly grew in this vicinity that were from 4 to 6 feet in diameter.

In June, 1898, I visited a man living some miles from here to get rubber seed, and saw a tree he had planted that was eight years old and 15 inches in diameter. He had bled it for the first time during the Christmas of 1897 and got from it 5½ pounds of rubber. By a systematic way of bleeding the rubber tree, I am sure the life of a tree can be prolonged indefinitely and it will continue to increase in size and yield. From the rough manner in which the natives bleed the rubber trees of Nicaragua (the wild forest trees) they will soon be exterminated.

For my actual experience on "The Daytonia" plantation, we have trees 1½ inch in diameter and from three to four feet high, planted from seed last June. They were planted out in the open sun without any shade whatever; neither have they been shaded at any time since transplanting last September. In order to give the rubber trees all the sun possible, we have the trails running east and west, so as to catch the sun all day.

A great deal has been said, *pro* and *con*, in regard to planting rubber in the sun, but the trees grow more rapidly when planted in the sun and it is quite evident that they are more healthy and produce more rubber. Take trees planted in the shade, as a great many natives have done, and you will find them a failure. This, we have learned, by close investigation for some years back, and also from actual experience. Rubber is of very slow growth when planted in the shade, and when found in the forest you will notice that the tree has shot straight up in search for the sun.

Rubber trees planted in the sun will attain a size in diameter in two years of from 5 to 6 inches and a height of from 15 to 20 feet, while trees planted in the shade in the forest 5 inches in diameter will reach probably a height of from 40 to 50 feet and will take, as near as we can ascertain, from information gathered from all the authentic works we can secure, from twenty-five to thirty years.

The method the natives follow in tapping the rubber tree is very injurious, as they, in their ignorance and carelessness, cut clear through the bark and into the wood of the tree. This is entirely unnecessary and uncalled for, as the milky substance, or rubber, is held or contained in millions of small globular cells 1-10000 inch in diameter, and in bleeding it is entirely wrong to cut through the bark and into the wood, as no rubber milk is gotten between the bark and the wood of the tree. It is held in the minute cells in the bark and if a tree is properly tapped, by making an incision simply in the bark, it will do no injury to the tree. We would say that rubber trees are not easily killed. We find trees on "The Daytonia" plantation, volunteer

trees, that have been cut nearly to pieces by the the rubber hunters and still they leave and flourish, showing that rubber is a very hardy plant and not easily killed as Mr. Scott would imply. It is a fact that there is very little known of rubber culture in Nicaragua, except on the eastern coast and near Pearl City.

As the editor of *The India Rubber World* says: "Because rubber grows in one locality, in a state, it is not an assurance that it will grow everywhere." We know there are large areas in northeastern Nicaragua that are totally unsuited for it, and even in this vicinity rubber does not do well everywhere, but altogether it is the finest locality in Nicaragua for rubber culture. In the dry zone in the interior and on the west coast of Nicaragua, it does not grow well. Rich land, good drainage, and plenty of moisture are the requisites for successful rubber culture.

GEORGE L. BITTINGER.

Pearl City, Nicaragua (Department of Zelaya),
April 9th, 1900.

Having just returned from a two months trip in Nicaragua and Costa Rica, where I visited and inspected plantations of rubber, chocolate, coconuts, pineapples, bananas, vanilla, oranges, sugar cane, and the like, and investigated localities, soil, and cost of planting, talked with men who are working and investing heavily in them—I feel that I am in possession of correct information on this important "Rubber question" in Nicaragua. In addition to the foregoing article of George L. Bittinger, which I endorse, I will only say that I am convinced that Mr. Scott knows absolutely nothing about the "cultivation" of rubber. His little article itself is full of contradictions, one paragraph with another, and would not be worthy of attention or consideration were it not for the fact that many innocent people read your valuable journal—people who do not know, and yet who are anxious to know the facts about the culture of rubber and which is now a very profitable and staple commodity and is a product of Nicaragua.

Now I saw on the plantation of Dr. Roman, at Jinotepe, Nicaragua, not a great way from Grey, town, where Mr. Scott lives, rubber trees nine and ten years old, that had been tapped since seven years old and are as strong and healthy as though never touched; these trees are over two feet in diameter, gave an average of 5½ pounds of rubber the first tapping, which has increased nearly a pound per year since. These trees were planted at first as shade for coffee trees. I also saw a number of old rubber trees, shown me by some native rubber cutters, from which they had cut rubber every year for the last fifteen to twenty years. The trees are still healthy and big, although considerably cut up, as these native cutters are indifferent and take no care of the trees, not even sealing their uneven cuts with mud to prevent exposure to the air, sun, rain, or insects, and yet the trees thrive and yield 10 to 15 pounds at each tapping. I saw three tapped. Rubber plantations have about 200 trees per acre; figure the profits.

The rubber tree, like all other trees, requires the proper soil, care, and conditions for its growth and profitable cultivation. That it can be made as profitable in Nicaragua as anywhere in the world, there is not the shadow of doubt, of which I believe I can fully satisfy anybody by absolute proof. At present the most suitable soil and location in Nicaragua for rubber cultivation, seems to be in the region of Pearl Lagoon, where are located a number of plantations.—*India Rubber World*, June 1st.

F. D. BITTINGER, M.D.

Dayton, Ohio, May 12th, 1900,

A TEA CESS FOR INDIA.

The Editor of "Indian Gardening and Planting" deserves credit for his strenuous exertions to make the necessity for a Cess on tea in India, as in Ceylon, clear to his readers and constituents. He has had the courage to draw the attention of Indian planters to the invidious position which they occupy, and he has started an agitation for the good of the industry, while he has advocated the cess as a matter of justice rather than expediency. We hope other Calcutta editors and the press generally will follow this good example.

TEA IN THE MELBOURNE CUSTOMS.

THE P.A. SHOULD ENQUIRE AND SUGGEST REFORMS.

A former Colombo resident writing to us from a South Colony, under date July 31st, says:—"When in Melbourne at the clearing house, passing through some luggage, I was astonished at seeing the manner in which the Customs officials dealt with the tea just arrived there. There are really no facilities for dealing with tea, and I think that the Planters' Association should call attention to the matter. Each box or chest of tea was opened and the contents poured into a canvas sheet, lying on the grimy floor where all kinds of merchandise was thrown. It was then taken and rolled up and placed in large scales and after taking careful note of the weight and the weight of the box or chest, it was carelessly poured back into the chest, and, of course, the chest not holding all the tea without packing, one of the attendants stepped into the chest (boots and what might adhere to them!) to give it the required pressure. A small quantity of tea, of course, is lost from every chest, but it is the practice of packing which is most obnoxious. Why should not Messrs. Davidson & Co. get the Victorian Government to invest in one of their patent packers—indeed all the Australasian Governments. It would greatly facilitate their work at the Customs. One worked by hand would be the most convenient."

EXPORT DUTIES IN COLUMBIA.

The Government of Columbia has promulgated an important decree, dated April 24th by which all exporters of Produce are compelled to pay to the Government certain duties. Exporters of coffee are to pay \$10 gold for every 125 kilos. Rubber and other gums, etc., are subject to an expropriation (forced loan) of thirty per cent of their value in gold.—*Chemist and Druggist*.

AMSTERDAM BARK MARKETS.—Shipments of cinchona bark from Java for the month of July are reported at 629,000 Amsterdam pounds, against 940,000 pounds in the corresponding period of last year. The total for the seven months to the end of August is 4,612,000. Amsterdam pounds, against 6,025,000 pounds in the corresponding period last year, and 6,102,000 in 1898.—*British and Colonial Druggist*, Aug. 3.

PLANTING NOTES.

SAMOA ESTATES, LD. (66,685).—Regd. July 19, with capital £50,000, in £1 shares, to adopt an agreement with N. J. Weaver and to carry on the business of cocoa, tea, coffee, sugar, fruit, tobacco, indigo and other produce planters, growers, and merchants, shippers, carriers, miners, smelters, explorers, engineers, etc.—*The Investors' Guardian*, Aug. 4.

THE TENDENCY OF RUBBER LANDS IN BRAZIL to come under private ownership and control is illustrated by the granting to a Brazilian citizen—Manoel Floriano Correa de Bulto—of a valuable concession near Marão's. The United States consul at Para reports: "The property consists of several thousand acres of rubber and cocoa land, including immense belts situated on the banks of the rio Negro, rio Japura, and rio Branco." A copy of the terms of agreement in Portuguese, has been filed in the Bureau of foreign commerce in Washington. The grant has been criticized by the *Journal do Commercio* of Marão's, as an alienation of sovereign rights.—*India Rubber World*.

FULLER'S EARTH IN THE UNITED STATES.—According to the *Chicago Chronicle*, there was recently discovered near the Ockiockonnee River, 14 miles west of the city of Tallahassee, Florida, what is believed by experts to be the most wonderfully pure vein of fuller's earth ever discovered in the world. This vein is said to yield, at the expenditure of very little labour, immense quantities of this peculiar earth, which stands the 100 test—that is to say, that it is absolutely pure, there is no waste. Nearly all the mines of this kind of earth contain, besides the valuable commodity, rock, flint, gravel, sand, &c., but this deposit is entirely free of such substances.—*British and Colonial Druggist*, Aug. 3.

THE BREAD FRUIT TREE (*Artocarpus Incisa*), the *Ficus Prolixa*, and the *Ficus Indica*, which give a sap containing the elements of indiarubber, grow abundantly in Tahiti and its dependencies. In 1850, rubber tree known under the names of *Hevea Brasiliensis*, *Hevea Guyanensis*, *Siphonia Elastica*, or *Jatropha Elastica*, was introduced into Tahiti, and the results obtained are reported to have been excellent. Nothing since, however, has since been done in the matter, although it is admitted that the production of rubber would add materially to the resources and revenues of this country. The trees most suitable to the climate of Tahiti are alleged to be *Hevea Brasiliensis* and the *Castilloa Elastica*, whose seeds are said to germinate naturally in the ground where they fall, and whose sap coagulates best in the open air.—*B. and C. Druggist*.

ELECTRICITY IN AGRICULTURE.—An association of farmers in Bavaria, according to a writer in *Feildens Magazine*, are building large electrical works to supply power for agricultural use. The current is generated near the village of Schafersheim, a distance of seven miles from the district of consumption, and is supplied partly by steam and partly by water power. From there it is to be sent at a pressure of 5,000 volts to the surrounding villages, where it will be employed for driving threshing machines, chaff cutters, bruising machines, &c. The motors used are very simple and compact, so that they can easily be handled by farm hands. If this experiment should prove successful, it is almost certain to be imitated in other portions of Germany, as the power used, according to the estimates, is far more economical than horse power or steam power in separate plants; and there might be a very profitable market for such installations also in our own country.

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 Esculentia (Buma 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 Lihosperma.—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, Sandalwood, 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.

RUBBER IN BAHIA.

H.M. Consul at Bahia, in his report for 1899, writes as follows:—

"The export of india-rubber continues to augment yearly, the value of this article exported in 1898 being £34,557, against £19,223 in 1897. A few remarks with reference to this product may be of interest. As it is well known the best rubber comes from Para, on the Amazon, the so-called seringueira. Owing, however, to the unhealthiness of the districts in which it grows, where, as a rule, rubber gatherers perish in a very short time from fever, I venture to express the opinion that it would be advisable for planters of rubber trees to turn their attention to the culture of the mangabeira and manicoba varieties, exported from Bahia. Mangabeira grows almost in any soil in that State, and flourishes in quantities in sandy districts, where absolutely nothing else can be produced. In certain zones of the interior, fertile in good rich red soil the tree yields more than four times the quantity of milk than when growing on sandy lauds. This tree, besides the rubber milk, yields a most delicious fruit called Mangaba. Were it not for the difficulty in planting this variety, which requires from eight to ten years before yielding, would be the rubber tree of the future. Considering, however, all the circumstances in favour and against the foregoing varieties, the manicoba tree shows many advantages over the others to make it a commercial success. It is easily planted, either from seeds or saplings, grows in six or eight months in any kind of soil to a height of six feet, and will begin yielding a considerable quantity of milk in about three years, far more in proportion than any other rubber tree in existence. I am personally acquainted with the planter, who, on his extensive property, has, during a short time past, planted over 100,000 manicoba rubber trees, and informs me that he intends increasing his plantations to 1,000,000 trees, with the full conviction that this industry, in a few years, will show extraordinary results."—*India-Rubber Journal*, August 6.

THE PRESENT STATUS OF RUBBER PLANTING.

(FROM "THE INDIA RUBBER WORLD," MARCH 1ST)

The utility of India-rubber is of course established. In every industry and art to which it has been applied successfully the demand is increasing, while new uses for the material are being developed all the while. These conditions obtain not only in the countries where rubber goods long have been in use, but they are becoming true of all the rest of the world. No advance in the cost of rubber checks its use. To take the United States alone, the imports of rubber have increased of late as follows:—

Year.	Pounds.	Import Value.	Average Price
1897 ..	42,159,129	\$21,670,019	51.4 cents.
1898 ..	44,236,070	25,937,108	58.6 ..
1899 ..	54,408,495	34,219,019	62.9 ..

This increase of consumption exists in spite of the success attained in reclaiming rubber from worn out goods, which material is now used to the extent of many millions of pounds yearly. Chemistry has not yet availed to produce a practical substitute for rubber. So-called substitutes are in wide use, but the best of these is of value only for combination with true rubber. The supplies of natural rubber are, practically speaking, inexhaustible, but they are for the most part confined to remote countries, sparsely settled with uncivilized people, under climatic and other conditions which make them uninhabitable for white men. Doubtless the output of rubber from the Amazon or the Congo might be doubled in a year if American or European laborers could enter the forests to collect it, but this is utterly impossible.

Such conditions naturally have directed attention to the possibility of bringing rubber under cultivation, as has been done with many other products which once were found only in a wild state. Practical rubber culture in any country is yet to be developed, though the total result of experiments in many parts of the world points to success. Wherever rubber trees flourish naturally it seems reasonable to suppose that trees grown from planting the seeds will yield rubber as well as those which grow from chance. Besides, under cultivation more trees could be placed on an acre than exist usually in a square mile of forest area, so that, in the end, it may prove more economical to produce rubber on plantations than to gather it in wild lands free to all comers.

In the United States interest in rubber planting has been directed largely to southern Mexico, on account of proximity, to stable political conditions and general conditions of development there, to the salubrity of the climate, and to the fact that the isthmus of Tehuantepec is the natural habitat of a tree (*Castilloa elastica*) which yields a rubber of good quality. Today experiments are in progress on a large scale in planting rubber in this district, with encouraging prospects on the whole, but it does not yet seem advisable for persons at a distance to invest an important part of their resources in a business the ultimate conditions of which cannot be said to be thoroughly known, without due consideration and a reasonably comprehensive study of the situation at close range. The inducements which have been held out in certain quarters to attract capital for rubber planting enterprises make the following suggestions pertinent.

A given species of rubber tree cannot thrive beyond certain limits of latitude. Thus the *Castilloa elastica* cannot withstand frost. Its growth must be confined within certain limits of altitude above the sea. It will not succeed without a certain amount of annual rainfall, certain conditions of temperature, a given degree of humidity. Besides, the character of soil will affect the result. The mere fact, therefore, that the *Castilloa elastica* is found in the forests of a given State does not prove that it may be planted successfully in every locality in that State.

A fact which has largely discouraged the planting of rubber is the time required for the growth of the trees. While seven years is usually mentioned as the earliest age at which the *Castilloa elastica* may be tapped, there is rubber in the plants from their very beginning. Doubtless the longer tapping is delayed the greater will be the yearly yield, and the longer the life of the tree. At the same time conditions may exist under which rubber may be gathered at an earlier age, and the high prices might make it profitable to bleed the trees freely, even at the risk of shortening their life. It is possible that in time *Castilloa elastica* may be cultivated as an annual or biennial crop, the plants being pulled up by the roots and all the latex extracted by mechanical and chemical means.

All these and some other considerations point to the desirability of careful investigation of any field before investing in lands for the culture of rubber—or any other plant the success of which depends upon so many conditions. It is well not only to look into the matter personally, but to secure the advice of experts in tropical planting. While the cultivation of rubber may in the end prove a safer investment than gold mining, it is quite as important that the proper location be chosen for a plantation as for a mine.

Some estimates of the possible profits from rubber in Mexico are based upon the idea of planting the Para rubber tree (*Hevea Brasiliensis*) there. The Para tree positively cannot thrive there. The price of Para rubber is also used in the estimates, but no rubber which Mexico is capable of producing brings within 25 per cent, as much as fine Para rubber. Nor should the New York or Liverpool prices of rubber be used in estimates, without reckoning cost of transit from the plantation to New York or European markets, including also insurance and brokerage. Many

estimates are based upon an impossible yearly product. The price of land is another important item, since profitable planting may be out of the question with too great an initial outlay. Prices of land generally speaking are much higher in our new possessions in the West Indies, than in Spanish-American countries, and certainly it is far too early to speculate on the opportunities in the Philippines, besides which the *Castilloa* is not indigenous there and we must naturally look to Government experimentation to determine its adaptability to those islands. The labor supply and the cost thereof should be considered, in comparing one country with another.

No doubt it may be found practicable to plant rubber in some countries where it is not now found native, but this should be attempted cautiously. Even within such limits of latitude, altitude, climate, etc., as are found to favor the *Castilloa elastica* in Mexico it might not be possible to grow this species in another country, owing to some subtle difference in the soil, which would prevent the trees from yielding rubber, even should they grow freely. It is interesting to note that the United States government is planning a series of experiments in the West Indies and the Philippine group to demonstrate to the world whether rubber can be produced in these islands.

San Juan del Norte, Nicaragua, Dec. 21, 1899.

To the Editor of the *India Rubber World*:—Your letter was duly received. I failed to reply on receipt of same, as I wished to get all the information possible regarding rubber planting. From what I have heard from several friends who have tried this business, and spent a great deal of time and money, I would not advise any one to start into the planting of rubber, at least in Nicaragua, as I am convinced that rubber is "no good." A friend of mine started three years ago and planted 12,000 rubber trees in the woods, underbrushing and thinning out the woods, the same as the natives do. They are now about as thick as a lead pencil and from two to three feet high, and he writes that it will take, at the rate of growth, a hundred years to produce anything.

If the ground is thoroughly cleaned the trees grow rapidly and will begin to produce in seven or eight years, but will it last? The rubber cannot be tapped with a bit, as the wood of the rubber tree is soft and spongy like the balsa tree; it immediately swells and fills the hole, and scarcely a drop of milk exudes. The tree must be tapped by entirely removing a piece of the bark with a sharp instrument, so as to obviate the filling of the wound by the wood swelling, and, furthermore, a small cut will only drain the milk from a very small distance on either side of it, so that to get any rubber from a rubber tree it will have to be badly mutilated, and the milk is the very life blood of the tree. Will the tree stand constant bleeding, healing, and wounding, long enough to pay the interest on the money invested for the seven or eight years one has to wait, to say nothing of the principal? I am sure not. I have been looking into this carefully, and find that after a tree has been cut three or four times, no matter how carefully, it shows signs of decay. The rainwater gets into the wound and finds its way under the bark, fermentation sets in, wood ants and beetles get in their work, and then good-by rubber tree. To plant rubber properly costs just as much in the first instance as to plant cacao, which produces a crop in the natural manner as fruit, which can be gathered without any damage to the tree; it is only a question of fertility of soil, and a little care to make the cacao tree a constant producer for an indefinite time, or comparatively so. You will probably hear from me again on this subject.—CHARLES D. SCOTT.

Appropos of the slow growth of rubber plants, Thomas Christy, of London, contributes to *The Tropical Agriculturist* some notes on planting *Castilloa elastica* in Mexico. Plants from seeds sown in the sun measured at one year 5½ inches in diameter, and 4 feet 2 inches high. Plants from seed sown in the forest at the same time measured only 12 to 14 inches high. Certainly the experience of the planters mentioned by Mr. Scott, does not agree with that of several correspondents of *The India Rubber World*,

A VETERAN PLANTER.

Mr. J. M. Vermont, of Province Wellesley, Penang, in writing to us about his "T.A.," refers to a paragraph in which Datu Meldrum mentioned his great age as a pioneer. Mr. Vermont writes:—"The paragraph that appeared in the *Ceylon Observer* a month or two ago with reference to myself as to my age is an error. I am entering my 74th year; but although much troubled with rheumatic gout, probably brought on by exposure in developing the three estates, I am still able to knock about, but of course not as active as in my youth."

ZANZIBAR CLOVES.

An American consular report on the trade of Zanzibar during 1899 says that the crop of cloves last year was the largest ever produced, being 8,061,259 lb. in excess of that of 1898. Notwithstanding this large crop, the Consul says that the clove plantation, particularly in Zanzibar Island, are not being cultivated in a way to keep them up to the past standard, for since the prohibition of the importation of slaves the supply of labour has diminished with increasing rapidity each year, and since the decree of 1897, granting freedom to the slaves, the labour supply has been quite inadequate to meet the demands. How this statement is reconciled with the fact that a much larger crop was gathered last year in spite of the labour-scarcity we are at a loss to understand.—*Chemist and Druggist*.

THE STATE OF AMAZONAS, BRAZIL, AND RUBBER.

CONSULAR REPORT FOR 1900.

Last year the British Consular agency in Brazil was strengthened by the appointment of a Vice-Consul at Manaus in the Amazonas. The first result of this arrangement is the presentation of a really capital report by the new Vice-Consul, Mr. Charles Lindsay Temple. This paper, which has been printed by the Foreign-office among its Consular Reports for 1900, is very interesting and instructive reading from a geographical point of view, with much graphic and descriptive merits also. It indicates the physical geography of this river-kingdom, which is the upper, or more properly speaking, the middle basin of the Amazon—the almost entire submergence of the area, when the mighty floods are out and the waters cover not so much the earth as the forest—the rapid subsidence of the all-pervading inundation, owing to the natural drainage and to the sun's rays.

One special feature is the preparation of caoutchouc or india-rubber, which is the main product of this forest-clad country. This article has always been largely used in Britain for waterproof clothing. But of late years the use for it has multiplied owing to the demand for the wheel-tyres of bicycles. Evidently the Vice-Consul has expert knowledge of all that relates to this valuable article, and this experience is embodied in the report with scientific accuracy and practical lucidity. Such an exposition must be important to those who are interested in this branch of trade.

Apart from this staple, there is a careful analysis of every item of export and import. Inasmuch as this vast territory of 600,000 square miles has its scanty population of 600,000 souls, largely engaged in producing certain things which the nations need across the seas, it follows that the people must largely depend on those nations for their food, their clothing, and the needs of their civilisation, though it must be admitted that this civilisation is for the most part not

very high. Thus it arises that their trade is both comprehensive and diversified. The report enters into every item of export and import, with some adequate remark upon each.

Some special facts or considerations may, however, here be noted. The dominant factor in the Amazonas trade is the indiarubber. Indeed, of the production of the world, 57,500 tons, about half, or 25,000 tons, comes from the Amazon district; of the other half, the greater portion, or 24,000 tons, comes from the East and West Africa.

The crying want will not be capital or emunuciation—that by water being peculiarly abundant—but labour, which is, as yet, too scarce.

RICHARD TEMPLE.

—*Journal of the Society of Arts*, Aug. 10th.

MAGALIESBERG TOBACCO INDUSTRY.

MR. F H HARTLEY INTERVIEWED.

ADVENTURES AND EXPERIENCES.

An interesting interview appears in the current number of the *Natal Agricultural Journal*, in the course of which Mr. F H Hartley, of Magaliesberg whose brand is so well-known to lovers of Boer tobacco, offers some remarks anent the early days of South African colonisation, and the present position of the tobacco industry in this country. *Inter alia*, he said:—"Magalie is the name of the chief who held the district when the Boers took the country. I bought my land there Vaalbank—in 1869; opened a store and soon afterwards started a mill, getting my power from the Magalie River. Since then I have spent at least £20,000 on improvements of one sort and the other. When my first mill became too small for the work I built another, and a short time ago I built the third, the best and most modern in the Transvaal at any rate. The machinery is driven by a turbine, and I can turn out really first-class flour. The Magaliesberg wheat is splendid. Everything except mealies is irrigated. The cultivation is limited to the water available on the farms. The south side of the range is much better than the north which is too hot. There they get weevil and moth into the grain much more than we do, and the rust is worse. So far as my observation goes, rust is bad according to the warmth of the nights. The Australian wheat was not up to ours in quality. The times for planting are oats in April, wheat in May, and as soon as oats are off the tobacco goes in.

Magaliesberg has had its reputation for tobacco for a long time. My father in his hunting days used to send presents of it to his Cape friends. The Voortrekkers soon discovered the suitability of the locality, and they took much intelligent care in the preparation. Nearly all the farmers in the district now cultivate it. On many of the farms Boer men, women and children work at the cultivation. Yes, the Boers, like other races, work if they can't help it. In debt? Yes nearly all. The continual subdivision of the land on the death of the parents is producing a class of Boer quite different to the original type. To convey an impression of the soil and climate to a Natal man it might be described as somewhat like the Tugela district near Colenso. The light red soil is best. Exhausted? Yes; manure is necessary everywhere. For tobacco cattle manure only is used—horse and sheep would spoil the tobacco. I cultivate about 40 acres, and there are very few, if any, who do more. In most instances the quantity is very small.

I started cutting and selling in bags in 1874 on a small scale. There was a lot of prejudice to overcome in introducing cut 'boer.' After the retrocession of the country, the Cape clapped on a duty of 2s per lb, so that limited me pretty much to the Transvaal, the then Free State and Natal. For a long time only Europeans who had been accustomed to cut tobacco, would buy it. The Free State took

hardly any; there they had never seen or heard of tobacco other than roll. They are an ultra conservative lot. You will remember what a struggle there was among farmers before the sulphur matches gave away to the safety kinds. In the Natal papers I advertised largely, and the brand became so popular among the British generally that I had to increase my plant and give up advertising. But it was annoying to be limited—I could not get the tobacco for the demand. I had to keep up the quality and competition regulated the price. The goldfields brought a big rush for cut tobacco. At first I bought from the farmers in the roll at 6d per lb, but there was such endless trouble about the moisture—nearly every farmer trying to impose upon me more water than his neighbours—that I resolved to end the constant wrangling by buying only in the leaf, and now I buy at from 3d to 9d per lb. It is necessary from business motives to buy the bad as well as the good. The good is sold in my bags under my name; the bad is cut up and sold on the Johannesburg market in bulk—with no guarantee—for what it will fetch. When ripe the plant is cut down and hung in sheds or under trees. There is not enough labour for a better way. By-the-bye, I might mention that during the British occupation the troops gained a liking for "boer" and for several years I got orders from all parts of the world, including Hongkong.

In dry seasons insects of course, are troublesome especially cut-worms. In a good season we look to get $\frac{1}{4}$ lb. per plant, and an acre should carry about 5,000 plants—that's 1,250 lb. to the acre. And ratoon or second crops produce about half as much. Formerly when the land was richer and more manured there was often a third crop. On the northern—the hotter side of the range—they still go in for third crops. The second crop was preferred by many Boers for smoking, and the first, the strongest for chewing. All genuine Boers are chewers as well as smokers. The habit, however, is growing out of fashion especially—among those who come into touch with civilisation. It might be worth mentioning that I am interested in a tobacco-growing experiment in GAZALAND. I believe the country is splendid there for tobacco, coffee and other things. Tobacco will grow all the year round. There is no fever there; on the high land there the frost began this year in the middle of May.

"As to the proposals in England to settle time-expired soldiers in the Orange River Colony and the Transvaal, it is a difficult question to answer off-hand. The desirability in some respects is obvious, but to succeed in farming in any part of South Africa—putting aside racial and similar considerations—requires above all, local experience—which fact new-comers will rarely believe—and, secondly considerable capital. Farming except on the large scale of the old Boers must be mixed and to avoid disaster much and varied local knowledge is necessary. Again it must be remembered that as a farming country the Transvaal is extremely patchy, as patchy as Natal."—*Natal Mercury*.

RUBBER PLANTING COMPANIES.

ENTERPRISE IN AMERICA.

The Mexican Coffee and Rubber Growers' Association (Philadelphia), incorporated in Delaware to acquire the property and concessions of the Grijalva Land and Coffee Co., Limited. The Grijalva properties include 100,000 acres in the districts of Mescalapa and Pichucalco, in the state of Chiapas, Mexico; about 60 miles southwest of San Juan Bautista, capital of the state of Tabasco; and front for twelve miles on the Grijalva river, navigable by the company's steamboats to Frontera, on the gulf coast.

The Palma Real Co., with a paid up capital of \$1,500,000, have been incorporated under the laws of West Virginia, to acquire 98,000 acres in the

state of Vera Cruz, Mexico, to be devoted to the planting of India-rubber and other tropical products.

The Nicaragua Rubber and Agricultural Co., incorporated in Delaware, September 26, with \$250,000 capital, own 8,105 acres of land in Nicaragua, purchased with a view to planting India-rubber and bananas or other fruits, on the Rio Coco, 80 miles inland from Cape Gracias. They offer to sell shares of stock, each to carry a certain amount of land planted with rubber and fruits, to be paid for in instalments.

The Isthmus Plantation Association of Mexico has been organized at Milwaukee, Wis., for the development of the lands known as the Hacienda del Corte, on the isthmus of Tehuantepec. The estate comprises 10,000 acres, and it is reported that 200,000 coffee trees and 40,000 India-rubber (*Castilloa elastica*) trees have been planted.

The Chiapas Rubber Plantation and Investment Co., described as an American corporation, is mentioned in a letter from the city of Mexico as owning 12,335 acres of fine rubber lands in the Rio Michal valley, in the state of Chiapas, and having planted more than 3,000 acres in rubber.

The Government of Peru announces that concessions for rubber lands cannot be transferred without the *cessionnaires* having obtained consent of the national authorities.—*India-Rubber World*.

GOLD REEFS IN BURMA.

Of the reefs with payable gold referred to in today's Government Resolution on the Geological Survey Department as discovered in Burma, the first is the Choukpazat Reef, in the Wuntho District, which has several associated veins besides a second reef half a mile to the north, and two veins of 900 yards to the north-east. Mr. Stonier finds it contains some free gold which can be extracted by simple machinery. Part of it is already being worked, the vein stone giving in all 14 dwts. of gold to the ton. The second is the reef discovered by Mr. Stonier about 14 miles north of Baumauk. It consists of quartz 9 ins. thick and where tested contains 9 dwts. of gold per ton of soil, also about 2 per cent of copper.—*Madras Mail*, Aug. 27.

COFFEE IN QUEENSLAND.

Though this, like rice, is grown upon the coast side of the main range from Cooktown to the Tweed Heads, the tendency is towards cultivation in the tropics, where plantations are now being cultivated upon a commercial scale. It has only been within the last three years that the interest shown in this product has demanded the attention of the Registrar-General from a statistical point of view, but from that time the increase in area has each year shown a fair advance. Taking the last two years for an example, it will be found that in 1897 there were 180½ acres of productive coffee trees and 130½ of non-productive, and in 1898, 199 acres and 233 acres respectively. The figures show an evident advance in the area planted, and the information to hand points to the statistics of the present year being yet more favourable. The imports for 1898 were 170,886 lb., and upon that basis there is room for the use of 602 acres before we overtake our consumption, which, upon the present population of 498,523, is at the rate of 456 lb. of coffee per head each year. The market in Europe, however, is good, and though we may not yet have learned how to offer our goods in the most attractive manner, the opinion expressed by the trade in London upon

Queensland coffee is very favourable, and by the time we are in a position to place a fair quantity for export that method of preparing our coffee will have been attained, and we shall be able to compete with those countries wherein coffee-growing has been prosecuted for centuries. The appointment of Mr. Newport as instructor in coffee culture has given an impetus to this branch of tropical agriculture, and as he has also an intimate knowledge of what may be termed allied products, such as spices, the benefits to the farmers of the North will be greater than was anticipated. The death of Mr. E Cowley, and the exigencies of the Diseases in Plants Act at Cairns has precluded Mr. Newport, up to the present, from giving that attention to instruction he would have wished, for the reason that he was retained in Cairns to supervise the nursery, and to attend to the inspection of fruit. Arrangements have, however, now been made to release him from that detention, and his services will henceforth be at the command of the coffee-grower. A report from him upon this subject is attached herewith.

PEPPER CULTIVATION IN MALABAR.

Pepper (*Piper nigrum*) is grown in Java, Sumatra, Ceylon and other Asiatic countries, but that which comes from the Malabar coast is acknowledged to be the best. The only taluqs in Malabar in which pepper cultivation is largely carried on are Kottiyam and Kurumbranad. The conditions most favourable to pepper cultivation are said to be copious rains, abundant dew in the night, and a gravelly red soil. These are found in other parts of Malabar, so it is not understood why the cultivation is chiefly confined to these two taluqs. Two varieties of pepper are produced in Malabar—the black and the white. The fruit is gathered green when intended for black pepper, but must become quite ripe for white pepper. White pepper differs from the black only in being stripped of its covering. After stripping them, the black berries are steeped in salt water, and when they have been exposed to the sun for several days the chaff is rubbed off with the hands. The process of cultivation is very simple. The vine is generally propagated by cuttings. It is usually planted at the base of trees, the most commonly used being *Murikku* (*Erythrina ludica*); other trees, such as the jack, cashewnut and mango-tree may also be used, but they are not in favour with the Malabar cultivators.

The first thing required for forming a pepper garden is to clear all jungle and root out all stumps of trees on the ground. This must be done by the middle of May. The *Murikku* standards, on which the vine is trained, should then be planted and about half a dozen cuttings of vine—each about 2½ feet in length—should be planted at the foot of each stem. The soil should then be turned up by digging, and the cuttings tied with a fibre on to the *Murikku* crop. The tying is necessary to facilitate the growth of the vine, which sends out small roots at every joint, which strike into the *Murikku* stem and enable the vine to climb up the prop. In three or four years the vine attains a height of six feet.

The vines begin to bear in the third or fourth year, and in four years more are in full perfection and continue so for 20 years when they die. They blossom about the month of June, and begin to bear fruit in the following two months. The gathering season is January to March. The plant requires constant rains during the blossoming season. The expenses of cultivation incidental to farming and maintaining pepper plantations are variously stated. But it may be stated approximately that a plantation of one acre will not cost more than £300 together with an annual expenditure of £10 for its upkeep. The outturns of the pepper harvest are also variously stated. The yield ranges from one to

three bharams per acre (one bharam being equivalent to 66 lb.) It is stated that a single vine produces from one edangali to four edangalis of dried pepper. There is no doubt that pepper cultivation is highly remunerative, and it is a pity that it is not carried on more extensively than it is at present.—*Indian Agriculturist*, August 1.

HUNTERS THE TEAMEN, LIMITED.

MORE PROSPERITY.

The third ordinary general meeting of the shareholders in Hunters the Teamen, Limited, was held on Thursday, at the Mitre Hotel, Manchester. Mr. George Ollerenshaw, chairman and managing director, presided.

The directors reported that there was a profit on trading of £34,183 14s 1d., and after payment of all expenses a net profit of £24,964 5s. 5d., which showed an increase on the preceding year of £5,555 2s. 3d. This amount added to £2,508 2s. 1d. brought forward made a total available profit of £27,472 7s. 6d. The preference dividend for the year had been paid, and an interim dividend on the ordinary A shares at the rate of 10 per cent, per annum, and on the ordinary B shares at the rate of $7\frac{1}{2}$ per cent, per annum, and £3,000 added to the reserve fund. The sum of £13,334 17s. 6d. remained available for distribution. The directors had made the payment of a dividend at the rate of 10 per cent, per annum on the A ordinary shares and interest and dividend at the rate of 10 per cent, per annum on the new issue as per agreement, and now recommended a dividend at the rate of 12 $\frac{1}{2}$ per cent, per annum on the B ordinary shares (making 10 per cent, for the financial year on the A and B ordinary shares). It would be remembered that in March last a further issue of capital was made, viz:—20,000 A ordinary shares at 10s. premium. This premium had been added to the reserve fund. In addition to the above £3,000 and £10,000, it was further recommended that the sum of £5,000 be added to the Reserve Fund, making the same into £22,500, and the sum of £4,487 7s. 2d. be carried forward.

The Chairman moved the adoption of the report and balance sheet. He said he was again in the happy position of being able to report progress and increased profits, the result of a largely-increased turnover. The new shares had been readily taken up by existing shareholders, and application had been made to the Manchester Stock Exchange for quotation of the new shares. Gentlemen connected with the provision trades well knew that the markets during the past few months had gone dead against the retailer, and under such adverse conditions the net profit was highly gratifying. The reserve fund of £22,500 must be very agreeable news to owners of B shares, for in the ordinary course of things their shares must a year hence rank equal to A shares.

Mr. S. J. Bradwell seconded. Each year, he said, they seemed to meet under brighter auspices. Their success was not so much in an increase in the percentage of profits as in a large turnover at about the same expense.—*Grocers' Journal*, Aug. 4.

A SUGGESTION FOR MAKING GREEN TEA.

I am going to try and make green tea, but so far I have no sailing orders. I am afraid that my tea will be different from that made by others. I imagine that there must be two or three men available who know how to make green tea who could be secured as instructors. These men could be deputed to visit the different districts and instruct the managers within a given circle, and others from a wider circle could come in and attend the demonstrations. The instructor should actually make a whole break, and all concerned should make tea on the same lines

and submit samples. Whatever appliances are required should be obtained beforehand, and everything prepared to make a large quantity of tea of *one quality and character*.

It would have been better to allow a bonus of 1 anna per pound, and half fee to the instructor, i.e., R6,250 for 200,000 lb., or better still, R12,500 for instructors and $\frac{1}{2}$ per pound bonus. The most important points in the new venture are quantity and uniformity. We have fixed the quantity at 200,000 lb. but have taken no steps to get equality of character, so that the 200,000 lb. will be split up into several sorts of tea. I do not believe that the political troubles in China will have any effect on our chances of gaining the American market; we need not hurry ourselves unduly. It will be better to get more system into our attempt even if it incurs a delay. We have not cut out China green teas in America because we have not tried to do so. If we *do* try we can do it, because our leaf is better and our labour cheaper, and because we are more honest. The plan I propose is to find instructors who have already succeeded in making suitable green tea for America.

These men will draw up a list of appliances and have them prepared by a fixed date. Iron pans, steaming cylinders, soapstone, gypsum, Prussian blue, cloth for pressing bags, tea chests of certain dimensions—in fact, anything they fancy. Each instructor would get promises of a fixed quantity of green tea to be made within a fixed circle. He would go to one central factory and *make* one invoice himself; and he would watch the manufacture of the others, and be ready to go and put matters straight if any great difference appeared in anyone's tea. The instructor's work would be done in two or three weeks, and the result would be a break of tea which could easily be matched in the future.

The individual managers would be released of all responsibility, and it really is not fair to ask any man to risk his reputation on an utterly unknown product. Those who succeed will do so by *chance*, and those who fail will be continued as fools if each one is left to mere verbal instruction. It would be wise if the proprietors to give up part of the bonus to secure expert and experienced instructors. I feel inclined to try 2,000 lb., and get R187 8-0 bonus, but I would certainly rather spend this in going to see the tea made by an expert than risk failure.

So much about instructors, but another point which is at present in dispute is the necessity of steaming apparatus. I was recently in Calcutta and had a talk with one who knows how to make green tea, and he says that steaming is done by the action of heat on the leaf. The leaf supplies its own moisture, which heat, (however applied), turns into steam.

Surely it is a mistake to apply "steam" obtained from water outside the leaf! By applying steam, a temperature of only 212 deg. can be given to the leaf, but I have read that leaf can be steamed on red hot pans; it is more than probable that temperatures over 212 deg. are required for making good green tea or Oolongs. Our Siroccos can give heat up to 350 deg., and that would make the leaf steam in about half a minute. I have never read that the Chinese or any Indian green teas in former times required a steaming apparatus.

I see an advertisement on page XIII of 9th August of your paper, stating that the cost of the *necessary* machine for steaming is R600. Would Mr. H D Deane tell us for how long *any* apparatus had been considered *necessary*. This means that the bounty of 1 $\frac{1}{2}$ annas on 6,400 lb would have to be advanced by the intending experimenter, and most of us would like to know whether steaming by the aid of an apparatus is really *necessary*. May I suggest that steam applied to leaf will make it more moist, so that besides the cost of fuel to make the steam, more fuel will be required to dry off the added moisture. Dry heat extracts moisture from the leaf in the form of steam, and the drying is thus already commenced. A.C.—*Indian Gardening and Planting*, August 23.

A FARMER'S EVERY-DAY LIFE IN SCOTLAND.

No XI.

(By "Cosmopolite.")

AGRICULTURAL SHOWS.

The month of July is dedicated to the Agricultural Shows of Scotland, and, from the Borders to John o' Groat's, the roaring of cattle, neighing of horses and squealing of pigs awaken the many welkins of the land of the mountain and the flood. All papers, agricultural and otherwise, are crammed full of exciting prize lists of show animals, and even Chinese massacres and Boerish victories occupy but a secondary place in the news of the day. But six columns of cattle show, day by day, is a little trying, and with this "white man's burden," the agricultural newspapers have been solidly and unreadably funereal for some time past. But in the boundless monotony of farming life, we could ill spare our cattle shows, and although the judging may not be all that we could desire, perhaps it is better for us "to bear the ills we have, than fly to others that we know not of." This year the judges have been more severely dealt with than usual, some of the exhibitors even going the length of refusing the tickets awarded to them, because the judging displeased them so much, one special grievance being the fact that a first-prize ticket was actually given to a horse bred by the judge himself, and said to be about the worst in the ring. Doubtless, there is much reason in the old farmer's remark, when, having been asked why he did not exhibit any of his fine stock at the shows, he replied:

"FIRST BREED YOUR JUDGES."

A good deal depends on luck in a show ring, but the best bit of luck that can come one's way is to have the judges as personal friends, or one of them the breeder of the animal you exhibit. I once got the Champion Cup for the best Clydesdale in the show-yard, and this prize I carried off with a filly that had bad splints on the fore-legs and was a shiverer; but I only let her go to the Show just to please my grieve, as I myself would never have dreamt of sending her as a likely winner. But my luck must have been in good working order that day, although the result only made me, thereafter, lose what little confidence I had in show-yard judging. I do not know if the unsatisfactory judging has been the means of driving visitors away, but the fact remains that Agricultural Shows are not so well attended, now-a-days, as formerly, and the only way to bring forward a bumper attendance is by introducing into the programme a military tournament or a Punch-and-Judy show. Last year the great attraction at one of these Shows, down south, was a prize given to the "ugliest dog in the show-yard." This novelty was so effective that the sum collected at the gate was "a record." I drew the attention of our local Agricultural Show Committee to this, and said that I thought I could put my hand on six or eight dogs, in this district, that, for ugliness, would take a deal of beating and make an exciting competition. I even advised them to go one better than

this, and include the ugliest owner, so as to make a pair. Ugly people do not often have a chance to win prizes, and this would be a grand opening for them, and I think it highly probable that such a competition will be included in the programme of our next season's cattle show.

THE HOLIDAY EXCURSION SEASON

has been in full swing during the past month, and the picnic hat is gaily blooming tra-la-, so that farmers have been pestered by trippers trespassing over their parks, leaving their gates open, and making themselves an abominable nuisance in general. Trains, in consequence of the travelling crowds, have been systematically behind time, and cattle trucked for certain markets are apt to arrive after the sale is over. The trippers never think of these things,—what do they care for a hereafter, absolutely nothing?—so long as they can get their own enjoyment, let the farmers look after themselves; and this we have had to do, sometimes with very bad grace I must admit, praying all the time that the end of the picnic season might soon come, when the revellers will stay quietly at home, and swear off the fermented juices of the vine, and the barley, the potato and the gooseberry.

Our cattle also are greatly disturbed by the omnibuses and char-a-bancs driving past, the rioters shouting lustily at the top of their voices, generally accompanied by an artist on an accordion, who, between the songs, drives dull care away by solemn and uncertain airs with variations. On one occasion I found my cattle, with tails erect, galloping for dear life, and then there burst on my view, driving along the road, a huge picnic party headed by a brake containing the town band, which had been commandeered for the occasion, the drum, which met with such a terrible accident on Lady-smith night, having been effectually repaired. As the party drove past me, they were letting off a song of joy of their own composition, and I plugged my ears with my fingers and hastened away to see that none of my cattle had been terrified to death by these outrageous junketers.

THE CROPS.

Had a stranger visited our district this time last year, and then come again now, he would scarcely be inclined to believe that it was the same place. Last year we were suffering from severe drought, the grass was burned up, the hay crop was almost *nil*, corn was short in the straw, and turnips were a complete failure. This year, owing to a warm and drippy season, everything is looking its very best, and, taking my own farm as a sample of the district, I never saw such a quantity of grass, I never cut a heavier crop of hay, my turnips are simply perfect, and my oats have the appearance of proving a profitable crop. I am not one of those whose cry is always a lament; when there is anything to be grateful for, I am glad to show my gratitude; and this year our crops leave nothing to be desired, except that

PRICES

may rule high when the time comes for us to sell. Beef and mutton continue at a satisfactory price, and, in this respect, the

war has helped us, and there is a prospect of prices keeping up for some time yet. The rich pasturage has caused store cattle to rise considerably in value, indeed it is difficult to get them at anything like a price that would leave a profit, but, as one must have his grass eaten down, I have been compelled, although I have no great liking for

IRISH CATTLE,

to purchase a mob of these, merely to eat down my grass, that is running wild. These cattle were bought in Limerick market on a Friday, and, the following Friday, I bought them at my nearest auction mart, so they have not been knocked about, from pillar to post, in the way that so many of these Irish cattle are treated for weeks before they are bought, and then, as a consequence, they take months to recover from the bad treatment they have endured. I trust that my mob may prove the advantage of getting this class of cattle as quickly as possible from their native wilds on to our good pastures, and that they may thrive exceedingly, and leave a handsome profit.

PLANTING NOTES.

METHOD OF MAKING WOOD FIRE-PROOF.—The latest method of making wood fire-proof is that of a Mr. Joseph L. Ferrell. The timber is not steamed in a vacuum, but the fireproofing solution is forced into it by great hydraulic pressure, amounting to 1,500 lb. on the square inch for some hard woods. The solution is a secret, but is neither volatile, corrosive, nor hygroscopic, and the timber, after treatment, is kiln dried so as to leave only fine crystals in the pores. A house of this wood is inflammable. Boxes made of it and placed in a fire of pitch-pine kept documents in them, it is stated, unscorched for 23 minutes, although the outside of the box was charred.—*Globe*, Aug. 10th.

RUBBER EXTRACTION.—We have been favoured with another letter on this subject from our esteemed confrère, Mr. A. Godefroy-Leboeuf, of Paris. He reports that the extraction of rubber from bark by a patent process has proved a success, and that a regular manufacture in this way will shortly be commenced. We trust our correspondent will keep us fully informed as to the success of this new factory, and if any of our rubber planters are enterprising enough to send us a kilo (2½ lb.) of any bark he would like to have experimented with, we shall see that it is sent forward and the result duly reported.

INDIAN TEA ASSOCIATION.—We are indebted to Mr. James Peter, Secretary to the Sylhet Branch of Indian tea planters, for a copy of the detailed Report of the general Committee of the Indian Tea Association for the year ended 28th February 1900.—Including list of gardens belonging to the Association corrected to the 30th June 1900, with proceedings of the Nineteenth Annual General Meeting held on the 22nd May 1900.—There is much valuable information in this volume to which we shall refer from time to time.

THE PROFITS of the Russian-American India-Rubber Co., at St. Petersburg, for the last business year are reported at 2,941,906 rubles, against 3,945,222 roubles, in the year 1898-99. The dividend will be only 35 per cent., against the customary yearly dividend of 50 per cent.—*The India Rubber World*, Aug. 1.

JAMAICA IS PURELY AGRICULTURAL.—Walking in the country and making enquiry, one soon discovers that seventy-five per cent. of the people are unable to answer with any certainty the following simple questions:—"How long does it take from the time of planting for a banana, or pine apple to commence fruiting, and how long after the fruit appears does it take to ripen?" "How long does the coffee or orange take to ripen after the blossom appears?" Of those who read ninety per cent could not answer. Yet these are things that we cannot avoid seeing before us, year after year. Our young men will not take kindly to agriculture; they all want to be Clerks and Gentlemen, I hear repeatedly day by day, something sorrowfully, and frequently sneeringly. Now this is partly true, in as much as a boy who has been "educated" at an elementary school is very apt to look down on the small cultivator as beneath him, and how can he be blamed? Can he not write and read, what is the good of his education if he is to go and hoe grass? His teacher in all probability is above planting a rose in a pot, and he has unfortunately for himself and his country, never seen a white man with a spade in his hands. "Buccra" don't dig, therefore it cannot be a good thing.—*Journal of the Jamaica Agricultural Society*.

YERBA MATE TEA.—Some of our Consuls in South America refer in their last reports to the virtues ascribed to the tea made from yerba maté, a herb which takes the place to some extent of tea or coffee, and which is derived from the leaves of the *Ilex Paraguariensis*, a tree of from 12ft. to 20ft. in height. Our Consul in Paraguay says this tea is consumed by a large proportion of the populations of Brazil, the Argentine, Uruguay, Chile, and Paraguay. The leaves are gathered every two or three years and dried over a slow fire; they are then pounded in mortars in the ground, and finally packed in fresh skins and dried in the sun. The tea is made by pouring boiling water on the leaves, which serve for several infusions. The taste is bitter, but not unpleasant, and the effects are asserted to be invigorating. It is said that it would be valuable as a restorative to troops on the march and on active service, and the French Government have ordered a shipment of maté for the colonial troops, and some samples have also been sent to Germany for experimental purposes. An attempt is also being made to introduce it into the United States as a suitable beverage for the working classes. When analysed the tea is shown to contain caffeine and cafetannic acid in important proportions. The Consul-General at Rio also refers to the subject as one of commercial interest. It is claimed, he says, on behalf of the tea that it possesses superior stomatic properties to tea and coffee, in that, while it is refreshing and invigorating and favourable alike to mental and physical exertion, it does not disturb the nervous system. But even Brazilians are not agreed as to its merits, some alleging that by its aid the most arduous work can be done, such as forced marches of troops on short rations; others asserting that in war coffee has proved much more sustaining. However this may be, it is largely consumed in South American countries when the prices of low grade China teas are too high to admit of their shipment to South America, and it is therefore possible that it has some good qualities to recommend it.—*London Times*, Aug. 9.

THE FEDERATED MALAY STATES:
PROGRESS IN EXPORTS AND PLANTING:—
COFFEE, SUGAR, GUTTA, RUBBER, &c.

The Resident-General, Sir Frank Athelstane Swettenham, K.C.M.G., has good reason to be proud of the continued progress and marked prosperity of the group of Malay States entrusted to his care. He has profited by observing the course of administration in India and Ceylon and taken care to avoid, as far as possible, acknowledged blunders, and to adopt any feasible improvements on the older systems of administration. The result is to make the "Federated Malay States" an object lesson to colonial administrators in the tropics, of the most interesting and useful character; and we now look forward to Sir Frank Swettenham's Administration Report from year to year, as sure to bring before us a record of good and progressive work and to contain much matter of special interest to all intelligent observers. The latest Report now before us is no exception to the rule. The revenue for 1898 (9,364,467 dollars) was the highest up to that year; but the return for 1899 is no less than 13,486,410 dollars—an increase of nearly 50 per cent! The total value of imports into the Federated States during 1899 was \$33,765,073 against \$27,116,416 in the previous year. The exports were valued at \$54,895,139 against \$35,241,003 in 1898. The increased value of trade was therefore \$26,392,763. The tin exported was valued at \$16,139,399, and beyond this, the local products exported were, Malay coffee, \$530,232; sugar, \$1,283,165 (nearly all from Perak); and gëtah, \$289,009, of which more than half was from Pahang. Of the four Federated States (Perak, Selangor, Negri Sembilan and Pahang) the first contributes nearly half the revenue, Selangor coming a good second; while the other two do not make together 1½ million of dollars. The surplus of revenue over expenditure last year was very nearly 2 million dollars! But the Resident-General is all for progress and writes:—

I have suggested the raising of a further loan of £500,000 and the construction, at a cost of about one million sterling, of a section of about 175 miles of railway from Seremban in Negri Sembilan (the terminus of the sanctioned extensions) to Johore Bharu, whence a short crossing by ferry-steamer and the Singapore Railway would take passengers from Penang right down the Malay Peninsula to Singapore. The growing prosperity of these States, our financial position, the present price of tin and the approaching completion of the Railway construction now in hand, make the moment peculiarly favourable for an undertaking which has so much to recommend it, and would confer such manifest advantages on the Malay State of Johore and the Colony of the Straits Settlements.

Here is what the Railways have done in 1899:

The Malay open lines of Railway gave a revenue of \$1,722,474 in 1899 against \$1,394,720 received in the previous year. Comparatively few miles of new line were opened for traffic, but work was advanced all along the extensions. The results would have been better had it been possible to get even a fair force of labour on to the work. With tin at its present price, and immigration almost at a standstill, it is impos-

sible to get labour for public works or planting at anything like a reasonable price.

It is very strange how development is checked by want of labour, and how difficult it seems to get the want supplied even from famine-stricken India. India and Chinese labourers are both so scarce or so much in demand that wages have doubled in a few years and even treble the old rates have to be paid. The Resident-General and his Government are, however, taking energetic measures to overcome this obstacle.—Here is an interesting paragraph on a vexed question:—

As is natural in a new country—that is, new to the rest of the world and modern methods of government—the year has been fruitful in legislation. There is no need to enumerate the Enactments passed, but we are on the eve of laying before the various State Councils some very important measures which have been under consideration for years. I allude to the Civil and Criminal Procedure Codes and the Courts Enactment. All these will probably be law before this report reaches the Secretary of State, and when brought into force, the present jury system will be abolished in favour of trial by a judge and assessors. If trial by jury is a suitable tribunal for such a mixed community as is found in these States, we are not yet ready for it, because we cannot supply the intelligent English-speaking and English-understanding jury on which its success must depend.

The working of the amended system in the States will be watched very critically we may be sure. As regards "planting," here is Sir F. Swettenham's deliverance—labour again being the trouble:—

Many Europeans have wisely planted rubber, coconuts and other products likely to do well should coffee fall to a price which would not admit of profitable cultivation. In the Negri Sembilan some of the planters have carried out the project for establishing the Coffee Curing Store to which I alluded last year. In other ways the Government is trying to second the exertions of a class whose efforts deserve encouragement. The export duty on coffee was suspended while the price fell below \$19 a pikul, and steps are now being taken to establish an experimental plantation under the supervision of a thoroughly qualified Superintendent whose advice and experiments will, it is hoped, prove of great service to planters. The great difficulty is labour, and while the Government has, for the last two years been trying, not without some little success to foster immigration from India, a special appeal will be made to the Indian Government in the hope of obtaining its co-operation in our efforts to transfer some of the surplus population of that country to the Malay States. Finally, we must close this very cursory and imperfect review of an able Report, by referring to a paragraph which at this period of "wars and rumours of wars" is of exceptional importance:—

The Regiment of Malay States Guides continues in a state of high efficiency. A large number of satisfactory recruits offered themselves for service and there was no difficulty in keeping up our full strength with men of the standard hitherto insisted upon. The Regiment maintained its reputation for good shooting and great attention was given to this part of the training. Three hundred men were offered to Her

Majesty's Government for service in South Africa but they were not required. They are ready for service there or elsewhere and when called upon will give a good account of themselves. A regiment of Malays could not fail to be of great use, in China or even in India, should the necessity arise for its transfer; for, no people have a higher reputation than the Malays for courage and persistency as soldiers when well led.

GUTTA-PERCHA.

It is one of the strangest facts in the evolutionary history of man that the discovery of the insulating qualities of gutta-percha should have been so nearly coincident with the demand for such a material, when ocean telegraphy became a pressing need. India-rubber, a similar gum in many ways, forms no reliable substitute, especially because it has been found to deteriorate in sea-water, while gutta-percha not only improves under the enormous pressure of the deep-sea waters, but appears to be absolutely imperishable: a material, indeed, of essential consideration when the cost of an ocean-cable may possibly exceed a million of money. India-rubber, too, presents many technical difficulties in its application; pure it is useless, and vulcanised the sulphur comes in as an uncertain agent. Hence, it is very doubtful, if gutta-percha had not "turned up," that ocean telegraphy would even now been practically useful. Here at once we appreciate what a debt we owe to the poking and prying investigator who saw this gum, tried it, and utilised it in other ways, and thus paved the road to the discovery of its insulating capabilities, of which he certainly never dreamt, being an untutored and unknown native Malay.

In 1843 one Jose d'Almeida, a Portuguese engineer, first sent over specimens of native-manufactured whips, knives, hats, &c., to the Royal Asiatic Society. A little later Dr. Montgomerie, a surgeon in the service of the East India Company, noted the peculiar faculty it has of softening in hot-water, and subsequent hardening in the shape then given; the idea of surgical splints was thus suggested to him. But it was not, according to some authorities, until 1848 when Prof. Faraday took the substance in hand that its higher destiny began to dawn upon the world, though it is claimed on behalf of Dr. Werner Siemens that he had suggested it as an insulating medium in 1846 to the Prussian Government. In any case it eventually proved to be precisely what was wanted, and curiously enough, though it is now approaching half a century since it began to be used, and the comparative scarcity and difficulty of supply has stimulated research in all directions for a substitute, it still remains master of the situation, since it only requires to be cleansed and purified to be available for the purpose in view. The gum is yielded by several trees of kindred species, but chiefly from *Isonandra Gutta*, now mainly met with in Borneo, though first recognised in Singapore. Like all native products found to be marketable in savage countries, the utmost improvidence prevailed in its collection, the trees being ruthlessly cut down and drained of their sap; and as it takes twenty-five years for a tree to attain a size capable of yielding an appreciable supply it is easy to see that even primeval forests, dotted only as they are with trees of the right description, are sure soon to be entirely depleted. In 1881 alone, the export justified the belief that no fewer than 5,000,000 trees were felled in Borneo, and as these are hewn down in the midst of younger ones without any consideration for the latter, it has been estimated that five times as many were destroyed.

Although few people can grasp the idea of the enormous number of trees which go to form wide-apread forests, the expert will gather from these figures that the waste is frightful, and would mean in time practical annihilation if it were permitted to continue. Fortunately, as in the case of the *Cinchona* trees which yield quinine, so soon as the value

of these native products is established, and a constant demand begins to threaten extermination, the botanist lends his aid, first, by determining exactly the species best fitted to yield the supply; secondly, by inducing its cultivation in other parts of the world which his study leads him to think are congenial. The practical collector, too, replaces the savage, and finds that a partial draught from time to time upon the tree's resources can well be borne, so that the "goose with the golden eggs" is kept alive, and becomes a perennial source of profit. The Dutch have introduced the gutta-percha plants at Buitenzorg, and the French into Cochin China; and thus, with a judicious check upon the extirpating native methods in the original forests of Borneo, Sumatra, and elsewhere, it is to be hoped that an adequate supply will be maintained and that we shall not find our transoceanic nervous system paralysed some day for the want of its proper integuments.—*Chas. T. Druery, F.L.S. V.M.H.*
—*Gardeners' Chronicle.*

RAISING ORANGE-TREES FROM PIPS.

Mr. W. H. Hand, of Mount Pleasant, Penrith, asks for information as to the best method of raising orange-trees from pips. His idea is to establish a little nursery in connection with his citrus orchard from which to supply young trees to replace those that die off from *mal di goma* or any other cause.

The Fruit Expert, Mr. W. J. Allen, says:—The pips for growing orange stocks should be taken from seedling oranges, as they make the best and most vigorous trees. The pips may be allowed to remain in the oranges until the warm weather in spring, when they are taken out and planted in a bed prepared as follows:—If the land is not a nice sandy loam, cart in several loads of sand and mix it with the soil, to which add, if procurable, one bag of well-rotted sheep manure to every bed 4 feet wide by 8 feet long. Great care should be taken to get the manure, soil, and sand thoroughly mixed.

Plant the pips about 3 inches apart to a depth of three-quarters of an inch, after which mulch the top of the beds with well-rotted, dry, fine manure scattered over the top to a depth of a quarter of an inch. This should be watered with a fine rose-pot every other day unless the weather be very dry and hot, when it should receive a good sprinkling every day. The beds should be protected from the sun by using frames raised from 12 to 18 inches above the bed, and covered with hessian or light brush fastened to the front, so that the beds are sheltered from the direct rays of the sun, which would possibly burn off the young plants as they show above ground. As the seedlings grow, the covers can gradually be discarded, until at length the plants are robust enough to require no further shelter. The latter part of September is a good time to plant the pips.—*Agricultural Gazette of New South Wales.*

PREPARING VIRGIN LAND FOR FRUIT-TREES.

A Correspondent at Lindfield, who is about to plant out a few trees for domestic use, asks:—

1. How deep has the virgin ground to be broken up?
2. How long before you plant should it be prepared?
3. What manure (if any) should be given to each tree?

The Fruit Expert, Mr. W. J. Allen, reports:—(1) Wherever it is possible, it is always best to break the ground to a depth of at least 15 inches—that is, loosening the subsoil, but not bringing it to the top. (2) It is always well to prepare the ground a few months before the planting season, so that it may have an opportunity of sweetening. This however, is not absolutely necessary, but is always advisable. When this

cannot be done, the desired result may be achieved by applying lime at the rate of 1 ton per acre. This dressing is essential for nearly all the land about Lindfield. The lime loosens and sweetens the soil, and the trees will thrive from the start. (3) If horse or sheep manure is obtainable, it would be well to give each tree about four shovelfuls of sheep, or double that quantity of horse, manure. This should be worked into the ground about a foot away from the young tree after it has been planted, but should not on any account be allowed to come into direct contact with the roots, otherwise it might kill the tree. The best plan, unless there are facilities for thoroughly watering the tree from time to time, would be to put any manure on the surface. The rain will wash the good of manure into the ground for the benefit of the tree, and the remainder will serve as a mulch. It will probably be necessary to have the area devoted to fruit-trees drained. If the sub-soil is sticky, and does not readily crumble when exposed to the air for a few days, draining will be essential.—*Agricultural Gazette of New South Wales.*

INDIA-RUBBER IN BOLIVIA.

(By Manuel Vicente Bolivian.)

The producing regions may be classified naturally according to the points from which the rubber is exported.

First Region.—Because of its importance, the region of acre occupies the first place, and in order to obtain the figures of total production shown in the general table for the republic (No. 1), we have been obliged to recur to private, but trustworthy, sources of information, such as Mr. Charles Satchell, ex-commissioner of national boundaries in the fixation of the boundary between our frontier and Brazil, in company with the chief of the Bolivian commission, Gen. Jose Manuel Pando. The quantity of 2,000 metric tons [4,409,200 pounds] annually is in complete accord with previous data communicated to us by the second of the gentlemen just named. A few days ago we read with much pleasure the report presented to the secretary general of the government, by our ex-minister in Brazil and ex-national delegate in Acre and Purus, Mr. Jose Paravicini, a document in which much information is given with reference to this important region. It is shown here that the population of this zone is practically 10,000; the number of *barracas** 100; and that the rate of taxation fixed on the export of India-rubber is 20 per cent. *ad valorem*, on an average price of 10,000 reis, or 5 bolivianos, on each kilogram. This being true, the revenue would amount to 2,000,000 bolivianos.† Owing to the rebellion in Acre, we are obliged to give, in the above-mentioned table, the tax prescribed by law, namely, 16 centavos and 12 centavos respectively, for fine gum and *sernamby* [coarse].

Acre is the official port for the exports of this region, which include a part of the rubber gathered on the upper Tahuamanu, and it is situated 4½ miles from the boundary line marked by the Bolivian-Brazilian commission. This line, however, has been disputed by engineer Cunha Gomez, but even if the present boundary should not prove exact, the one proposed by him is drawn at only 1,600 meters distant, so that this port remains in territory unquestionably Bolivian.

Second Region.—This is comprised in the zone watered by the rivers Madidi, Alto Beni, Bajo Beni, Orton, Manuripi, Tahuaman, and other lesser streams—all being rich in *seringales*. This

region includes the territory known as the national delegations of Madre de Dios, Acre, and Purus, excepting that part which finds a natural and more convenient outlet in the Acre river. The export port of the second zone is Villa Bella, at which is situated a national custom house. This town is situated on the high land at the confluence of the Beni and Mamore rivers. The production indicated in the general table has been furnished to us from the official documents of the custom house mentioned.

Third Region.—This zone comprises the forests which produce rubber in the department of La Paz, or, the cantons of Challana, Songo, Mapiri, Huanay, Goroico, and a part of the province of Campolican. The outlets for this region are Puerto Perez on Lake Titicaca, and Punto and Mollendo in Peru.

Fourth Region.—The fourth region is situated in the north and east of the department of Santa Cruz de la Sierra, formed by the province of Velasco, bordering on the Brazilian state of Mato Grosso. It is in this region that the rubber is gathered along the Paragua and Verde rivers, at the most remote points, and where labor is hardest to obtain, and this is the reason for the difference in duties imposed, they being 12 and 6 centavos, respectively for fine gum and *sernamby*.*

The province of Cochabamba possesses the rubber tree in the Yuracares region; and, judging from the important discoveries recently made there, followed by petitions for concessions of *estradas*, it is probable that this region will become no less in importance as a rubber region than La Paz, for the conditions of soil and climate are identical. With public peace assured, and legislation which consults the best conditions for fostering this industry, we do not doubt that Bolivia will become one of the principal regions for the production of this important article of commerce.

La Paz, November, 1899.

The rubber movement from Bolivia will be facilitated by another steamer which has been placed on Lake Titicaca, which serves as a channel of transportation between Bolivia and Peru. The new steamer "Coya," of 550 tons, was built at Dumbarton, Scotland, and transported to Mollendo, on the Pacific coast, whence it exported the grade of rubber known as "Mollendo." It was carried from the coast in twenty-two cars up the railway, along the steep slopes of the Andes, the lake side. Then it was put together, and the boilers and engines installed. The distance traversed by the steamer is 100 miles, the journey occupying about ten hours.

EXPORTS OF RUBBER FROM BOLIVIA IN 1898.

Customs.	Ser-			Total.
	Acre	Fine.	namby. Caucho.	
...kilos	2,000,000	...	...	2,000,000
Villa Bella ..	757,444	105,818	1,989	865,246
Puerto Perez...	256,542	...	...	256,542
Puerto Suarez	27,556	1,611	...	29,167
Total	3,041,542	107,424	1,989	3,150,955
Total value	\$ 13,223,967.00	\$ 326,944.12	\$ 6,053,000	\$ 13,556,964.12

[The values are given in Bolivian silver currency.]
(Continued on next page.)

* The Bureau of American Republics, under recent date, reported that the Bolivian export duties on India-rubber had been modified by a presidential decree. Henceforth an *ad valorem* duty of 8 per cent. will be charged on all rubber exported, except that from the Acre district, on which 15 per cent. will be charged. The former taxes of 10 and 16 centavos per kilogram, according to quality represented in 1896 an *ad valorem* duty of 7 per cent. on fine rubber and 6.57 per cent. on *sernamby*; or coarse.—THE EDITOR.

* Barraca is a kind of shanty erected for the shelter of the laborers.—TRANSLATOR.

† The *Boliviano*, divided into 100 centavos, on April 1st, 1900, was worth 43¢ cents, United States currency.—THE EDITOR.

EXPORTS FROM PUERTO PEREZ (VIA MOLLENDÓ)
SINCE 1893.

1893 ..	13,051 kilos	1896 ..	133,865 kilos
1894 ..	37,994 do	1897 ..	180,669 do
1895 ..	63,518 do	1898 ..	256,514 do
January-June, 1899 ..		113,504 kilos.	

—*India Rubber World*, August 1st.

CACAO CULTIVATION FOR INDIA.

To the Right Honourable the Secretary of State for India, Whitehall, dated Grass Mount, Forest Hill, S.E., 4th May, 1900.

"My Lord, I have the honour to submit for your Lordship's consideration the following remarks relative to the practicability of cultivating Cacao (*Theobroma Cacao*) in India under conditions peculiarly favourable for adoption in that country. Thus I venture to submit this proposal in view of the desire of the Government of India to develop the agricultural industries of that country. Your Lordship having recently stated in the House of Commons (*vide the Times*, April 4th) that the Government would do everything they could to try to vary and diversify the occupations of the Indian people."

From a report of mine on the Agricultural Products of Tolima, Colombia, issued as a Parliamentary paper by the Foreign Office, (1895) No. 379, I extract the following relative to this cultivation:—"In the South of Tolima, it is interesting to note, this cultivation is pursued on a considerable scale with great success, under the influence of irrigation. The region in question is characterised by prolonged droughts, and the application of irrigation has thus proved most advantageous. Cacao thus produced has become quite an important industry. Planters in British Colonies will be glad to learn that the plant is amenable to systematic irrigation, a condition that assures the extensive cultivation of the plant in comparatively dry regions, for excessively humid conditions of climate have been deemed indispensably requisite for the plant." Some plantations in Tolima are not irrigated, but those that are irrigated, far surpass in productiveness than the others.

The cacao planters of Tolima, who grow for and transport to Bogota and surrounding country thousands of mule loads of this article annually, have been forced by circumstances to adopt irrigation in consequence of the greatly reduced rainfall experienced during many years owing to the wholesale destruction of the forest in the district for the wide extension of pastoral husbandry. In this connection I again quote from my aforesaid Report:—"The thousands of square miles of natural pasturage on the plains and lower hills of Tolima assume during the rainy season the mossy beautiful verdure. But in the alternate season of drought the general aspect is that of a desert."

Besides being well acquainted with this culture in Tolima I have traversed hundreds of square miles of forest in another province of Colombia far distant from Tolima, throughout which I found cacao growing wild. In Colombia, under cultivation cacao flourishes from the hottest plains up to 4,000 feet above the level of the sea, hence its adaptability to a considerable range of latitude—*i.e.*, the great zone within the 25th parallels of latitude—this in the New World. Doubtless in the Old World the range would be somewhat more limited.

Plantations of cacao, in countries wherein it is largely cultivated in the ordinary way, are established under the shade of lofty trees which are planted in order to afford the requisite shade to screen the plantations from the scorching rays of the sun.

Cacao cultivation under the alternative method herein propounded, that is the irrigation method, is most beneficially influenced by this necessary

condition of shade, inasmuch as a considerable amount of moisture by evaporation from the humid earth is diffused amidst the trees consequent upon the double umbrageous canopy of foliage over the land. Large plantations are thus benefitted more than small ones. Thick belts of forest trees surrounding the plantations contribute to the desired condition of humidity, as well as protecting the cacao plants from the injurious effects of strong prevailing winds.

A communication read to the Agricultural and Horticultural Society of India in 1883 states: "There is another product to which attention might be directed with advantage, namely cacao. All attempts to raise the *Theobroma Cacao* in Bengal appear to have failed: the tree attains a certain age and then dies. But there are other parts of India where the climate might be found suitable to its production."

It may not be amiss to add in this connexion, by way of indicating the facility with which cacao plants are introduced to other countries, that I introduced in 1873, under instructions from the Governor of Jamaica, Sir John Peter Grant, all the best Trinidad varieties, having visited that island for the purpose to Jamaica, where they have flourished, and where their cultivation is now carried on on a large scale. I also introduced to Colombia some of these varieties both from Trinidad and Jamaica, and this too very successfully. Furthermore, during recent years, cacao has become an important product of Ceylon.—I have, etc., (Sgd.) ROBERT THOMSON.

A NEW METHOD OF EXTRACTING RUBBER.

(SPECIALLY TRANSLATED FOR "INDIAN GARDENING.")

In the issue of the *Revue des Cultures Coloniales*, dated 5th February, to hand by last mail, the editor writes:—"A new way of extracting caoutchouc destined to transform the methods of gathering, of cultivation and preparation, has been frequently talked of in the press of late. We have asked M. Godefroy-Lebeuf, the well known colonial horticulturist, who is associated with that discovery, to be kind enough to explain its origin and consequences. The following is the letter which he has addressed to us upon the subject:—

To Monsieur Milhe-Pouingon, Editor of the *Revue des Cultures Coloniales*.—You have asked me for information on the extraction of caoutchouc from bark. You have an absolute right to do so, for it is, thanks to you, that I have been able to obtain, through the intervention of M. Le Cesne, the first elements of our researches. I say "our" for as soon as I was in possession of samples, I communicated them to all who interested themselves in the question. At first I anticipated that the solution of the problem would be effected by the employment of chemical processes, and naturally I engaged my searchers in following that view. We were far from suspecting that the method of extraction was very much more simple than we had foreseen. By means of the distribution of samples a scrap of bark fell, by the help of M. Wehry, into the hands of M. M. A. and V., of the Museum. While these gentlemen were triturating the mass they found that the pounding eliminated easily a great proportion of impurities; they pushed their researches deeper, obtained a little mass of gum mixed with bark, ascertained that the gum gathered itself together, and that the particles of caoutchouc agglomerated they continued the mechanical action and obtained at last caoutchouc sensibly more fit for use than the average of the gums which we receive from Africa.

"These gentlemen wished to associate us in their discovery, and it is thus that the Arnaud Godefroy-Lebeuf, Verneuil and Whery patents were taken out.

"Our process is remarkable in the sense that it permits the extraction of caoutchouc from the smallest scraps of wood, twigs and bark which contain it.

"In spite of the rough instruments, which I use, whenever you wish it I engage to extract from plants of less than six months, nay of less than three months from sowing, an appreciable quantity of caoutchouc and appreciable to such a point that I ask myself if the annual culture of caoutchouc plants will not be industrially possible. The bark must have been dried as a necessary preliminary; with green or fresh material I could not affirm anything.

"Note that our processes are based upon the *Landolphia* and *Hancornias*, I believe without having experimented, that they may be applied to the *Ficus*, *Willoughbeia*, *Urecola*, *Parameria*, *Mascarenhasia*, *Cryptostegia*, and to all plants which contain fibres of caoutchouc in the dry state.

"And now, here is what we base our process upon. The caoutchouc coagulates in the tissues of the plants in proportion as they dry, in such a way that a parcel of bark and roots is nothing but a parcel of very impure caoutchouc. It is a question of eliminating the impurities.

"Take a scrap of bark of *Thol*, *Landolphia Hendeloti*, dry it. When dry, take a mortar and pound the bark for a minute. This done pass the whole through a fine sieve. You remove 10 per cent. of dust, rub in your hands the broken scrap, there will come out more dust. Repeat the operation five or six times and you will obtain a "malga" composed of fibres of caoutchouc mixed with particles of bark.

"When you have pounded it enough you place the 'malga' in hot water, boiling in the strictest sense, but only during a few minutes and you pass the whole through a sieve, which will allow the particles of bark to pass with the water so saturated with tannin that this product alone, perhaps, will pay the expenses of extraction.

"You again pound the little mass which remains in the sieve; the splashes resulting from the action of the pestle fix themselves on the sides of the mortar and may be removed by washing; after some operation you obtain a mass of caoutchouc still impure, but of which the impurities do not reach 10 per cent. of the weight of the gum. With a little patience one finishes by getting rid of all. In order to refine the gum we pass it between cylinders abundantly moistened and we obtain perfect caoutchouc. This is a laboratory experiment which I will make under the eyes of your readers if they ask it of me; the treatment by the ton per day necessitates apparatus which we shall see produced shortly.

"The *Landolphia Hendeloti* give easily 6, 7, 10, 15 per cent. of their weight dry (bark); I take but 7 per cent. as an average. In this way 10,000 kilos of bark would give 700 kilos of caoutchouc. I estimate the price of bark at 100 francs per ton on the spot, the expenses of extraction at 70 francs per 70 kilos; we obtain then 70 kilos for 170 francs. Our process is applicable everywhere, it requires but primitive appliances for small operations and if one does not wish to push the cleansing to the end.

"As for the mode of operating with creepers which grew again when cut, here is the experiment which I invite planters to make.

"Let them divide their concession into 10 equal lots, cut and treat by our process all the creepers which grow in lot No. 1 from the first year, and renew the operation in the following years in the other lots. They will thus have ten cuttings, which will give them such results that they will not hesitate to take care of their creepers and increase them.

"I engage to obtain in a single treatment of the richest creeper ten times more gum than could be obtained by tapping. Note that we do not only treat creepers which are fit for tapping, but the feeblest, since the plants of a few months give already an appreciable part of gum.

"When *Landolphia* is dealt with, the manipulation is hard enough, the fibrous bark not breaking without protest; but with *Hancornia speciosa*, it is easy. That bark does not contain more than 5 or 6 per cent. of caoutchouc; that at least, is what I have obtained by primitive process; but the bark is very friable reducing to powder almost instantly under the pestle. The gum disengages with very small effort.

"I cannot find a better comparison as regards the process than with the extraction of gold from quartz. Gold exists in all parts in the quartz as caoutchouc exists in the dry plant where it is coagulated. Break the quartz, break the bark, eliminate and separate the gold and the caoutchouc; there, in two words, is all the operation."—*Indian Gardening*.

PRODUCE AND PLANTING.

THE TEA TRADE OF RUSSIA.—Through the Foreign Office, the Board of Trade have received a copy of a despatch from the British Commercial Agent at St. Petersburg, in reference to tea. It states that the consumption of Ceylon teas is increasing in Russia. Much tea comes to Odessa, though mostly in transit to Moscow, where it pays duty. Some 7 500,000 funts (1 funt equals 14½ oz) of tea were cleared at Odessa last year, much more than in 1898, thus showing that Odessa is gradually becoming a big tea market at the expense of Moscow, which hitherto monopolised all the tea trade of Russia. Moscow, as the great tea distributing centre of Russia, is much concerned by present events in China. According to local papers, big tea firms are buying up all supplies possible. Large quantities of black tea are en route, partly by the Volunteer Fleet steamers, "Kherson" and "Yaroslav" the former from Colombo, the latter from Singapore. Private telegrams say the stocking of reserves at Hankow is impossible, as also the Kiakhta route while two companies decline insuring. Large stocks have been brought up, but without facilities as yet for shipment. The St Petersburg dealers, it is said, have met together to consider the advisability of raising prices for retail sale, and rumours say they are inviting the co-operation of Moscow firms. Hankow and Foochow, especially the former, are the chief markets for Russia's purchase of tea. Of 1,511,000 poods of Bohea imported into Russia in 1898 over 1,000,000 came via Odessa. The remainder, as also almost all brick and cake tea, for the preparation of which Russian firms have constructed special establishments at Hankow, Kiau-Chang, and Foochow, came overland via Irkutsk. 1,106,000 poods of brick tea and 34,200 of cake tea were imported by this route in 1898. The present disturbances affect the most important point of the tea transport routes to Russia. According to the *Commercial and Industrial Gazette* of St. Petersburg the amount of tea exported from China to Russia in 1899 was in piculs (1 picul equals 133 lb) as follows:

	Black.	Green.	Brick, &c.	Total
Via Odessa ..	189,751	5,698	—	195,449
Via Kiakhta ..	197,143	—	349,628	537,771
To Russian Manchuria ..	29,357	29,030	78,266	133,653

THE EFFECT OF CHEAP TEA.—Tea growers have considered that their lot, when compared with the distributor, is not exactly a happy one, and they have looked with envy upon the profits of the large tea dealing firms. But these latter have their ups and downs. At a recent meeting of the National Tea Union, which has not had a successful year, and consequently could not pay a dividend on its ordinary shares, Mr. A. J. Slaney, the managing director, in the course of his speech on the directors' report, said: "The last three years, including the one just closed to June 30th, have been trying years for the tea trade in particular. With the exception of a few concerns, whose efforts have been mainly directed towards the exploitation of their proprietary lines without the slightest thought or care for the interests of the retailer, I do not think many wholesale firms in our trade have done really well. That which affects us so much is the extraordinary craze for cheapness, and English ladies seem nearly all tarred with the same brush, delighting to hoast what beautiful tea they buy at 1s 2d, 1s 4d, and 1s 6d per lb retail. Well, with a sixpenny duty to come off, carriage, manipulation, packing, &c., the margin is very small indeed when a really good article is supplied,

The worst feature has been the increasing tendency of prices downwards, with just this plain fact that we have at times more work for a less turnover, with of course diminished margins becoming beautifully less, until in many cases they almost entirely disappear. The public are certainly getting the best of it, for neither the grocers' nor the wholesalers' profits on tea are what they were some years ago. Naturally we expect to do a shade better out of medium and fine goods, but with dwindling proportions of this kind the position becomes more difficult from a profit-making point of view. To show how fine our trade is cut I may state that a single eighth of a penny more per lb all round would go a long way towards paying a handsome dividend on our shares. As an example take the teas we are selling today at 1s, 1s 1d, and 1s 2d, duty and carriage paid. It often happens that there is barely a half-penny per pound between the cost at the docks, to which duty has to be added, and the price at which the stuff is sold duty and carriage paid to all parts. When you remember that rent, rates, wages, &c., have to be paid, and when a large and increasing proportion of the output is in stuff on which a gross margin of about $\frac{1}{2}$ d per lb. only is obtainable, with a decreasing proportion of such grades as might yield us a gross profit, say, of $\frac{3}{4}$ d to 1d per lb, you may realise why our margin for division today is so much smaller than hitherto."

VENEZUELAN COCOA.—The British Consul at Caracas states that as the prices of cocoa are at present very good it has caused agriculturists to continue extending their plantations, and it is thought that in a short time cocoa will take an equal place with coffee in importance as an article of export. A proof of this is that, notwithstanding the many drawbacks to agriculture, the amount of cocoa exported in 1899 showed an increase. —*Home & Colonial Mail*, August 17th.

THE TEA PLANTERS OF ASSAM AND THEIR AGRICULTURAL CHEMISTS:

THE GREAT QUESTION:—HOW TO MAKE TEA PAY!

The *Indian Planters' Gazette*, of August 18th, tells us that,—

Mr. H Mann, B.Sc., F.I.C., Agricultural Chemist, who has been appointed Scientific Officer for the tea districts, has made a short preliminary trip to Assam, Cachar, and Sylhet, in order to get some idea of the districts and of his line of work. He is now touring through Darjeeling, the Terai, and the Dooars. As the result of his visit to the tea districts in the Assam Valley, Mr. Mann has suggested to the Calcutta Committee that he should devote attention in the near future to an extended investigation of typical soils from each of the Assam districts, to a study of "Blister Blight," of "Thread Blight," and possibly also of "Red Rust," and to an attempt to discover methods for placing the so-called "fermentation" of a tea under better control.

The study of blights and of soils is of importance and of scientific interest, but what planters and all interested in non-paying gardens want to know is,—How can tea be made to pay? Why cannot tea of good quality be made the season through? It is an established fact that at certain periods teas of excellent quality are manufactured, which, do what we will, we cannot turn out at any other times during the season. Why is this? There must be some reason for this phenomenon. What we want to know is how to make good quality teas, the season through from start to finish. A knowledge of the life history, etc., of blights will not help us. A study of the chemical process of oxidation, or so-called fermentation, would lead to more valuable information in the direction indicated. If Mr. Mann will discover the reasons for our not uni-

formly obtaining the, so much to be desired and coveted, bright, new copper colour to our rolled leaf, he will indeed have performed a signal service to planters. We want to know to what this colour is due, and how we can always obtain it throughout the season. Tea with infused leaf of this colour is bound to be good. Why cannot we always obtain it? There must be reasons,—what are they?

REMOTENESS OF THE RUBBER COUNTRY.

Writing of a trip up the Amazon, by steamer, to Manaos, Frank Leslie Rockwood, in the *Lewiston (Me.) Journal*, mentions meeting another steamer which "had been away from Para for one year, up one of these unexplored rivers, and had not been heard from. There were rumors that the Indians had got her, but here she was, loaded with rubber, and full of wild, half naked passengers, just returning from a successful trip. They could tell experiences that would seem improbable in the present day, but this great Amazon river and its branches will not be explored for fifty years yet, as some fighting has to be done to see it all." It is not strange, in view of the assertions made by this correspondent, that the English shareholders in Amazon shipping lines do not get larger dividends. He mentions a profitable local trade along the river, all the profits of which are pocketed by the officers of the steamers, "who get rich out of it." It is such conditions as are here suggested that have the most important bearing upon making rubber an expensive commodity.—*The India Rubber World*, August 1st.

PLANTING NOTES.

A CAMPHOR TIP.—The *Evening News* is advising its readers who are putting away their clothes to buy what camphor they need at once, as events in the Far East are likely to lead to much higher prices. The information, however, is a trifle late, and is only another instance of where the *irresponsible adviser* shows his incorrect knowledge.

PROTECTING YOUNG TREES.—To protect young trees from ants and borers it is recommended to wrap the trunks with tarred paper. Dig away the earth so that the tarred paper may be put well below the surface. Fold the paper about the trunk and tie tightly round the middle and bottom. This prevents the entrance of insects to lay eggs under the bark. When the paper is in place put back the earth above it, and tie the top of the paper closely to the tree.—*Journal of the Jamaica Agricultural Society*.

THE VALUE OF NUTS.—It is said that the Nut trees of the world alone could, if necessity arose, provide food all the year round for a total population three times greater than the present. It has been pointed out to the Washington Department of Agriculture that Brazil Nuts around Para grow in such profusion that thousands of tons of them are wasted every year; with Coconuts it is the same in many centres.—*Journal of Horticulture*, August 16th.

COFFEE CROP SITUATION.—The Brazilians have furnished four crops from July 1, 1896, to June 3, 1900, averaging 9,200,000 bags, against the four previous crops, averaging 5,000,000 bags. Production for four years has so largely overtaken consumption and the visible and invisible supplies are so heavy everywhere that in order to obtain and secure higher values there must be something in the way of a crop failure, and it is by no means a question of eight or nine or to 10 million bags.—So say Messrs. W H CROSSMAN & BRO, of New York.

COST OF PLANTING RUBBER.

(To the Editor of the *India Rubber World*.)
 In your issue of July 1, under the heading of "An Experiment in Costa Rica," you state that "nowhere exist to our knowledge, data to justify any particular calculation of the cost of planting and bringing to a productive age rubber trees. It might be more or less than \$40 per acre." I will give you figures from actual experience. Planting trees fifteen feet apart each way or 196 to the acre, the cost of planting would be per acre:

	\$
Underbrushing land	2
Thinning out timber	4
Transplanting	2
Costs of plants from nursery	1
Total	9

To bring the trees to a productive age, viz. eight years old, all that will be required is to keep out the undergrowth. To this, I think, all who understand anything of the nature of the growth of rubber will agree. This cleaning will not be as much work as the first underbrushing, as the growth will not be as heavy at first. But, allowing it to cost the same as the first underbrushing, or \$2 per acre, there will be one cleaning the first year, six months after planting; and after that two cleanings a year for four years, then one cleaning per year for two years, a total of seven years, bringing the trees to their eighth year, when there will be a product of one to three pounds of rubber per tree, from which expenses can be paid.

The total cost cost of planting and bringing trees to production is, per acre:

	\$
Planting	2
First year, one cleaning	2
Second year, two cleanings	4
Third year, two cleanings	4
Fourth year, two cleanings	4
Fifth year, two cleanings	4
Sixth year, one cleaning	2
Seventh year, one cleaning	2
Total for planting and	20

bringing to production 31

My reason for cleaning but once the sixth and seventh years is, that the trees are so large that the light undergrowth will have no effect, if the cleaning is done once a year. Believing that this will be of value to you with reference to the cost of producing rubber, I remain, yours very truly,

ASSISTANT MANAGER, The Indiana Rubber Co.
 Goshen, Ind., 21st July, 1900.

ST. HELIER'S TEA COMPANY, LIMITED.

The eighth annual ordinary general meeting of the shareholders of the St. Helier's Tea Company, Limited, was held today in the office of Messrs. Bois Bros. & Company, agents and secretaries, when the following report by the directors was submitted:—

ACREAGE.	
250 acres in bearing.	
29 do planted in 1896.	
34 do do 1898.	
313 acres.	
114 do Jungle, &c.	
Total	427 acres.

The Directors have now the pleasure to submit their Eighth Annual Report to the 30th June last, which they trust will be considered fairly satisfactory by the Shareholders.

The crop, which was estimated at 95,000 lb. of made tea to the 30th June, has turned out 108,110 lb., but has realised an average price of 34.29 cents per lb. only, as against 38.69 last year.

The cost of the tea in Colombo, exclusive of the sum of R2,667.53 expended on Capital Account, works out at 24.65 cents per lb., as against 25.56 cents per lb. last season.

The balance at credit of Profit and Loss Account, after writing off the sum of R1,572.64 for depreciation of buildings and machinery, but including the sum of R705.42 brought forward from last year, amounts to R2,784.10; and out of this sum the Directors recommend that a final dividend of 5½ per cent be declared, absorbing R2,750.00, leaving the sum of R34.10 to be carried forward to next year.

Mr. W Sandys Thomas retires from the board by rotation, but being eligible offers himself for re-election.

The Shareholders will have to elect an Auditor for season 1900-01.

There were present: Messrs. W Sandys Thomas (Chairman), Stanley Bois, W Cross Buchanan, (by his attorney, W Sandys Thomas) Percy Bois, H C Buchanan, Miss S J Buchanan and Miss M A Buchanan, (by their attorney (Mr. Stanley Bois).

The report was adopted, and a final dividend of 5½ per cent declared, making eight per cent for the year.

Mr. Sandys Thomas was re-elected Director.

Mr. O T MacDonnott was re-elected Auditor.

A BISHOP ON DIGGING.—After distributing the prizes to the successful scholars of the Hampton Grammar School on Wednesday, the Bishop of London said he always thought it would be a good thing that every boy should have some definite manual work. He was not sure that digging would not be a good thing—digging hard for one hour. Our first parents had to perform that very primitive pursuit. It was one that had to be done in the primary tussle with Nature, in which, after all, we were engaged, and which civilisation had produced. Everyone ought to know what hard manual labour meant, and he should be glad to see its application take a place side by side with the more highly developed curriculum of which we were so proud.—*Journal of Horticulture*, August 16th.

SOUTH AMERICA when it comes to be systematically opened up by the great capitalists of the world, as will surely happen in this century,— says *Bradstreet's*—and the union of the fluvial systems of the Amazon and the Orinoco, will absorb the attention of the world's best colonists and engineers. A great empire is destined to grow up in that continent, and from the Andes down to the Atlantic and the Caribbean Sea will be witnessed the most tremendous activity. A rich soil, great grazing plains and gold mines of immense resources will be exploited by a new breed of men, the result of an intermingling of the hardiest emigrants from old Europe and North America. South America is a continent that will not be long neglected by the empire-makers of civilisation.

TEA *versus* COCONUTS IN CEYLON.

ERRONEOUS VIEWS CORRECTED; ROOM FOR EXTENSION OF PALM PLANTING.

A correspondent inquires whether we noted an editorial paragraph in the columns of our evening contemporary, a week or two ago, setting up Tea against Coconuts. We had marked the paragraph for comment, but the pressure of other important matters caused us to lose sight of it. After all, what the local "Times" says cannot mislead those who are interested in either product, or in both (as a growing number of planters are); for there is no antagonism between the two. The idea of rivalry in a bad sense is a creature of a disordered imagination—just as was some years ago the attempt to set up Ceylon Tea against Indian Tea, when, really, as British-grown Teas they had a common destiny, namely to oust the China product from its pre-eminence which they have so largely done—though it is equally a morbid imagination which would regard our commercial success as the true origin of the Boxer movement—a *casus belli*, in fact!

Tea and Coconuts are, without doubt, the most important products of the Island; and on them mainly, if not wholly, depends its prosperity. But European and Native alike grow both products, manufacture them, and deal in them; and the success of one in no wise depends on the failure of the other. Where our contemporary of the "Times" got the confused, if not wrong, idea that "some have gone so far as to hint that the various products of the coconut palm were as large in amount as the total value of estate produce," we cannot divine. We presume he means that his "men in buckram" had asserted, or implied, that the total *value* of all palm produce exported was equal to the value of the Tea sent out of the Island; for, of course, one cannot compare the *amount*, or quantity, of one with the value of the other, any more than one is justified in speaking of Coconuts as if they were not estate produce. We have certainly not come across any one who claims equality of value for Coconut and Tea *exports*; and yet our contemporary offers a comparison between the value of the *exports* only of the respective products! We have seen it stated, and we have asserted ourselves over and over again, that one great difference between the two products is this: that, whereas, practically, all the Tea we grow—save at most $1\frac{1}{2}$ per cent—is sent out of the Island and appears in the Export Tables,—only about *one half* of the produce of the Coconut palm (we doubt if so much,) is shipped beyond seas. Even then, however, we are not aware that it has been claimed that the total value of produce of the palm is equal to that of the tea produced in the Island. Apart from other considerations, the latter is valued as a manufactured article, while much of the former is sent away, and most of it is consumed locally, in a raw state. Whether the snuffing-out of Tea or the snuffing-out of Coconuts—may the Fates

forfend either blight!—would be the greater calamity to the country and the people, is an academic question which we see no advantage in discussing.

Can it be that our contemporary was thinking of what Governor Ridgeway said when he opened the Legislative Session of 1898, and recalled only a very hazy idea of the comparison then instituted between the chief Island products and the object of the comparison? His Excellency, whether rightly or wrongly, deprecated the pessimistic views then held by some about the position and prospects of Tea; he asserted his own confidence in it; and then compared the condition of trade in 1897 with that of 1877, to show that the Island was far more dependent on Coffee in 1877 than it is now on Tea. When Coffee was at its highest value, was the reasoning, it stood in the Export Tables at 81 per cent of the total value of our exports, while Coconut produce was then valued at less than 4 per cent. The value of Tea exported in 1897 was but 56 per cent; while the products of the Coconut palm had risen to $15\frac{1}{2}$ per cent; and in the interval the total trade had risen from 1,231 to 1,831 lakhs, of which exports represented 611 and 850 lakhs, respectively. The object of the comparison was not to magnify Coconuts at the expense of Tea, but to show that the Island is less dependent for its present and prospective prosperity on one product than, than it was in the days of Coffee—surely an undeniable fact, and a very desirable one at the same time, as it is not only in respect of "eggs" that the concentration of all one's hopes on one object is unwise. It may be mentioned that, although the exports of Tea have increased by 15 million lb. since 1897; yet, owing to the fall in price and the increase of other exports (Plumbago especially), Tea only counts in value for about 52 per cent of the total value of Exports (by the Customs) in 1899; Plumbago counting for 22 per cent; Coconut produce between 14 and 15 per cent; Cinnamon nearly 3; Cacao scarcely 2; Coffee not quite $1\frac{1}{2}$ per cent (what a falling-off for the old king!); Cardamoms and Cinchona together scarcely 1 per cent, and all the rest about 4 per cent.

One other point, however: the Customs valuation of produce is by no means conclusive. It is at best a rough-and-ready estimate; but Coconut products are at a disadvantage in last year's statistics. As we pointed out in a review of the Chamber of Commerce Export Tables soon after their publication in January, there was a falling-off in 1899, as compared with the previous year, in Oil, Copra and Nuts, which represented about 59 million Coconuts or a deficiency in value of about $1\frac{1}{2}$ million rupees. This was due to the two droughts of last year, which, indeed, told on the crops of this year, as well. But there is evidence of a recovery beginning now; and as we have no present apprehension of over-production in Palm products, we have no hesitation in saying that we welcome the extension and development of the Coconut Industry far more readily than that of Tea,

THE PHYSICAL PROPERTIES OF SOIL.*

The investigation of the physical properties of the soil, its so called mechanical analysis into particles of various grades of fineness, upon which depends to a large extent the amenability of the soil to cultivation and its power of supplying water to crops, has of late years received greater attention than the chemical methods of examining the soil. Whether too much was expected from the chemist, or whether the method itself was essentially at fault, certainly the old way of determining the gross proportion of the principal elements of plant nutrition—nitrogen, potash, phosphoric acid, lime—present in the soil, has often failed to yield information of practical value to the cultivator; hence the German investigators, led by Professor Orth, of Berlin, in analytical matters, and by Professor Wollny, of Vienna, as regards soil physics, have been more and more concentrating their attention on the physical side of the question. The example of the Germans has been followed and extended by the younger school of American investigators in the various agricultural experiment stations that are so liberally scattered over the United States, with the result that the experimental work carried out in the laboratory and in the field on this subject by Hilgard, Osborne, King, Whitney, and others, probably by this time exceeds in amount the whole of the continental work. In England, but little research of the kind has been done, hence the late Sibthorpean Professor has thought it well to prepare—first, for a lecture course at Oxford, and now in book form—a summary of the more important recent investigations, chiefly American, on the physics of the soil, with the view of inducing our younger agricultural teachers to pay a little more attention to questions of cultivation, and a little less to artificial manures. Professor Warrington's book cannot fail to be of service to the serious student of agriculture; it brings together a mass of information that was scattered through scientific periodicals of various dates and countries, whereas hitherto the only place where the English reader could find any general view of the subject was in that excellent little book *The Soil*, published by Professor King, of Wisconsin, in 1895.

Soil physics, with which the book before us deals is briefly the study of the laws of tilth, of the acts of husbandry as affecting the texture and water content of the soil; and as Professor Warrington maintains at the outset, this question of tillage and management of the land is of far greater practical importance than manuring. Every farmer or gardener is well aware that one mis-timed cultivation may easily ruin all chance of getting a satisfactory crop; indeed, on some soils a single ill-judged operation may throw the land into a bad state that can never be rectified during the whole rotation, until the land goes down to grass again.

The only question is, whether the soil physicist will be able to provide much more practical assistance to the cultivator than the chemist has in the past, and we think Professor Warrington rather exaggerates in its turn the value of a physical analysis of a soil; in the present state of our knowledge we doubt if more can be predicted from it than information of the most general kind, which any experienced man would gain by merely walking over and handling the land on one or two occasions.

Professor Warrington in this connection draws attention to some of Hilgard's examinations of Mississippi soils, and Whitney's of Maryland soils; mechanical analyses are given of land suitable for market garden work, Tobacco, Wheat, and grass, and of these he says: "With these differences in physical constitution, the agricultural value of soils, and their suitability for the growth of different crops plainly connected. We could hardly have a better illustration of the great influence of physical structure and

of the extent to which this can be revealed by the methods of mechanical analysis." The example given hardly bears out this opinion, the classification (market-garden land, Tobacco, Wheat, and grass-land) is of a very general kind; neither here, nor in any other American work, is there a correlation of the soil analyses with those subtle but real differences in the working of particular soils which the cultivator learns by experience; indeed, we question if the American farmer is sufficiently practised in the finer arts of tillage and management of land to supply the analyst with the information necessary for the interpretation of the experimental results. Such classification as soil analysis gives may be of service to the pioneer opening up new districts, or introducing more specialised crops in what has been a roughly cultivated region; but in a country like ours, where there exists a body of actual experience about the behaviour of almost every individual field, the soil physicist has still to learn from, and not to teach, the cultivator.

Our own experience would tend to show that the problems of soil-texture are too complex to be solved by a consideration alone of the sizes of soil particles. We have found, for example, that soil samples from almost contiguous fields on a well-marked tract of land that possessed special cultural characteristics, yet would vary by more than ten per cent. in their proportions of sand and clay, although there were no differences in the behaviour of the land to tally with these variations in mechanical composition.

The first chapter of Professor Warrington's book is devoted to a consideration of the methods of mechanical analysis. On the whole, he appears to give the preference to the process of grading the soil particles by means of water running at various speeds, which has been brought to the greatest refinement of Hilgard; and Schlessing's decantation method, which is practised in France and Belgium, is dismissed as crude. But, as Petermann has pointed out in his book on the Analyses of Belgian Soils,* the alkaline solution employed in Schlessing's method ensures that the material estimated as "clay" shall correspond very fairly in its chemical nature to pure clay, i.e., hydrated silicate of alumina, and with this our experience agrees; whereas the "clay" separated by the other methods is much more largely mixed with sand particles of excessive fineness. Of course, Hilgard's method is of great refinement in grading the particles of sand. It may be questioned, however, if this refinement is not something of a snare, tempting the observer to consider his work more accurate than is possible from the nature of the material; for our observations seem to show that in a country like England, of a markedly undulating surface, that has long been under cultivation, the mechanical composition of the soil varies enormously, even from field to field on the same type of land.

Chapters II. and III. deal with the relation of the soil to water, the movements of water within the soil as affected by cultural operations like ploughing, hoeing, mulching, and rolling—this is the part of the book that will particularly appeal to the gardener, for here he will find explained the principles that underlie much of his practice in the management of the land, and a proper appreciation of these principles cannot but quicken his observation when at work, and his powers of dealing with a novel situation. The discussion is plentifully illustrated by accounts of actual experiments, mostly carried out in America, and very skilfully devised to illuminate the point at issue; while, as he reads, the thoughtful gardener or farmer will be able to supply a running comment from his own experience.

The last chapter of the book deals with the movement of salts in the soil, with the composition of drainage waters, and the loss of plant food that thereby results, and particularly with the sterility arising from the accumulation of saline residues in

* Lectures on some of the Physical Properties of Soil. By Professor R. Warrington (Oxford, Clarendon Press, 1900.

* Recherches de Chimie, &c., Appliquées à l'Agriculture (Bruxelles), 1898.

or near the surface, when the percolation of rain-water through the soil is exceeded by evaporation at the surface. Under such conditions the soluble parts of the soil unused by plants, such as the sulphates of soda and magnesia and common salt, may accumulate to such an extent as to form a white incrustation on the surface that renders the land wholly or partially sterile; this occurs, for instance, in the white alkali soils of America, and again in other hot countries where irrigation is carelessly practised without under-drainage. The phenomenon on a small scale is not unknown to gardeners. Plants kept in pots for some time without a change of soil, and watered regularly with spring or well-water, gather up a hurtful excess of saline matter; and we have seen on a greenhouse Rose-border a characteristic saline efflorescence due to "white alkali" from the water used. The remedy is in all cases the same—to wash the salts out of the soil into the subsoil by increasing the amount of percolation through the soil. Professor Warington might have found an interesting illustration of the point in Sir Alfred Milner's book on Egypt, where he shows how the English irrigation engineers found many of the lands had been rendered sterile, because only the old irrigation canals bringing the Nile water to the fields were in use, while the canals at a lower level, which should have returned to the Nile the water that had percolated through the soil, had been allowed to decay. When, however, the drainage canals were restored, and the lands well drowned to wash out the saline matter that had accumulated by evaporation, the fertility returned.

In conclusion, we have to thank Professor Warington for a very instructive book on a little-known subject, that cannot but be fruitful both of thought and of suggestion to the agricultural teachers to whom it is commended, and also to the gardener and farmer. We cannot, however, help wishing that the book were something else—it is after all a compilation that might have been drawn up by another man. What the younger generation of agricultural investigators and teachers would have accepted from the Sibthorpean Professor with even fuller gratitude, would have been a little more criticism and suggestion of fruitful lines of research. The energy of the American researchers in accumulating results is not always tempered by wisdom, sometimes the wood cannot be seen for the trees, and instead of a wholesale commendation of their work, we should have preferred an ampler measure of the judgment and long experience of Professor Warington himself. A. D. H.—*The Gardeners' Chronicle*.

MANURES:

*Being a Lecture delivered by Mr. A. P. Hanson,
(Agricultural Teacher, Jamaica.)*

If there be a subject the study of which the Agriculturist can neglect without doing material harm to himself, it is not the study of manures. In an island like ours whose wealth is only in the soil, and whose population is rapidly increasing, the prudent man looks forward to the time when there will be little or no maiden land to be cultivated, and the success of the Agriculturist will depend entirely upon his skill to accumulate and apply manure. Even now our small land owners are crying out. After one or two years' cultivation of a plot of ground they abandon this latter, which with careful tillage and the application of manure, would yield far more than the badly tilled, so called "strong land," and save the planter the money paid as rent. Only to say this, however, will not bring about the desired effect upon our people. They want to know how to come in possession of manure, but this is not far to seek. The scientist if asked, will tell us of special manures such as sulphate of ammonia, nitrate of soda, &c., but they are far beyond the reach of the ordinary

planter, nor does he need be anxious about them, for he has always immediately around him many things that can be turned to valuable fertilizers if only properly treated. Let us look for example, at nature's method, which is always exemplary. Here is a luxurious growth of trees and shrubs. Unlike our cultivated plant, these remain on the same plot of ground for years in succession, and, instead of diminishing, acquire increased vigour and luxuriance every season. They never cry out as our cultivated plants seem to do that the soil is poor. The reason for this can be easily explained. Instead of being removed to some remote place, the leaves, flowers, fruits, &c., of the plants of natural growth fall back upon the soil, decay, and return to it the elements of which it was robbed. In this way the fertility of the soil is constantly kept up. On the contrary, when we cultivate our plants we reap not only the crops, but the leaves, stems, and sometimes even the roots of the cultivated plants, in this way the soil is year after year robbed of its fertilizing elements, and in course of time must become impoverished. The planter should remove from the field nothing but what he requires for home consumption or the market. He should plough into the soil all the leaves, stems, and roots of the plants cultivated, and of the weeds that grow. Besides these latter if permitted to remain will deprive the cultivated plants of their food. If seeds are permitted to seed in the field, this will cause increased labour. If these points are carefully attended to, such a course of procedure will give longevity to the producing power of the soil. In addition to these, we have numerous other substances that can be most effectively employed as manures. Every planter should always be making a compost heap upon and into which he should cast sweepings from the house, the kitchen, and the yard; also hair, blood and bones of the animals that might be killed, rags, the litter from the stable, the goat-pen, the sty, the rabbit-pen, the fowl-house, night soil, dead fowls, and all things that will decay. It is by dint of such carefulness that we can always be in possession of manure to a greater or less degree, manure cheaply got, but of great value. Another instance that comes within the reach of every one, and which claims special attention as a fertilizer is wood ash. Ashes may be collected in large quantities in every home. It contains potash which is required by every plant, and enjoyed by all as a luxury. Therefore, waste not the ashes, but give it to the plants. The common salt also is a valuable fertilizer. But it may be said that they cannot afford to use this as a fertilizer. The elements in it which makes it valuable as such are soda and chloriue. Well, both these are to be found in the ashes above spoken of. It will do well, however, to pour sea water into the holes dug for the purpose before planting the coconut or sugar cane. In respect to the application of manure to the soil, it must be understood that the parts of the manure used up by the plants must assume a liquid form. The plants cannot take solid bits of food as we do, and water is a great influence in dissolving the plant food. When we put sugar in a glass and pour water upon it the sugar seemingly disappears, and the only evidence of its presence are the colour and taste of the water. When we drink this coloured water we drink in the sugar too. This is similar to what goes on among plants. Water is necessary to enable them to take up and assimilate food. I scarce need state also that the plants send out their roots in search of food below the surface of the ground, and that before the water can penetrate the earth to bring about the desired result the soil must be properly tilled. Tilled as a rule to the depth of about eighteen inches, unless the soil before reaching that depth be of such a nature that it will yield no support to the plants. When this ploughing has been accomplished lay over the soil the manure collected, and bestow a kind of secondary tillage so as to ensure the manure getting mixed with the soil. When there are plants such as bananas, already in the field, the manure need not

be heaped up around the stem of the plant, as the trunk is entirely unable to absorb the manure from without. One way by means of which we can make the most of the good work wrought upon the soil by manure is by not putting in the same kind of plant every year. All men do not like the same kind of food—all plants do not take up the same kind of plant-food from the soil. If some do, it is done in a varied extent. Again, some are deep feeders and gather up the food from the lower layers of the soil called the sub soil. Others draw from the upper layers called the surface soil, and are called surface feeders. These facts must lead us to see that certain elements in the soil may be left untouched by certain plants. We therefore see the necessity for what is called rotation crops. For example, if you plant yams on a certain plot of ground this year, do not plant your yams on that plot next year, but vary by planting corn, say, next year; then in the third year plant sweet potatoes, and in the fourth year plant peas. Return to yams the following year and retrace your steps, under favourable circumstances you are certain to have very satisfactory results. When you have done these things, leave your fields to nature, and she will do the rest—*Journal of the Jamaica Agricultural Society.*

ARROW-ROOT CULTIVATION.

The cultivation of Arrow-root is, by no means such a difficult thing as may be imagined. It is grown much like the common potato and, after it has once been put into the ground, is in need of no special care: like potatoes it should be sown on soil composed of a due admixture of sand and loam. It will grow well on land where the surface soil is open, sandy and light and not moist at all, although it will thrive better on moist land, the tubers yielding, however, a less quantity of flour, than when they have been raised on dry ground. Whether roots or tubers, or whether shoots be used, the great thing is to select light open soil, and to break it up thoroughly before planting the shoots or laying down the roots or tubers, so that the new root or tuber may be allowed free and unchecked scope for the fullest development. The earth should then be made up into beds and the shoots or roots or tubers, two in each hole, should be put down at intervals of 12 to 18 inches apart, when they are covered over with leaves to prevent the earth from drying up—these leaves, when decayed, serving as manure and hindering the growth of weeds. Unless in a great fallure or rain, the land sown does not need watering. The sowing should be made in the rainy season, or not later than October or even November. In proportion to the depth to which the ground is dug up and the soil is stirred the tubers become large. No further care is then needed beyond frequent weeding and keeping the roots clean and sweet. Though the crop does not specially call for manuring, it will derive some benefit from a dressing of rotten old dung and leaf mould. The soil is not to be disturbed after the planting till the tubers are fit to be dug up, that is some eight to ten months after. It should be borne in mind that the cultivation slightly varies, when tubers or roots are used. In this case, the roots or tubers are sown on a separate piece of ground, and when the shoots come out they are to be transplanted to the beds specially prepared, and set down at the distances indicated above. Care should be taken to water the roots or tubers till the shoots come out, and to protect them from too much exposure to the heat of the sun. As the plant grows, the roots of each should be earthed up so as to allow of their fuller and freer development. In order to secure tubers of large size and in greater quantities, the flowers should be cut off just as they appear on the plant. When about six months old, the stems and the leaves of the plants not allowed to flower, will be strong and green; while plants that have flowered become yellow and show signs of decay.

It has been found that plants which had been stripped of flowers produced, on an equal space of ground, about thrice the weight of large tubers as compared with the plants that had flowered, which yielded a small number of middling sized tubers with a great number of smaller size.

As to the simplest process for converting the arrow-root into the finest flour, the roots should first be stripped of the scaly leaves by washing them in water. When sufficiently clean they should be reduced to powder by the use of graters or, more easily still, by pounding them in a mortar. Sufficient water should be poured over the powder to convert it into a liquid; and after this liquid has been thoroughly stirred up, it should be filtered through a rough cloth, in which the threads are set apart, into another vessel which should be kept unshaken till the powder settles down at the bottom. The stale water should then be poured out and the powder should be stirred up again with fresh water and passed through the process of filtration through a finer cloth. The washing and filtering should be repeated till the water comes out perfectly free from the slightest tinge of any color. When the powder is finally settled, the water should be thrown away, and the sediment dried in the sun on clean white paper.

While drying, the powder should be constantly broken up to prevent it from forming into lumps and to reduce it to a state of perfect fineness.—*Planter.*

GROWING SWEET POTATOES.

A Virginian farmer, in the *American Agriculturist*, gives the following advice on growing sweet potatoes:—To begin with, soil free from stone seems essential, and a clay loam the best. The field is well ploughed and the soil turned up in high ridges, far enough apart to be worked by a one-horse cultivator. I leave the field for a couple of days or so, for the soil to become warm and well dried out.

Perhaps you buy the plants. I make a square of boards, a foot and a half to two feet deep, in a sunny place, and fill with mast (dried pine needles, tea-tree leaves or forest oak needles would serve the same purpose), slightly mixed with dry clay loam, for a depth sufficient for the seed potatoes to be placed on end. I placed them close together and over all put a covering of mast. If mast is unobtainable, a lot of finely cut straw will do, being careful that it is not put on too thickly. The sun is allowed to shine in a while, then towards night a muslin cover is put on. This is wholly or partly removed at times, but must remain on over night.

The potatoes are given an occasional light sprinkling, unless native uses her watering pot on them.

It will not be long before crisps, tender, green leaves will peep through the mast, which must lie thin and light. When sprouts are from 5 to 8 inches long, one can readily pull them, one at a time, by hand through the mast, pulling only such as are of proper length for planting from day to day.

When ready to plant, a quantity of the sprouts are supposed to be large enough two or three days after the ridging. One person begins at the end of the row, and with a gardener's trowel quickly makes little openings 18 inches apart on top of the ridge. He does this in an even manner, and another follows with bucket or apron full of the slips and drops one, stem end down, in each little hole. Next the one who used the trowel comes along with a bucket of tempered water, and a small dipper, and puts a small quantity of water in each hole with the plant, while the man who dropped the slips follows closely behind, and with one quick movement of both hands firms down the soil around each slip. It has been quick work, and the rows look even and handsome. The dipper of water keeps the slip fresh until it starts its rootlets. One may look over a large patch and scarcely see a lost plant. During the season, the cultivator goes through twice. Weeds are not very prolific then, and the plants got ahead rapidly.—*Agricultural Gazette.*

THE MARTYRDOM OF GARDENING.

Much has been written of the pleasures associated with the pursuit of gardening; but its penalties have been almost entirely ignored. Nothing can damp the enthusiasm of its advocates; there is no sorrow associated therewith that their remembrance can recall. It was Socrates, we think, who wrote of double blessedness: "If you marry, you will repent it; and if you do not, you will repent it;" and the same advice may be given to those about to enter earnestly upon the horticultural life. It is a great responsibility to have charge of a large and (potentially) beautiful garden, which has many visitors during the season of flowers and fruit; who, though they may not be too critical in your immediate presence, may yet be very emphatically so, when, disappointed with what they came to contemplate, they have retired from your view. They came, perhaps, with great expectations, for whose existence you were partly responsible, and which, saddening to relate, have not been fulfilled. But they do not consider that you are hardly to blame for the "washed-out" condition of your earthly paradise in a season such as this. Nature, like that memorable creation of Dickens, viz., Captain Cuttle's landlady, Mrs. McStinger, has her great washing-days, somewhat trying to her constitution; and her subjects, like the humble captain, have to suffer the consequences. After a visitation such as we have recently experienced of the annual "Lammis floods," accompanied, in all probability, by fierce south-easterly winds, you go into your garden of an early autumn morning, and you find that your Roses, in a literal as well as a metaphorical sense, have "gone to the wall." Many of your finest climbers, suddenly succumbing to the pressure of the storm, and the weight and violence of the rain, have been blown to the ground. The entire blooms of your garden, Roses, Lilies, Sweet Peas, Violas, Irises, Delphiniums, Gladioli, and Carnations, have been utterly destroyed; and nothing remains to their fond cultivator, whose gaze only yesterday was riveted by their beauty, but to remove them from the parent plants as speedily and effectively as lies within his power. Even this, as most of us know from experience, is a serious operation, or at least a very tedious and irritating one; making immense demands upon the divine faculty of patience, while at the same time it makes havoc of the fair element of hope. But Hope, as the optimistic poet has sung, "springs eternal in the human breast;" and though a thousand magnificent flowers have been swept to desolation on the wings of the shower-laden, remorseless blasts, as many buds, full of embryonic life and potential loveliness, remain. But what of that, if these are destined by Nature to endure a similarly crucial experience, as soon as they have spread their silken petals to the air, and dedicated their beauty to the sun?

To preserve a garden in all its possible integrity and symmetry, under such atmospheric conditions as we have endeavoured to describe, is a perfect impossibility; in many instances you feel almost paralysed by the sad destruction of your treasures which the elements have wrought. Nature, so long your sympathetic friend, and gentle inspirer, is now your enemy; in her amiable moments, she had looked like the innocent flowers she was preparing to destroy; but the serpent of deceit was lurking invisibly there. The great Wordsworth, indeed, has asserted of Nature (in all probability when he was experiencing on a calm evening her benignant influence during his famous visit to the regions of Tintern Abbey), that "she never did betray the heart that loved her"; and there can be no question that she usually, though not always, gives warning before she strikes. But what of all this, when she strikes so very hard? Her fairest creations of the gardens, and of the fields; the golden corn that is ruthlessly swept by her autumnal floods, and levelled to the ground; her loftiest trees, which are prematurely divested of their large and lustrous leaves; the fair fruits that

are severed, unripened, from the pendulous boughs; the flowers that too early anticipate their decay; receive for the most part no mercy from Nature when she is suddenly seized with such impetuous moods.

But even Nature, with all her unconscious cruelty, can repent; though often for the horticulturist her repentance comes too late. And then we experience the full significance of those Aruoldian words—

'Sad Patience, too near neighbour to Despair!'—*Gardeners' Chronicle.*

RAISING TOMATO PLANTS.

In an answer to a correspondent who desires information how to raise 100,000 tomato plants for a canning factory, the *American Agriculturist* says: "If planted in rows 5 feet apart and 3 feet in the rows, which is about the proper distance, it will require about 3,000 plants per acre. One ounce of tomato seed contains from 8,000 to 11,000 seeds, but of course it is not safe to count upon the growing of every seed, and producing a good, healthy plant. Truck farmers generally sow about $\frac{1}{4}$ lb. of seed per acre to be planted. For early fruiting it is necessary to sow the seed in hotbeds or greenhouses and transplant the young plants from time to time as they become too crowded. But as for canning purposes extreme earliness is not of prime importance, the seed may be sown in the open ground in a warm and sheltered border where the young plants may be covered with hay or some other light material in case of late frosts. Some large growers have been quite successful with planting the seeds direct in the field, but this is only practicable on light and warm soil."—*Agricultural Gazette.*

HORTICULTURAL TEACHING IN GERMANY.—HEER L. Wittmack, in a paper contributed by him to the *Official Catalogue of the German Section of the Paris Exhibition*, mentions the measures taken in Germany with regard to horticultural training. The science, he says, is highly developed. The most advanced teaching emanates from three institutions: the Royal School of Horticulture at Wildpark, near Potsdam, established for seventy-five years, and shortly to be transferred to Dahlem, near Berlin, in the vicinity of the new Botanic Garden; the Royal Institute of Pomology at Proskau, near Oppeln (Silesia); and the Royal School of Pomology and Viticulture at Geisenhemsur-le-Rhin. The kingdom of Wurtemberg has, since 1860, possessed a private institution, the Pomological Institute of Reuthingen; and Saxony, since 1892, has maintained a School of Advanced Horticulture in Dresden. At Koestritz is an establishment for general instruction. Elementary schools of gardening are sometimes in connection with, sometimes independent of, higher-grade schools; they are maintained by different confederate states, or by the governments of the provinces. Prussia includes twenty-three, Bavaria five, Saxony two, Wurtemberg four, the Grand Duchy of Baden, Saxe Weimar, and the Grand Duchy of Hesse, each one. In all these establishments instruction is given in the culture and utilisation of fruits and vegetables, &c.; moreover, instructors continue this course of training in different towns. In certain cities, such as Berlin and Leipzig, are schools of gardening for young men, who do practical work in the day; in other cases, again, in Berlin for instance, there are gardeners who themselves make arrangements for obtaining courses of instruction; often apprentices and youths attend the popular courses for the adults. In some localities they teach gardening and the cultivation of fruit-trees to children in the gardens attached to their schools.—*Gardeners' Chronicle.*

TROPICAL PLANTS IN QUEENSLAND.

ANNUAL REPORT FOR THE STATE NURSERY, KAMERUNGA.

SIR,—I have the honour to submit the Annual Report for the year ending 30th June, 1899.

SUGAR-CANE.—During March I noted that some insect appeared to be attacking and damaging the cane in two out of the three fields under this product. I at once reported the matter and sent specimens to the Department, and Mr. Tyron proclaimed them to be the cane-borer. Upon this the instructions of the Department were prompt to destroy the two fields of cane in which it had been found, and to search the other fields carefully. The two fields of cane, therefore, have been destroyed, but hitherto no borer has been observed in the third field, though a sharp watch is being kept.

CITRUS FAMILY.—Fruit fly seems to be especially bad this year, and allows no fruit of the orange or lemon trees to ripen; a few only of the rough-coated lemon have escaped. Bark-splitting is bad among the citrus trees, and the scale *Lecanium longum* is to be found on some of the orange-trees.

BANANAS.—The exports from the district remain good, though fruit fly and a species of rust are giving trouble in the vicinity of the Baron River. A supply of good Cavendish banana suckers, free from disease, will be kept for distribution. The new Guinea varieties have, I understand, been lately transplanted, together with the *Musa textilis*, to a new piece of ground. They have not borne yet this year.

COCOA.—*Theobroma cacao.*—One of the old trees bore three pods early in the year, from which seed was obtained. There being no demand for seed just then, these were raised in the bush-house, where no difficulty was experienced in germinating them. There should be a fair supply of seed this coming season, the heavy rains having been all in favour of the cocoa-trees.

The effect of an attempt at pruning these trees, some time back, has been apparently to stunt their growth. Pruning is not generally resorted to, and considerably more moisture in the soil and humus is necessary for a satisfactory growth than is to be had in the present locality of the cocoa-trees in the Nursery.

MANGOSTEEN.—Two trees in the bush-house have attained a height of 5 feet and 4 feet respectively, while those in the open vary from 18 inches to 2 feet. This is a slow-growing tree, but thrives best under much the same conditions as cocoa, needing a heavy moist soil rather than a light dry one. The fruit, if it can be successfully grown, will probably prove both popular and profitable. Its flavour and delicacy are unsurpassed, and the fruit, having a thick rind or skin, will travel well in cases or even sacks for journeys of a week or so.

PEPPER.—*Piper nigrum.*—Pepper in its natural state grows on the stems of large and rough-barked trees in dense scrub land. It would probably grow readily in scrub lands in this vicinity, but it must have shade. The pepper in this Nursery being out in the open, and having only a small stick some 5 feet high to cling to, is not growing under sufficiently suitable conditions for satisfactory results to be expected. The plants seem to take to the soil and climatic conditions readily, however, and the growth seems as strong and healthy as could be expected. Planted under more favourable conditions, its culture would probably prove very successful.

CLOVES AND NUTMEGS.—The soil in this Nursery is not suitable for these spices. Better and more satisfactory results might be obtained by growing these trees on the borders of unfelled scrub, where a certain amount of shade, humus, and leaf-mould would be obtained. Such districts as the Lower Russell, Daintree, and Bloomfield would appear to more nearly approach the conditions of their natural habitat.

VANILLA.—This orchid seems to grow readily in this district. I have met with it in several places other than these gardens. The bean is particularly valuable when properly cured, though it is easy to spoil its value by improper methods of drying and sweating. I have not seen any vines in bearing yet; those in the Nursery are suffering from the attack of the green arboreal ants which eat away the stem close to the ground. The plant does not necessarily die when the stem is served, but derives its nourishment from the small short roots it puts out into the bark of the trees it grows on. It will, however, endeavour to get new roots into the ground, and will send down long succulent shoots, which would form new connections with the soil if not in their turn attacked by the ants. While putting all its energy into forming root, however, it is natural that it will not bear to the same extent as a healthy plant, and possibly will not bear at all.

Probably artificial fertilization will have to be resorted to, and unless the question has already been gone into, there will be room for some interesting entomological experiments.

The *Piurera* or Pagoda tree-shade for the vanilla orchids in the nursery is insufficient, especially just now, when it is shedding its leaves. The trees are not tall enough or of large enough girth to give sufficient support, nor do they deposit sufficient leaf to form mulch that can retain the moisture. Some of the vanilla plants are already very near to the tops of the trees they have been set to grow upon. The bark of this shade-tree, moreover, does not give sufficient hold for the vanilla, but gives way here and there, allowing the orchid to hang in festoons, to its own detriment.

DIVI DIVI (*Casalpinia coriaria*).—These trees are growing well and bearing heavily. The crop is now beginning to come in. Cultivation is reduced to a minimum with this, and judging by the quantity of pods on each tree, it should prove a paying crop. Its bulk will, however, be its disadvantage, and will be a serious expense if any great amount of transport is necessary.

COFFEE (*C. arabica* and *C. liberica*).—The field of coffee that had been planted here, and was, I am given to understand, some three years or more old, was rooted out by the late overseer. The few trees that have been left along the roadside are poor specimens, being neither of a good class, nor in any way cultivated, pruned, handled, or topped. The few berries on the trees are small, and quite unfit for seed. The plants in the bush-house are of a mixed variety, and are one and all too old and stunted to make good plants for distribution. I have had to refuse applicants for both plants and seed—a state of affairs that I hope may be remedied by next planting season.

As I am dealing with this subject separately in another place I will say no more on coffee culture here.

CEARA RUBBER (*Manihot Glaziovii*).—This tree has taken to the district and soil. In the nursery it has been become almost a weed. The large trees that are bearing seed scatter it about and it germinates readily, even in the middle of footpaths if left long enough. Section III., field 1, has been planted up with several hundreds of these trees about 6 feet apart, as well as a portion of field 3 of section III., and in a few years, when these trees are large enough to be tapped, they should prove a fair test of its economic value. There are any number of plants and cuttings available for distribution.

PARA RUBBER (*Hevea brasiliensis*) is not doing so well as the Ceara. It appears to be considerably more delicate and to suffer during dry weather and hot winds. The plants are hardly big enough or old enough to judge of its possibilities yet.

ASSAM RUBBER (*Ficus elastica*).—This thrives well here and is a most handsome plant. It will, however, be a very long time before there is sufficient stem to tap.

FIBRE PLANTS.—*Agave rigida* grows well and is to be had here in quantity. Nearly all of the old plants are now flowering. *Musa textilis* has taken to its new quarters and is making new suckers rapidly. Ramié needs much more rain and moisture than it gets in this nursery. It is small and stunted. I have seen it grow luxuriantly in swampy ground. *Fouquieria gigantea*: the mother plants have flowered and are dying away, giving place to innumerable young seedlings.

PALMS.—These useful trees seem to grow well in this district. There are many handsome varieties in the gardens. *Phoenix rupicola* looks well and germinates from seed readily, but is difficult to transplant if allowed to grow too long in the seed-beds. *Elæis guineensis* seed has been germinated after repeated failures. The palm is prolific and plenty of seed is available. I hope to be able to germinate in quantity and have plants for distribution soon.

TESONTE (*Euchlena luxurians*).—The few plants grown here have not been very successful. Most of the seed seems to have been taken by cockatoos, which are troublesome. There being only enough seed for replanting, none has been available for distribution.

KAFIR CORN (*Sorghum*).—This useful grain, known as "white cholom" in India, does not seem to have been raised during the past year. It is useful as food for man and beast, and supplies abundant fodder. It is broken or crushed, or boiled, and used as a substitute for rice. Is fattening food for cattle and horses in this state. There are several varieties, of which this is one of the best though small. It produces a large quantity of stalk and leaf, which is popular fodder for draught cattle in the East Indies.

PAWPAP.—The continued heavy rains in March had disastrous effects on our Pawpaw trees, killing many off by rotting the roots. Some would have recovered had not the wind blown them down before new roots could be made. Several good trees were lost, including the branching variety. There are several varieties not in the Nursery, however. Three distinct varieties are known in Southern India, besides a Chinese variety, apart from the branching variety here. The Singapore Pawpaw is not especially large, but turns a golden yellow when ripe, and has a fine flavour. The Chinese is a long pointed fruit, and is a dark green colour when ripe. This would probably travel better than most. The male tree is not a necessity in a garden, though there is nothing lost by retaining one should a number come up from the seed. The *Papaya carica* may be dioecious, monoecious, and even hermaphrodite. I hope to be able to deal with this interesting fruit tree later on by itself.

JACK FRUIT (*Artocarpus intergrifolia*).—The only tree of this useful fruit in the Nursery shows signs of a past crop, but none of a further crop this year. The tree is rather slow-growing, but the timber is hard and good. It is of a dark yellow, and is useful in making furniture. The tree is prolific. I have had over seventy fruit on one tree, averaging 35 to 40 lb. each, some fruit being 65 to 70 lb. each. The fruit has a strong but not unpleasant smell, though many object to it. Once the taste is acquired, the fruit becomes very popular. The seeds make an excellent vegetable, and are a good substitute for potatoes when boiled. When dried and ground the seeds or nuts give a wholesome meal. The nuts roasted are not unlike English chestnuts. The fruit, seeds, pulp, skin, and all except the rough outer covering are readily eaten by cattle, and pigs are specially fond of them and fatten on them.

Of the plants and seeds received during the year a few rooted cuttings of *Piper methysticum* are still in the bush-house. Before planting out I would await the result of my suggestion to open up a piece of new scrub land in which plants of this nature may be experimented with under conditions more readily approaching their natural habit.

Many of the plants subsequently mentioned in the list as being received would appear to have succumbed, as no trace of them can be found.

PARA RUBBER.—Of the 260 plants received some sixty odd have been planted out in the Nursery, and a few distributed. A good many seem to have died out.

CANDLE TREE.—The seed sent up has germinated freely, and there is any quantity of seedlings available for distribution.

DURIAN (*Durio zibethinus*).—All the seed of this tree have failed to germinate. This is possibly owing to the seed having either dried in transit, or to being kept too moist in the seed-bed. The seed is somewhat difficult to germinate, and should be planted as soon as possible from the ripe fruit. I trust some more will be obtained shortly for experimental purposes.

CEARA RUBBER is germinating freely, but the African rubber (*Kickxia africana*) is not as yet showing any signs of germination.

IMPROVEMENTS.—Nothing of the nature of permanent improvement has been carried out this year. Ordinary wear and tear has had to be remedied, and small repairs were necessary to the dwelling-house and bathroom, after the departure of the late occupants. These have been effected, and the house has been repainted. The office and outbuildings, that also need painting, are now being done.

The advisability of purchasing, for the use of the labourers employed, the humpy that was erected in the adjoining paddock by one of the labourers at his own expense is under consideration.

PUMP, BOILER, AND MACHINERY.—As the late overseer remarked in his last report, it was found necessary to thoroughly overhaul this plant. The floods in March had done some damage by washing away the corrugated iron shed over the pump, and breaking off the foot-valve of the suction-pipe and washing it down stream. The boiler had not been tested or examined, apparently for five years or so. This was done, and the shed replaced by a smaller and more substantial one. The foot-valve is presumably buried under some of the new sandbank in the bed of the river. A thorough search having failed to discover it, it was replaced.

The pump itself had to have new packing supplied for the pistons, and this has been fitted up, and now works well, but the injector mechanism on the boiler is now found to be worn, and not working properly. As the pump was not working, and could not be worked, when it was examined for repairs, this injector irregularity could not be tested. It is a constant source of trouble, and if a small donkey pump could be supplied for filling the boiler, as is, I understand, in use at the Mackay State Nursery, it would save a great amount of time, trouble, and labour.

The plant, as now situated, is inconvenient and awkward. The engine-house is near the house of the man in charge, but the pump is down on the bank of the stream some 100 yards off, and the water supply some fifty or sixty yards further off again. Whenever the river is in flood the pump is submerged, and the piping and foot-valve bent, damaged, or (as in this case) broken off and lost. This is gradually spoiling the pumping engine, and is a constant expense. I would therefore suggest that at the end of this dry season the pump be removed to a site alongside the engine-house, and three spears be sunk from there. This would cost only some £35 to £40, save subsequent expense in repairs, be above flood-mark, and enable the pump to do more work.

I would suggest that a piece of scrub land adjoining the present enclosure in the nursery reserve be opened up for the purpose of experimenting with such products as Vanilla, Pepper (three varieties), Cardamoms, Nutmegs, Cloves, Cocoa, Mangosteens, &c., &c.; all of which need more or less shade and constant moisture, mulch, and humus.

The opening up of such a block, say 5 acres in extent, would not necessarily be an expensive undertaking, for all the plants and trees mentioned (each an industry in itself, if proved capable of being grown under existing climatic conditions) it is necessary to have the larger scrub trees standing. The clearing would therefore be reduced to a minimum, and amount to little more than a brushing of the scrub.

The Pepper family and Cardamoms need dense shade, and but little more clearing would be necessary for the larger spice trees, and would give them many of the conditions essential to their successful culture, and also supply them with surroundings and soils infinitely nearer to those obtaining in their natural habitat. Each of these products I hope to deal with in the course of the year, and to record my experience of them in Departmental *Journal* from time to time.

HOWARD NEWPORT.

—Queensland Department of Agriculture.

PLANTING NOTES.

PEACHES IN GEORGIA, U. S. A.—The Hale Peach Orchard in Georgia has, we are informed, about 300,000 trees; one block of 60,000 Alberts is the heaviest loaded of all. The proprietor, Mr. Hale, estimates that 8,000 car-loads of Peaches will be shipped out of Georgia this year.—*Gardeners' Chronicle*.

THE MULBERRY IN LOMBARDY.—By way of Milan we have news to the effect that the immature condition of the Mulberry foliage in Lombardy has greatly interfered with the success of the silk industry in that section of Italy. The frequent and serious variations in atmospheric conditions have been all against cocoon raising by the silkworm, and the decrease in production is placed at some ten per cent. So much for the inter-dependence of commerce and vegetation.—*Gardeners' Chronicle*.

SOOT.—From a paragraph in our valued contemporary, the *Revue de l'Horticulture Belge* for August, we learn that a dressing of soot is fatal to the Phylloxera, and beneficial to the Vine. We have seen no Phylloxera now for some years in our vineries; but should it occur again, we shall hope to try the effect of the soot, as if efficacious, it would save much trouble and expense. The plan adopted is to dig in around each stock in winter time 1½ litre of soot (say 2 pints). Our contemporary speaks of the root-form of the insect. Whether a dusting over the foliage with soot would be equally efficacious is not tarted.—*Gardeners' Chronicle*.

TOMATO DISEASES—There are various diseases, all of which have been repeatedly described and figured in our columns: 1, the leaf-rust, *Cladosporium fulvum*, chiefly attacks the leaves, which look as if dusted with brown powder; 2, the Tomato-rot, which is identical with the Potato disease; 3, the Black-rot, attacking the fruit chiefly, but not entirely—it often forms circular patches around the style; 4, the sleeping disease, attacking the leaves which become flaccid and droop. Bordeaux Mixture, or potassium sulphide ½ oz. to a gallon of water sprayed on the plants will be of service, if carried out effectively at an early stage of growth, but spraying will have no effect on No. 4. All these diseases are greatly favoured by growing so many plants of the same species in the same house. Under such circumstances the disease is certain to spread from one plant to another, hence the necessity of up-rooting and burning all affected plants. As even now many people seem not to know of the Bordeaux Mixture, we add the proportion: copper sulphate 4 lb., lime unslaked 3 lb., water 40 gallons. Place the copper sulphate in a coarse-sacking bag, and suspend it in 6 gallons of cold water, in a wooden tub with no iron about it. Slake the lime and add it to the copper solution gradually. Stir freely with a wooden stick, and add the remainder of the water; then let it settle. It is best to use more rather than less lime, so that the foliage may not be injured by the spraying. It is as well to try the effect on the leaves before using it extensively, as then the mixture can be diluted if necessary. Two or three applications at intervals are better than a strong dose at one time. Less troublesome to make, and in some cases equally effectual, is a mixture consisting of liver-of-sulphur oz., water 10 gallons.—*Ibid*.

Tea.—China furnished little over 48 per cent. of the total supply; Japan, over 41 per cent. This shows that Ceylon and India have a great field for work if they would supplant China and Japan teas by machine-made tea.—*American Grocer*, Aug. 8.

FISH MANURE.—A Tellicherry correspondent writes:—"The shoals of sardine fish had failed to appear on the Malabar Coast for the last three years consecutively and consequently the coffee planters were in utter disappointment in procuring the fish manure, which is manufactured only of this species of fish. Now I am glad to mention that the shoals have just appeared on the Coast and there is every sign of a continuance of their appearance. I hope this will be a welcome news to coffee planters as they attach much importance to this manure."—*Pioneer*.

EARTH NUTS, PEA-NUTS (*ARACHIS HYPOGEEA*).—From an American journal we have the information that the last crop of this edible nut was reckoned at between four and four-and-a-half million bushels. This is quite a favourite article of consumption in the United States, and would be more so here were heat applied to driven off the oily contents—as is the case, we believe, in the States. Mr. Theodore Wood, a member of the Executive Council of New Guinea, says that Pea-nuts are likely to prove a great success in that part of the world, certain portions of the "Possession" being eminently adapted for their cultivation. Samples sent to Brisbane would appear to be quite equal to the best of anywhere else. As far as can be judged at present, the class of land in British New Guinea upon which the Pea-nut will thrive should yield at least four tons to the acre, and in favourable seasons the planter may be expected to take two crops per annum. The cost of cultivation is very small, the labourer being easily satisfied with a very trifling remuneration.—*Gardeners' Chronicle*.

COMMERCIAL CULTIVATION OF PLANTS UNDER GLASS.—It is estimated that the retail value of cut flowers sold in the States annually is \$12,500,000, the estimated apportionment of this sum being for—

Roses.. .. .	\$6,000,000
Carnations	4,000,000
Violets.. .. .	750,000
Chrysanthemums	500,000
Miscellaneous flowers, including Lilies, &c.	1,250,000

Estimating the average retail value of Roses, Carnations, and Violets at \$6, \$4 and \$1 per hundred, respectively, the total number of each sold annually based on the above values, would be, of—

Roses.. .. .	100,000,000
Carnations	100,000,000
Violets	75,000,000

275,000,000

The retail value of the plants sold is placed at \$10,000,000. Taking the plant trade as a whole, and the country in the aggregate, the average-sized pot used is estimated to be 3 inches, and the average retail price 10 cents per pots. This means that there are no less than 100,000,000 plants sold every year. To handle this business in entirely requires probably an average of not less than one man for every 1,500 square feet of glass, or 15,000 men in all. Fifteen hundred square feet of glass per man may seem like a low estimate, and such is the fact when considering commercial establishments of any size. The larger the area of glass, other things being equal, the more square feet one man can handle. As a matter of fact, some of the large Rose-growing establishments do not use more than one man for each 10,000 square feet. Large Carnation establishments will run about the same as Roses; while Violets, owing to the great amount of work involved in cleaning the plants and picking the flowers, average higher. It is the many thousand small establishments that increase the amount of labour required.—*American Gardening*.

TIGER SHOOTING IN THE MALNI FORESTS, C. P. INDIA.

At the foot of the Satpuras, not far from the mountain homes of Mahadeo, lies the Malni Forest Reserve. In the good old days, to the keen shikari, there could have been no fairer country, both for scenery, climate and "sport." In those days, the Malni Reserve lay on the borders of an interminable expanse of forest-country, open and park-like, crossed by many small streams, running swiftly in their rocky beds. Low hills, covered with a pleasing mixture of teak and large feathery bamboos, were dotted about at frequent intervals, and in the near distance range upon range of mountains rose high, one above the other. In all this vast extent of country there were but few small scattered villages; but, on the other hand, it was the home of the aboriginal gonds, a race which, alas, is fast disappearing with the advance of cultivation and so called civilisation; and it has already lost, at least in those parts, all its manly, noble characteristics. In those days every man could have prided himself on being a simple, truthful, unsophisticated man of the woods, a true lover of the jungle, a real sportsman. In addition, each village had its recognised shikari, or leader of the hunt: but the leader of them all, the recognised and accepted king, was Telu. He was, perhaps, the last of the real unadulterated aboriginal gonds of the old school.

A BORN SHIKARI,

a perfect tracker, a polished jungle gentleman. He was long, lanky and venerable in appearance. Clothed in his black, wrinkled, epidermis; a piece of string round his waist; a "chakwak" (pipe) worn behind the ear! with his long flowing matted locks—nothing could ruffle his temper, or his keenness after shikar. Alas, poor man, he died, so the legend goes, many years ago, a victim to the ire of the Deo, over some little neglected shikar offering.

The gonds, however, did not hold undisturbed possession of these wilds. There were many other denizens of the jungle; and the bison, the sambar, the cheetah, the smaller deer, the black bear, the tiger and the panther were all to be found here. My first year in India was drawing to a close when I found myself posted to the Malni Reserve. During the whole of the year, my one and only ambition had been to shoot a tiger: and in the vain endeavour to get one I had tried every expedient that mortal youth could dream of—stalking, beating, bribing, praying, cursing, sitting up by day and by night, everything had been tried in vain. I had in fact begun to think that tigers were a fraud and a disillusion, except as regards their pug-marks. But the Malni Reserve soon raised my hopes. Not only were pug-marks plentiful enough, but my gond friends, who had got over their natural shyness, and with whom I very soon got on the best of terms, assured me of easy success, and told me many a startling tale. Not only this, but the good sport I had with other beasts—my first sambar, my two bears, my panther—soon raised my fallen hopes.

It was under these circumstances that Telu and the little band of shikaris I had collected together, came to me one day with the news that a tiger was creating much havoc among the cattle at the village of Malni, which gave its name to the Reserve; and they urged me to proceed to the place as soon as possible. Accordingly, Telu and

his little court, with a herd of young buffaloes went on ahead to prepare the way, and I myself soon followed.

In those days, Malni was a small Gond village, though perhaps larger than most, situated some short distance from the river of that name; and the strip of broken ground between the village and the river was covered with scrub jungle, fairly dense in places, with a few large trees; the whole intersected by numerous small, moist, shady streamlets and nalas. On arrival the reports I received were so excellent that I soon determined

TO GET THAT TIGER,

and I am afraid it would have required many, very many, reminders from my superior officer before I could have been got to budge. Moreover, postal arrangements were very defective. However the luck was with us, for the very first morning after my arrival Telu came rushing into camp with the news that one of the young buffaloes had been killed during the night, and its carcass dragged away into the jungle—always a most auspicious sign. Messengers were immediately sent off to bring up as many beaters as they could from the surrounding scattered small villages. Meanwhile, Telu and myself did a track round the area in which the tiger was supposed to be slumbering after its gorge. The tiger had killed in the patch of jungle between the village and the river, and so the matter was comparatively easy. The River Malni on one side the village and fields on the other, and a nice sandy path above and below; and the results of our investigations were most satisfactory. The tiger was there, so Telu assured me.

The next operation was the tying up of the machan, and more particularly choosing the right tree to have it on. Personally, I knew nothing about it, and so hard to trust to Telu; and we chose a spot with a small open space in front, and a small strip of growth on the left.

Eventually the beaters arrived. I was seated on my tree, the stops were duly arranged on the right and left of me, and the beat began. For volume of noise, mingled with queer weird local sounds the beating of the tom-tom and the ubiquitous kerosine tin, it would be impossible to beat a throng of aboriginal gonds. And so the beat came merrily along, and I was ready to jump out of my skin with very excitement. Suddenly, a grunt and a growl was heard—and then a huge beast is seen by me to be moving through the patch of scrub, away on my left, some 200 yards away. At the same time, the group of stops on my left start coughing and hammering.

Mad with excitement I loose off my rifle in the direction of the tigress. Bang goes my right barrel, bang the left: and by the time the smoke has cleared away, there is no sign left of the tigress. However, no sooner have I had time to reload my rifle, then the tigress appears in the open, start in front of me. She is apparently looking straight at me, and about 80 yards away. This is too much for me, and whizz goes the bullet from the right-hand barrel. Over rolls the tigress, kicking like a shot rabbit, and bang goes the second bullet, and the smoke clears away for me to see

THE TIGRESS BOLTING

back towards the beaters. Much excited, I had hardly time to reload when away on my right, across the open space a small

young tiger dashed past and then a second. I at once imagined that they must have stopped on the edge of the jungle, and to get a better view I proceed to scramble higher up the tree. As I am scrambling up out dashes a third young brute and stops immediately under my tree. Balancing myself as best I could, I fire, only to see the cub dash on into the jungle.

Eventually the beaters come up; I descend from my machan, and a consultation is held. There is no doubt that the tigress is badly wounded—a pool of blood where she fell, and blood clearly shows the direction she has taken. But, alas, the three cubs have gone off unscathed.

In the excitement of the moment I at once determined to track the wounded tigress, and away we start, the plucky gonds only too keen to follow. The blood, however, soon stops, and matters are proceeding somewhat unsatisfactorily, when one of the shikaris suggests that the tigress must have made for water, and he assures us (as far as I am able to understand), that he can take us to the very spot. Accordingly, we give up tracking and proceed straight for the suggested haven of rest. As we get near the spot, men climb up trees to look ahead, while the rest wander about somewhat aimlessly. Suddenly one of the men from the top of a tree remarks, in a very casual tone of voice—

“THERE LIES THE TIGER.”

Immediately we all come rushing up,—convinced that we should see the fallen monarch dead as a matton. We are all crowding round a little bush growing out of a small nalla, when suddenly a terrorizing “uph-uph” resounds at our very feet, and out springs the tigress. We did not stop to inquire, away we scattered in all directions and scrambled up the nearest trees; whilst the tigress fortunately for us, kept to the nalla and disappeared. That was enough for me, at least for that evening. Besides, it was getting dark. And so we wended our weary way home, sick at heart that no trophy had been bagged. However we were soon holding councils of war; and the valiant Teln's proposals that a company of buffaloes should be brought in to our assistance next day were unanimously carried, and all arrangements duly completed. Meanwhile, I spent a restless night, dreaming of tigers and cursing my bad luck.

Next day the beaters and a herd of buffaloes arrived, and away we started. All Central Indian portsmen will have learnt the value of the jungle-reared buffalo in tracking wounded carnivora. Accustomed, as they are, to live in the densest jungle, they are quite prepared to meet the onslaughts of any tiger, and promptly forming into line, heads down, they will charge straight at any tiger they may meet. Accordingly, on this particular morning, it was decided that I should sit on a selected tree and that the beaters should drive the buffaloes through the jungle, and thus beat the wounded animal out. I had not sat up very long, and the comparatively silent beat had only been going on for a very short time, when away, in the distance, down below me, some considerable distance away, I saw a huge tiger bound across a small open space. I at once got to the ready and waited patiently, shortly to be rewarded by

THE TIGER APPEARING;

and there he stood, a few yards from me, looking back in the direction of the beaters; but alas his body was covered by a clump of trees, on one side

his huge head projected, on the other his tail. No, it was impossible to fire, and meanwhile I shook with excitement and fear that the tiger would see me and bolt. However, after an age of suspense, the tiger stepped forward quietly and slowly, and his body being exposed I fired. Down he dropped without a move, save a wag or two of his tail. But I was not going to lose him this time, and before he could ever think of coming to life again, three more bullets were duly lodged into him.

Soon the beaters came up and there were great rejoicings; but this was not the wounded tigress. It was a fine male, 10 feet 5 inches, and never a wound had he received before. The question of the wounded tigress, therefore, still remained to be solved. Accordingly, we proceeded to track through the jungle, the shikaris leading the way, tracking down the dry nalla beds, the buffaloes being driven through the thicker bits of jungle. After a time we came to a small underground nalla, a kind of a small winding cave, which opened out into the bigger nalla down which we had been tracking. The trackers stopped, and after some little further examination arrived at the conclusion that the wounded tigress had retired into the little cave. But there were doubts expressed, and so in the hopes of further developments arising I took up a position behind a tree at some little distance from the mouth of the cavern and fired a charge of shot into it. At once

A DEEP, LOW, GROWL

came out from the cave, and away every one fled to take refuge up the nearest trees, whilst I stood at attention. But nothing further happened and similar charges of shot only succeeded in bringing forth low grumbling growls. Consequently, other steps had to be taken. On creeping up to the mouth of the hole and cautiously peering in, it was impossible to see anything of our friend, as the small cave at once wound round to the right. It was, therefore decided to try the effects of a prog. Accordingly, I stood at attention on the banks of the nalla just over the hole, whilst two of the braver gonds, armed with a long bamboo, proceeded to push this into the hole. Suddenly, a loud roar. Away they all bolted, fully expecting that the tigress would bound out in her wrath, but no tiger appeared. Again and again were those tactics followed; but save for a growl there was no apparent result. Braver and braver grew the proggers, and the tigress, in her anger, would gnaw the end of the bamboo, but she refused to show herself. Owing to the winding nature of the hole it was impossible to get at her, and so the bamboo was given up in despair. During these antics we had noticed that a small tiny crack in the ground led down from the bank into the hole, and peering down it, a small portion of the tigress could be seen. In fact, its tail, as it afterwards turned out. Accordingly, I had sent for kerosine, but only a single bottle was forthcoming. This we lighted and poured down the hole, with the result that the tigress' tail was badly singed; but still she refused to show herself. And so the day passed and darkness was coming on, so that all further plans of operation had to be postponed. Moreover the shikaris assured me that the tigress must be at the point of death, otherwise she would never have endured such treatment. We contented ourselves, therefore, with blocking up the mouth of the cave loosely with branches, and then wended our way home, fully confident that next day we would merely have to dig her out. And all arrangements were made to obtain the necessary implements from a distant dépot.

Next morning, armed with spades and pickaxes, we again set out; but as soon as we reached the hole, the shikaris, after examining the place, pulled out a few hairs and exclaimed, "The tigress has got out during the night;" and sure enough there were the pug-marks going down the nalla towards the Mahi River. Here was a serious predicament. A council of war was hastily summoned, and as a result the buffaloes were again sent for, whilst we waited in patience. After a few hours the buffaloes arrived, and the order for an advance was given. The shikaris and myself tracked down the nalla, the buffaloes were driven through the jungle on either bank, followed by the beaters. And so we tracked down the nalla, until we came to the river where it was found that the tigress had turned back into a dense bit of jungle a little higher up. But she had not drunk water in the river, and this was considered a good sign by the shikaris, who took it to mean that she must indeed have been very bad. On the edge of the river we again formed up into line, the buffaloes on this occasion leading, and we all followed. Suddenly, after having proceeded a short distance, the buffaloes made a mad dash forward, snorting vigorously; something yellow was seen to dash past in front of the buffaloes and jump down into a small nalla a little to our left, whilst all the beaters and shikaris disappeared up trees. Meanwhile, goaded on by my friends, who were safely ensconced on the tops of trees, I crept quietly up to the edge of the nalla and peered over. There, round the nearest bend to the nalla, I could just make out

THE TIGERS' TAIL,

and little else; however, I came to the present, and taking careful aim at the root thereof, discharged both barrels in rapid succession, and then gracefully retired at the double. After a short time, having reloaded, I again advanced cautiously at the ready, but just as I crept up to the edge of the nalla and peered over, there was the tigress a couple of yards off, staring me in the face, and she at once opened her mouth, making a hideous face; but like a flash of lightning I fired and the tigress sprang a few feet into the air, and fell on the same spot; again I fired and over she fell. But my blood was up; hastily reloading, I fired again and again, and assurance was indeed made doubly sure. It was now getting dark, so the tigress was hastily swung on to a pole, flaming torches were lighted, and our entry into camp was indeed a sight for the gods. My first tiger, and a tigress besides, and no end of tamasha! On the first day the tigress had been hit a little to the right side of her chest, and it had all festered very badly.

And now for the moral. When I began writing this account of how I shot my first tiger, I had certainly meant to draw a moral for the benefit of our young shikaris. I should have felt that I had not written in vain if I could impress upon them the folly of at once following up a wounded tiger on foot; the folly of losing one's head and firing at a dangerous animal at long ranges, especially when it is coming straight towards one; the folly of ruining a valuable skin by firing a quantity of lead into the carcass of the dead animal. But after all, does my story really bear out these excellent precepts? Had I followed them, how much never-to-be-forgotten excitement should I not have missed? And, apparently, as long as the luck is with one and the

gods are favourable, all will end well. After all, youth may indeed rush in where experience-wallahs fear to tread.
FELIX CHAUS.

THE CEYLON PLUMBAGO TRADE.

The following is the substance of a letter addressed by Mr. T. Stretch, of Messrs. Darley & Butler, London, to our evening contemporary:—

"The present position of the plumbago trade seems to be exciting a more than usual interest in the article, and has led to some writing which is not instructive but misleading, and which may therefore do harm in some quarters. What is the actual position?"

1. For many years London was the great distributing market for plumbago as well as for most of the produce of the East. Then considerable stocks were held here, and the Continental and, to a large extent, the American trade was supplied from this source. In consequence prices were governed chiefly by the supply on this market. This has long ceased to be the case, and, owing to facilities of communication and the enterprise of Agents and Merchants on the Continent and elsewhere, a more direct means of doing the business has been evolved. Instead of London, Colombo has become the distributing centre; stocks in London have for some years dwindled to a quite inappreciable quantity, and prices are ruled by the supplies available in Colombo. The transfer of the trade from London accounts for the fact that few Brokers now thoroughly know plumbago. Those who now handle it know it well, and are honourable and trustworthy men.

2. The method of transacting business has altered to meet the altered conditions. Whereas formerly a user on the Continent sent an order to his London Agent on a sample of plumbago actually in stock, under the later system he sends his order on a standard sample supplied to him by an Agent either representing a shipper direct or the shipper's Agent in London, who transmits the order to Colombo where the plumbago is bought. This is a simple enough matter on the face of it; but the satisfactory completion of the contract depends upon the shipper delivering to the buyer a quality equal to the standard on which he bought. A consumer knows what he can use best in his special manufacture, and it does not suit him to receive inferior plumbago even if he pays for it less than his contract price. This is the great difficulty and it can only be overcome (1) by the shipper being exact in buying to match the standard, and (2) by the dealer who sells to him being loyal to his engagement and delivering the quality he has sold. Supposing these conditions fulfilled, there can be no better way for mine, owners and dealers in Ceylon of carrying the business through. The chief market is at their hand, and the orders in that market are the proper gauge of the demand from all the world.

3. It has been alleged that present prices of plumbago are low, and it is sought to show that this is in consequence not of oversupply but of the method in which plumbago is brought and sold. It is not the fact, however, that prices are low. Taking ordinary lumps as the representative grade, reference to the statistics will show that the price in Colombo in the years 1891 to 1896 ranged from R125-130 per ton for common to R240-260 for good. There was hardly any variation in these six years, though in 1894 the price of common fell to R100,

In 1897 the rise in prices began, which culminated last year, when they advanced to R400 for common and to R1,125 for good. The above quotations are taken on the last day of each year. On the 30th June last, common was quoted R350, and good R700—a considerable fall, but still leaving prices high. The rise that took place was clearly traceable in its causes, and was based on nothing newer than the laws of supply and demand. During a long period of depressed trade, especially marked on the United States of America, manufacturers became habituated to the system of buying as they wanted supplies. Most of them did not buy for stock, for prices altered little. When the trade began to improve, they did not believe that prices would continue to rise—no one anywhere dreamed of such activity as has been witnessed in the last two years chiefly caused by the movement of trade in the U. S. after the last Presidential election. When they awoke to the fact that prices were really rising all wanted to buy at once, and the rise became a succession of leaps and bounds. It is natural that there should be a re-action. It is the regular course. All markets stocked; high prices checking trade; buyers holding off; producers accumulating stocks and unable to sell; prices, what can be obtained and quite uncertain. This condition will in turn change, and as surplus stocks are used up, a stable market will once more exist, but what prices will rule when that time comes it would be unwise to prophesy. The statement of such patent facts and elementary principles demands an apology, but it seems called for by the ignorance of all such principles shown in the writing referred to.

4. To sum up the position then, it appears:—
(a) That London is not now the distributing centre, but that Colombo is.

(b) That the system of business is now based on standards, the accurate matching of which requires judgment, knowledge and honesty.

(c) That prices are not low at present, and, judging by experience of the past may go lower.

And finally, that they are governed, as they always will be, by the laws of supply and demand, and the invariable rule that, after a period of inflation, there must come a time of depression. How long the latter will last will depend much on producers, who will have to adapt themselves to the demand. If they do not do so now, many will perforce have to do so later, when it becomes unprofitable to work their mines. In the meantime, the only advice that can be given them is: Don't believe in any fancy or interested schemes for overriding natural laws. Such schemes always recoil on their inventors bringing loss where gain was promised."

The strange part is that while he was about it Mr. Stretch entered into no explanation of the causes of the enormous expansion of the plant-bago trade during the past few years. It is not simply that the price rose rapidly and to an unprecedented pitch, (from which it has since fallen):—that may be accounted for in the way Mr. Stretch points out; but the far stranger experience is the simultaneous enormous increase in exports. Usually, one would expect prices to fall with an addition of 50 per cent to exports; but that was not the case during most of 1899. Here are the figures for the past four years:—

EXPORTS FROM CEYLON.

	Cwt.		Cwt.
1896	.. 340,491	1898	.. 473,075
1897	.. 357,257	1899	.. 616,385

We suppose it is true that increased activity in regard to "armaments" in Europe and America, accounts for the disposal of well-nigh 14,000 tons above the average export, during part of 1898 and in 1899? But then we infer there is no slackening of armaments even now and yet the shipments of our valuable mineral this year have greatly fallen off—only 243,190 cwt. to 3rd of Sept. against 412,178 to same date last year. After all, this may mean that heavy stocks were laid in last year; but if so, was it not a little foolish of the buyers to be in such a hurry to store up so much beyond current requirements and so raise the price so greatly?

THE PROSPECTS OF CEYLON TEA
IN AMERICA,
LOCAL MANUFACTURE OF "GREEN"
TEA.

We learn that the attitude of the large United States' tea importers towards Ceylon "greens" is that of determined hostility. They resented the introduction of our "blacks"; but they have four times as much interest in "greens," and it is thought that Ceylon dealers must work through the tea-packet houses at first.

We have received copies of advertisements of Ceylon tea, published by two tea houses in Boston which are not subsidised by the Ceylon Commissioner. They have both been forced to push or hold "Ceylons," by the action of a subsidised firm. One of the former, it seems, refused some time ago to sell Ceylon packets. But they have been obliged to advertise our teas, because a rival was making such vigorous efforts. This is what advertising does all the world over:—it makes an article known; householders inquire for it; grocers must have it; and importers then have to look out for it.

In this connection, we may refer to the local manufacture of "green" tea and Mr. F. F. Street's very practical letter of which we had no time to make mention yesterday. It is clear there is to be no "rush" into the making of "green" tea, as was feared by the American Commissioner and some London dealers. These gave two million lb. as the quantity which, if well made and satisfactory, might be taken off in twelve months; but we see that our evening contemporary thinks one million lb. an outside estimate for Ceylon "green" tea shipments in 1901. If so, there will certainly be no special pressure and the American importers may well restrain their hostile attitude for a few years, say till about 1903, when perhaps we may get up to four or five million lb. in shipments of "green" teas.

HOW TO MAKE GREEN TEAS:
IMPROVED METHODS ADVOCATED.

To the Editor.

Sept. 3.

DEAR SIR,—At the request of Mr. H D Deane, and in the interests of those making green teas, I desire to draw attention to that part of Mr. Deane's printed letter, "How to manufacture green tea," which gives a "gloss" or "glaze" to the leaf, as I consider it improves the leaf appearance of the teas treated and in no way detrimentally

affects the liquor, and will, I think, improve the keeping properties of the leaf so treated.

China green teas, which are highly glazed, are very good keeping teas, much more so than blacks.

Although I should deprecate following Chinese methods in many respects, I think Ceylon planters cannot do better than follow them in the matter of glazing the leaf, especially as Ceylon greens are inclined to be dull dead and unattractive in leaf appearance, without the glaze.

The following is the extract referred to:—
“When you final fire for packing, I recommend that when the *Sirocco trays* are spread to put them in a ‘*steam cupboard*,’ (particulars can be had from Messrs. Brown & Co., Limited.) and turn on steam for 30 seconds, before firing; this will give the tea a *fine gloss* or to take the *juice of some of the tea you are rolling*, and water each tray when spread with it, seeing that all the tea on the tray is moistened with it. *This latter process* is best done in a wooden tray or box, and the *juice mixed in with the hand sufficient to make it all damp* (every grain) but *not wet*, then spread on the trays and fire at 190 to 200, and you will have the ‘glazed’ tea which some American dealers prefer.”

To which Mr. Deane has since added the following post-script in copy sent to me:—

“A good plan, indeed the better, is to use one roll of steamed green leaf on the day of final firing for glazing only, to do this steam the leaf and squeeze out most of the water before starting roller, then put on the weights and roll till there is no juice left, collecting the juice in buckets. You will get sufficient to do over 1,000 lb. of tea and the juice will be thicker and the glaze more pronounced and the twist tightened.”

“Of course the leaf in the roller after this can only be fired and mixed in with the fannings.”

As this glaze can be applied to different degrees, I would suggest planters to send samples to me in order to ascertain whether the degree of glaze applied is as it should be.

While on the subject of green tea, I might mention that I deprecate describing Ceylon green tea as Chinas are graded, viz. “Hyson,” &c., far better grade as per Mr. Deane’s letter or as suggested by Messrs. Larkin, viz. Ceylon black tea gradings with the prefix green, to which I would add, *avoid* the word “Broken,” as brokenness, in green tea, condemns; thus we have “O.P.,” “P.,” “P.S.,” “Souchong,” &c., all leafy grades.

Apologising for taking up so much of your valuable space.—Yours faithfully,

F. F. STREET.

GREEN TEA MANUFACTURE IN CEYLON.

Writing to a Madras paper (“Planting Opinion”) Mr. Drummond Deane gives the following list of proprietors or Agents in Ceylon as using his patent process:—

Ceylon Tea Plantations	... 2
Eastern Produce and Estates	... 2
Maskeliya Tea Co.	... 1
A E Wright, Esq.	... 1
E Rosling, Esq., Chairman, Ceylon Planters’ Association, Hon. J N Campbell, Ceylon Planters’ M. L. C.	... 1

C P Hayley, Esq. ... 1
Messrs. Geo. Stuart & Co. ... 2
and several more are on order.

This makes ten factories so far in all. Mr. Deane adds:—

“So far no one in India has tried my method, I suppose, on the principle “that nothing good can come out of Ceylon.” I hope shortly to have permission from London to go in for “green Teas” myself, but “London Agents” don’t like teas going to America naturally, and there’s the rub, when one is financed from London.”

The *Indian Planters’ Gazette* of August 25th, says:—“Letters from planters in the tea districts point to the fact that the green tea manufacturing mania has not caught on in Bengal and Assam. With the exception of one or two faddists, no one gives it even so much as a thought.”

CEYLON TEA IN AMERICA.

The total imports, exports, and net imports of tea for the fiscal year ending June 30th, 1900, were as follows:

Imports from—	Pounds.
China	40,867,290
Japan	35,189,623
East Indies	4,455,450
United Kingdom	2,444,400
British North America	1,352,616
Other Asia and Oceania	302,636
Other countries	231,476
Total	84,843,491
Exports	1,539,869
Net imports	83,303,622

HINTS TO HAY GROWERS—The hay-growing experiments by Sir John Lawes at Rothamsted Park have had interesting results. On land which has had no manure for forty-five years the weight of hay secured is 12½ cwt. per acre; the plot receiving a mineral manure has given 27 cwt. per acre; while the plot receiving a mixture of minerals and ammonium salts has yielded 38 cwt.; and the plot receiving minerals and nitrate of soda has given 49½ cwt. The heaviest manured plot produced 60½ cwt. per acre, while the same plot on a portion of the land which has received a dressing of chalk in addition to other manures gave 65½ cwt. per acre. — *Journal of Horticulture*, August 16th.

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	1'68	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	22'31	6'66	11'31	15'12
May ..	10'09	9'31	8'30	5'80	17'73	12'09	10'61
June ..	13'99	8'37	10'14	10'94	9'23	8'37	7'53
July ..	0'52	2'85	5'24	6'15	1'11	4'58	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	1'48	5'01	1'78*
October ..	30'36	16'78	4'71	20'60	12'99	14'52	
November..	5'83	19'81	11'36	17'33	8'58	12'66	
December..	9'44	11'76	8'39	3'65	4'44	6'29	
Total..	92'23	101'06	82'73	103'11	73'48	88'33	67'54

* From 1st to 5th Sept. 1'78 inches, that is up to 9-30 a.m. on the 6th Sept.—Ed. CO.,

Ceylon Rainfall.

THE P. W. D. METEOROLOGICAL OBSERVATIONS FOR JULY 1900.—We append the Monthly Return of rain from which it will be seen that the highest fall in July, was at Padupola in the Central Province. 54.72 inches and the lowest at Potuvil in the Eastern Province, 0.13 inches.

S. G. O. METEOROLOGICAL OBSERVATIONS FOR MARCH, 1900.

The following is the return of the total fall of rain for March, from which it will be seen that the highest fall was at Meeriabedda, Haputala 15.49 inches, and the lowest at Puttalam 0.13 inches.

WESTERN PROVINCE.		EASTERN PROVINCE	
Negombo, Mr. Bucknall (6) ...	6.01	Urubokka, Mr. Caldico (890) ...	13.84
Kalutara Mr. Gregson (36) ...	8.21	Tangalla Mr. Fox (94) ...	1.95
Labugama, Mr. Bond (369) ...	21.33	Mamadola, Mr. Doole (56) ...	2.62
Henaratgoda, Mr. Silva (33) ...	13.02		
CENTRAL PROVINCE.		N.-W. PROVINCE.	
Katugastota, Mr. Morgan (1,500) ...	12.38	Magalawewa, Mr. Gunaratna (176) ...	2.10
New Valley, (Dikoya) Mr. Warl (3,700) ...	24.81	Maha Sawewa tank, Mr. Adams (160) ...	0.40
He'ebola (Pusseliawa) Not received (3,300) ...	—	Teneptiya, Mr. Churchill (8) ...	1.30
Yarrow Estate, Not received (3,400) ...	—	Batalagoda, Mr. Madhupola (1) ...	10.04
Peradeniya Mr. MacMillan (1,540) ...	16.42		
Duckwari, Mr. Edwin (3,300) ...	18.84	Kalawewa, Mr. Chillappa (288) ...	N.1
Caledonia, Mr. Goork (4,273) ...	19.24	Maradankadawala, Mr. Euncson (443) ...	0.20
Pussellawa, Mr. Pow-l (3,000) ...	19.72	Mihintale, Mr MacBride (354) ...	0.91
Halgala, Mr. Nook (5,551) ...	9.31	Horowapataua, M. MacBride (217) ...	1.44
S. Wanarajah Estate, Mr. Tatham (3,700) ...	27.74	Madawachchiya, Mr. MacBride (285) ...	0.90
Padupola, Mr. Ward (1,636) ...	54.72	Topare, Mr. Jayewardane (200) ...	0.97
Mylapitiya, Mr. Fletcher (1,777) ...	0.40	Mimneriya Mr. Eves (122) ...	0.30
		UVA PROVINCE.	
		Bandarawela, Mr. Tocke (4,000) ...	3.02
		Haldumulla, Mr. Viramuttu (3,100) ...	2.59
		Kumbukam, Mr. Ewland (446) ...	2.48
		Koslanda, Mr. Rowland (2,258) ...	1.93
		Tanamalwila, Not received (550) ...	..
		Bibile, Mr. Silva (680) ...	51
		Taladena, Mr. Fernando (1,100) ...	1.22
		Alutauwala—Mr. Leembruggen (300) ...	0.28
		SABARAGAMUWA.	
		Ambanptiya, Mr. Dassanayaka (729) ...	30.37
		Pelmadulla, Mr. Robertson (480) ...	20.13
		Kolonna Korale (Hulandaya) Mr. Dabre (203) Nil	
		Awisawella, Mr. Clarke (105) ...	24.17

Colombo (40) ...	3.71	Sauntrieham, Agrapitana (51) ...	7.30
Ratnapura (27) ...	0.13	Mr. Orcharl (5,200) ...	0.36
Puttalam (295) ...	3.49	Gingran-oja, Kotuiale, ..	..
Anuradhapura (12) ...	0.67	Mr. Cox (3,300) ...	..
Mannar (9) ...	0.34	Labookelle, Ramboda, ..	..
Jaffna (12) ...	0	Mr. Stone (5,000) ...	1.67
Trincomalee (26) ...	0.35	Duesinawa, Puntala-oja, ..	..
Batticaloa (50) ...	1.40	Mr. Meedfe (4,600) ...	0.83
Galle (48) ...	5.41	Sogam, Pussellawa, ..	..
Kandy (1,654) ...	2.68	Mr. Euties (3,500) ...	3.52
Nuwara Eliya (6,188) ...	0.26	Kurundu-oja, Maturata, ..	..
Halgala, Nuwara Eliya (5,581) ...	1.11	Mr. MacMahon (5,150) ...	2.79
Badulla (2,225) ...	3.81	Kabaragalla, Maturata, ..	..
Kurunegala (381) ...	1.11	Mr. Maclean (4,400) ...	1.36
Maligakanda, Colombo (70) ...	2.33	Margalla Estate, Moopana, ..	..
Mr. Johnson (20) ...	—	Mr. Bctt, (2,200) ...	3.11
Agricultural School, Colombo, Mr. Rodrigo (120) ...	0.53	Mupana, Hospital, Mupana (Mr. Sela) (500) ...	1.43
Passara Hospital, Passara (Mr. Thomasz) 2,200 ...	1.80	Madulima Hospital, Lunuwala Dr. Vethecan (4,600) ...	..
Welhelmia, Puttalam, Mr. Ratnayake (131) ...	0.93	Badulluwella Hospital, B'wella Dr. Ootloo (460) ...	2.23
Horakele Estate, Chitlaw, Mr. Beven (50) ...	0.41	Meeriabedda, Ha'utale, Mr. Dupuis (3,600) ...	15.49
Chitlaw Kacheheri, Chitlaw, Mr. Koeh (10) ...	0.48	Udahema Estate, Hapu'ale, Mr. Bisset, (4,400) ...	14.16
Franklands Estate, Veyangoda, Mr. Beven (Orange Hill, Ragama Mr. Abdul (69) ...	3.33	Haputale Hospital Harutale Mr. V. San (4300) ...	5.63
4.15	..	Pot Office, Bandarawela, Mr. Menzi (4,033) ...	2.60
Henaratgoda Gardens, Henaratgoda, Mr. de Silva (33) ...	2.93	Calland r, Ohiya Mr. Green (5,125) ...	..
Kotna Godela, Rambukana Mr. Windus (530) ...	..	Mariawatte, Gampola Mr. Salmoud (1,600) ...	4.23
Eadella or Liberia Estate Polgahawela Mr. Inches (425) ...	2.25	Orwell Estate, Gampola Mr. Jaylor (1,800) ...	3.73
Geekianakanda, Neboda Mr. Towgood (200) ...	0.71	New Forest, Deltota, Mr. Wardrop (3,500) ...	6.29
Polgahakanda, Neboda Mr. Wight (300) ...	..	Rajawella, Estate, Telienuya Mr. Miller, (1,500) ...	..
Labugama, Hanuwella, Mr. Bond (369) ...	4.88	Lower Spring Valley, Badulla Mr. Rettle (3,650) ...	4.20
Rayigam, Horana, Mr. Dawson, (300) ...	6.86	Gourakeie Estate, Badulla Mr. Hope (1,200) ...	2.79
Ka'augma, Avisawella Mr. Cooke (200) ...	4.10	Mosagalla Estate, Badulla, Mr. Deaker (4,500) ...	3.64
Dunedin Estate, Avisawella, Mr. Bayley, (400) ...	4.16	Ledgerwatte, Badulla Mr. R. tie (4,000) ...	1.96
Digalla Avisawella, Mr. Tottenham, (400) ...	3.24	Humbegama Tan's, Badulla (Ranbanda Korala) ...	2.02
Pambagama, Avisawella, Mr. Bridgman (600) ...	..	Des'ela Estate, u'walatenna Mr. Vanterstott (800) ...	0.25
Avisawella Estate Avisawella Mr. Byrle (259) ...	7.03	Sombawatte Estate, N'pitiya Mr. Jamieson (1,600) ...	3.55
Yatideriya, Kegalla, Mr. Fairweather — ...	3.70	Gammadiwala Estate, Ratnawela Mr. Westland (2,400) ...	1.16
Mahawalatenna, Balangoda Mahawalatenna K. M. ...	5.13	Kobonella Estate, Rangala, Mr. Pole (3,300) ...	..
Agaraland Estate Balangoda Mr. Boyd (2,115) ...	..	St. Martins, Rangala, Mr. Ellis (3,600) ...	2.15
Maduwanwala, Rakwana, Maduwanwala R.M. (750) ...	5.03	Crystal Hill, Matale Mr. Van Starrex (1,400) ...	0.75
Amnikand'a, Morawaka, Mr. Anderson, (1,400) ...	5.39	Vicarton Estate, Matale Mr. Carle (3,250) ...	1.27
Pan'kanda, Morawaka, Mr. Davidson, (1,900) ...	5.54	Matale Mr. Tisseverasinghe (1,208) ...	0.94
St. John Del Rey, B'gawantalawa Mr. Glanville (4,300) ...	1.91	Wariapolla, Matale, Mr. Dickenson (1,200) ...	1.43
Friedland, Bogawantalawa Mr. Rasmell (5,200) ...	..	Dambulla, Mr. Chinnayya-pelali (400) ...	2.02
Campden, Bogawantalawa, Mr. Gidden, (4,840) ...	2.63	Kotta Estate, Pallai, Mr. Todd (13) ...	..
Blair Athol, Dikoya, Mr. Lane (3,641) ...	6.85	Mantota Hospital, Mannar, Mr. Adams (17) ...	0.75
Anufello, Dikoya, Mr. Dickon (4,300) ...	3.45	Buttala Hospital, Buttala, Mr. Perera ...	6.31
Ma-keliya Hospital, Maskeliya Mr. Poulter (1,200) ...	6.14	Police Station, Hatton Police Constable Miskin (1,141) ...	3.48
Hope Estate, Hewaheta, Mr. Shipton (5,000) ...	2.77	Medway Estate Nilaveli, Mr. Abraham, ...	0
Coldstream Estate, Watawala Mr. Spedding (3,800) ...	1.65	Delwila, Kurunegala, Mr. Price (490) ...	1.9
Holmwood Est., Agrapitana, Mr. Bosanquet (5,240) ...	3.03	Pathugalla, Kegalla Mr. Sancti (550) ...	1.00
		Woodside, Urugalla Mr. MacMahon (3,000) ...	0.38
		Gilardstown, Wattagama Mr. Hardy (2,500) ...	3.39
		Ja'ela Hospital, Ja'ela Mr. Fernando (4) ...	3.12
		Maspana, Uda Pussellawa Mr. Jones (2,000) ...	1.69

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	900	—	—
Ceylon Tea and Coconut Estates	500	—	..	..
Custlereagh Tea Co., Ltd.	100	90	—	—
Ceylon Hills Estates Co. Ltd.	100	—	25	—
Ceylon Provincial Estates Co. Ltd.	500	—	50	5 0
Claremont Estates Co., Ltd.	100	—	—	—
Clunes Tea Co., Ltd.	100	7	75	—
Clyde Estates Co., Ltd.	100	40	—	—
Doomoo Tea Co., Ltd.	100	65	—	65
Drayton Estate Co., Ltd.	100	120	150	—
Ella Tea Co., of Ceylon, Ltd.	100	..	..	..
Estates Co., of Uva, Ltd.	500	20	250	200
Gangawatta	500	—	—	—
Glasgow Estate Co., Ltd.	500	955	—	9 5
Great Western Tea Co.,	5 00	—	610	—
Hapugahalanda Tea Estate Co.	200	—	—	—
High Forests Estates Co., Ltd	500	525	—	—
Do part paid	350	—	—	—
Horekelly Estates Co., Ltd.	100	—	—	—
Kalutara Co., Ltd.	500	—	375	—
Kandyan Hills Co., Ltd.	100	—	70	—
Kunapediwatte Ltd.	100	—	—	—
Kalani Tea Garden Co., Ltd.	100	—	—	—
Kirklees Estates Co., Ltd.	100	—	120	—
Knivesmire Estates Co., Ltd.	100	—	70	—
Maha Uva Estates Co., Ltd	500	—	—	385
Mocha Tea Co., of Ceylon, Ltd.	500	625	—	—
Nahavilla Estate Co., Ltd.	500	—	400	—
Neboda Tea., Co. Ltd	500	—	500	—
Nyassaland Coffee Co. Ltd	100	—	—	—
Ottery Estate Co., Ltd.	100	—	—	—
Palmerston Tea Co., Ltd.	500	—	500	—
Penrhos Estates Co., Ltd.	100	—	100	100 xd
Pine Hill Estate Co., Ltd.	50	—	—	45
Pitakanda Tea Company	500	—	—	—
Putupaula Tea Co., Ltd.	100	—	—	—
Ratwatte Cocoa Co., Ltd.	500	—	—	—
Rayigam Tea Co. Ltd.	100	52½	—	50
Roeberry Tea Co., Ltd.	100	60	—	—
Ruanwella Tea Co., Ltd.	100	—	40	40
St. Heliers Tea Co., Ltd.	500	510	—	—
Talgaswela Tea Co., Ltd.	100	—	—	—
Do 7 per cent. Prefrs.	100	—	..	..
Tonacombe Estate Co., Ltd.	500	—	450	—
Udahage Estate Co., Ltd.	100	..	..	..
Yagama Tea & Timber Co., Ltd.	50	..	..	..
Union Estate Co., Ltd.	500	200	..	..
Upper Maskeliya Estate Co. Ltd.	500	—	450	..
Uvakkelle Tea Co., of Ceylon, Ltd.	100	65	..	65
Vogan Tea Co., Ltd.	100	..	75	75
Wanarajah Tea Co., Ltd.	500	..	1000	..
Yataderiya Tea Co., Ltd.	100	..	375	..

CEYLON COMMERCIAL COMPANIES

Adam's Peak Hotel Co., Ltd.	100	95	..	..
Bristol Hotel Co., Ltd.	100	..	..	125
Do 7 per cent Debts	100	107.50	..	..
Ceylon Gen. Steam Navg'n. Co., Ltd.	100	..	..	..
Colombo Apothecaries' Co. Ltd.	100	142.50	145	145
Colombo Assembly Rooms Co., Ltd.	20	15	..	..
Do prefs.	20	..	..	..
Colombo Fort Land and Building Co., Ltd.	100	95	100	95
Colombo Hotels Company	100	..	300	300
Galle Face Hotel Co., Ltd.	100	..	150	147.50
Kandy Hotels Co., Ltd.	100	..	..	..
Kandy Stations Hotels Co.	100	..	30	..
Mount Lavinia Hotels Co., Ltd.	500	150	175	..
New Colombo Ice Co., Ltd.	100	175	..	..
Nuwara Eliya Hotels Co., Ltd.	100	..	..	..
Do 7 per cent prefs	100	..	100	..
Public Hall Co., Ltd.	100	15	..	..

LONDON COMPANIES

Company	paid p. sh.	Buy- ers.	Sell- ers.	Tran- sactions
Alliance Tea Co., of Ceylon,	10	8½	9½-10	..
Anglo Ceylon General Estates Co.	100	..	35-45	..
Associated Estates Co., of Ceylon	10	..	3-4	..
Do. 6 per cent prefs.	10	..	6½-7½	..
Ceylon Proprietary Co.	1	..	3-4	..
Ceylon Tea Plantation Co., Ltd.	10	..	26-27	..
Dimbula Valley Co., Ltd.	5	..	5½-6	..
Do prefs.	5	..	..	..
Eastern Produce & Estates Co.	5	..	5½-5¾	..
Ederapolla Tea Co.,	10	..	8	..
Imperial Tea Estates Co., Ltd.	10	..	..	..
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	..	½-¾	..
New Dimbula Co., Ltd.	1	..	2½-3	..
Nuwara Eliya Tea Estate Co., Ltd.	10	10	..	..
Ouvah Coffee Co., Ltd.	10	..	5-7	..
Ragalla Tea Estates Co., Ltd.	10	..	10	..
Scottish Ceylon Tea Co., Ltd.	10	..	13-15	..
Spring Valley Tea Co., Ltd.	10	3	4-5	..
Standard Tea Co., Ltd.	6	..	11-12	..
The Shell Transport and Trading Company, Ltd.	100	..	..	..
Yatyanota Ceylon Tea Co., Ltd.	10	..	8-9	..
Do. pref. 6 o/o	10	..	9½-10½	..

BY ORDER OF THE COMMITTEE.
Colombo, August 31st, 1900.
*Latest London Prices.

THE LOCAL MARKET.

Colombo, Sept. 5th, 1900.

COFFEE:—				
Estate Parchment per bushel	R8.00	to	10.50	
Chetty do do				
Native Coffee } per cwt.				} Nil.
do F. O. B }				
Liberian coffee:—per bushel				
do cleaned coffee:—per cwt				
Cocoa unpicked:—per cwt	R40.00	to	45.00	
do cleaned do	R49.00	to	50.00	
Cardamoms Malabar per lb.	R2.0	to	1.00	
do Mysore do	R1.25	to	1.50	
RICE:—				
Soolai per bag of 164 lb. nett	R9.62	to	9.87	
1st quality:—per bushel	R3.70	to	3.75	
Soolai 2 & 3rd. do do	R3.60	to	3.85	
Coast Calunda	R4.12	to	4.25	
Coast Kara	R1.75	to	4.00	
Kazala	R3.55	to	3.58	
Muttusamba Ordinary	R5.37	to	6.00	
Cinnamon per lb No 1 to 4	R0.52	to	53.00*	
do do 1 and 2	R0.61	to	10.62	
do Chips per candy	R9.50	to	95.00	
Coconuts Ordinary per thousand	R35.09	to	38.00	
do Selected do	R36.00	to	39.00	
Coconut Oil per cwt	R14.25	to	14.50	
do F. O. B. per ton	R285.00	to	290.00†	
POONAC:—				
Gingelly per ton	R97.50	to	160.00	
Coconut Cheku do	R82.50	to	85.00	
do Mill (retail) do	R85.00			
Cotton Seed per ton	R83.00			
Copra per candy				
Kalpitiya do	R45.00	to	47.75	
Marawilla do	R44.00	to	45.50	
Cart Copra do	R36.00	to	42.00	
Satinwood per cubic feet.	R2.00	to	2.25	
do Flowred 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	R4.00	to	14.50	
Jaffna Black Cleaned per cwt	R14.00			
do mixed do	R11.00	to	12.00	
Indian do	R8.00	to	12.00	
do Cleaned do	R10.00	to	13.50	
Sapanwood per ton	R5.00	to	55.00	
Kerosene oil American per cases,	R6.75	to	6.85	
do bulk Russian, per tin	R3.12	to	3.15	
do Russian per cases	R6.50	to	6.80	
Nux Vomica per cwt	R2.00	to	3.50	
Croton Seed per cwt	R23.00	to	28.00	
Kapok cleaned f o b per cwt	R24.00			
do uncleaned do	R5.50			
Plumbago } Large lumps	R300.00	to	700.00	
per ton, { Ordinary size lumps	R250.00	to	600.00	
according to grade	R150.00	to	450.00	
to grade Dust.	R75.00	to	300.00	
* Unassorted, sorted and haled	53 cents.			
† Casks extra.				

COLOMBO PRICE CURRENT.

(Furnished by the Chamber of Commerce.)

EXPORTS.

Colombo, 3rd Sept. 1900.

CARDAMOMS:—

All round parcel, well bleached per lb.	R1 40
Do. dull medium do.	1 20
Special assortment, 0 and 1 only do.	1 70
Seeds do.	1 50

CINCHONA BARK:—

Per unit of Sulphate of Quinine 11c—1½ to 3 o/o

CINNAMON —

Ordinary assortment	per lb.	53c.
Nos. 1 and 2 only	per lb.	62c.
Nos. 3 and 4 only	per lb.	53c.

CINNAMON CHIPS:—

Per candy of 56) lb R95 00

COCOA:—

Finest estate red; unpicked	per cwt	R50 00
Medium do do	"	45 00
Bright native, unpicked and undried	"	none
Ordinary do do	"	none

COCONUTS—(husked).

Selected per thousand	R48 00
Ordinary "	R39 00
Smalls "	R30 00

COCONUT CAKE—

Poonac in robins f. o. b. per ton R82 50
Do in bags none.

COCONUT (Desiccated).

Assorted all grades per lb. 13½c

COCONUT OIL—

Dealers' Oil per cwt. R14 50
Coconut Oil in ordinary packages, f. o. b. per ton R322 50
Sellers at R322 50

COFFEE.—

Plantation Estate Parchment on the spot per bus. R10 50.
Plantation Estate Coffee f.o.b. (ready) per cwt.—R55 00

COFFEE.—

Native Coffee, f.o.b per cwt.—None.

CITRONELLA OIL—

Ready do per lb. 65c.

COPRA—

Boat Copra	per candy of 560 lb.	R45 50
Calpenty Copra	do do	R45 75
Cart do do do	do	R42 00
Estate do do do	do	R45 50

CROTON SEED per cwt R22 00

EBONY—

Sound per ton at Govt. depot R175.—Next sale 3rd September.

Inferior R120.—Next sale 3rd September.

FIBRES—

Coconut Bristle No 1	per cwt	R11 50
Do 2	"	none
Do mattress	"	4 00
Do "	"	3 50

Wool Yarn, Kogalla

Do Colombo	"	1 to 8	18 00
Do Colombo	"	1 to 8	16 00

Kitool all sizes

38 00

Palmyrah

per lb 28c.

PEPPER—Black

per lb 28c.

PLUMBAGO—

Large lumps	per ton	R700
Ordinary lumps	do	600
Chips	do	450
Dust	do	300

Do (Flying)

125

SAPANWOOD—

per ton R52 50

SATINWOOD (ordinary)

per cubic ft. R2 50

TEA—

Broken Pekoe and Broken	cts	cts	cts
Orange Pekoe per lb	70	55	35
Orange Pekoe do	70	46	39
Pekoe do	50	38	32
Pekoe Souchong do	34	29	29
Pekoe Fannings do	34	25	23

Broken mixed—dust, &c.

per lb 27 24 20

CEYLON EXPORTS AND DISTRIBUTION, 1899-1900.

COUNTRIES	Tea.		Coffee—cwt.		Cocoa, C'mons.		Cinnamon.		Coconut Oil.		Copra.		Poonac.		Plumbago.		Ebony.		Japan-wood, cwts.
	1899 lbs.	1900 lbs.	Plan-tation	Native	Total	lbs.	Bales lbs.	Chips lbs.	1900 cwt.	1899 cwt.	cwts.	Desic-cated Coconut lb.	cwts.	Coconuts. No.	1900 cwt.	1899 cwt.	Fibre.	cwts.	
TOTAL	77953114	65717757	5135	17503	246778	19 682	548672	19 682	58821	14398	524810	8117295	78 40	120 65	36130	280	7824	1206	11493
Austria	11132	73-8	..	..	..	15000	25200	..	..	..	..	..	..	..	..	..	..	..	..
Belgium	12465	9283	..	..	..	150	150	..	..	..	..	..	..	..	..	..	..	..	..
France	174626	73707	..	..	..	79906	6477	..	..	..	..	..	..	..	..	..	..	..	..
Germany	235762	259907	..	..	..	33484	30994	..	..	..	..	..	..	..	..	..	..	..	..
Holland	2000	12860	..	..	..	322242	251974	..	..	..	..	..	..	..	..	..	..	..	..
Italy	6007	8716	..	..	..	55885	63392	..	..	..	..	..	..	..	..	..	..	..	..
Russia	5513548	2423986	..	..	..	57100	63392	..	..	..	..	..	..	..	..	..	..	..	..
Spain	15130	11800	..	..	..	130000	25200	..	..	..	..	..	..	..	..	..	..	..	..
Sweden	51118	35988	..	..	..	240	240	..	..	..	..	..	..	..	..	..	..	..	..
Turkey	15201	11007	..	..	..	4051	4051	..	..	..	..	..	..	..	..	..	..	..	..
India	68103	361001	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Australia	1048313	1029036	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
America	328898	1061827	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Africa	33476	21682	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
China	91686	56769	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Singapore	4268	44794	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mauritius	700	6381	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Malta	254375	189402	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total export from Isl.	93701825	85599580	7970	19625	368257	963940	1464656	963940	231663	1093	7904440	983787	243100	41278	69872	2617	69872	11493	93701825

Total export from Isl. Jan. to 3rd Sept. 1900

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Prices Current, London, August 8th, 1900.)

	QUALITY.	QUOTATIONS.		QUALITY.	QUOTATIONS.
ALOE , Soccotrine cwt.	Fair to fine dry	44s a 85s	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
BEES' WAX , cwt.				Low sandy Ball	1s 3d a 1s 7d
Zanzibar & (White)	Good to fine	£6 a £7 10s		Sausage, fair to good	2s 6d a 3s 3d
Bombay (Yellow)	Fair	£6 10s a £7 8s 6d	Mozambique	Liver and livery Ball	2s 4d a 3s 1½d
Madagascar	Dark to good polish	£6 8s a £6 10s		Fair to fine ball	3s a 3s 2d
CAMPHOR , China	Fair average quality	157s 6d	Nyassaland	Fr to fine pinky & white	3s a 3s 3d
Japan		192s 6d	Madagascar	Fair to good black	2s a 2s 10½d
CARDAMOMS , Malabar lb.	Clipped, bold, bright, fine	2s 6d a 2s 9d		Niggers, low to fine	11d a 2s 8d
Ceylon—Mysore	Middling, stalky & lean	1s 5d a 1s 7d	INDIGO , E.I.	Bengal—	
	Fair to fine plump	1s 7d a 4s 2d		Shipping mid to gd violet	3s 7d a 4s 6d
	Seeds	1s 10d a 2s 4d		Consuming mid. to gd	3s a 3s 6d
	Good to fine	2s 11d a 3s		Ordinary to mid.	2s 9d a 3s 2d
	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 7d a 2s 6d
	1sts and 2nds	3½d a 4½d		Pale reddish to fine	2s a 3s
CASTOR OIL , Calcutta	Dull to fine bright	37s 6d a 47s 6d	MACE , Bombay & Penang	Ordinary to fair	1s 4d a 1s 11d
CHILLIES , Zanzibar cwt.	Ledgeriana Orig. Stem	3½d a 6½d	per lb.	Pickings	1s 4d a 1s 4½d
CINCHONA BARK —lb.	Crown, Renewed	5d a 7d		Dark to fine pale UG	6s a 7s
Ceylon	Org. Stem	3½d a 5½d	MYRABOLANS , cwt.	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		Rhajpore, &c.	4s 3d a 8s
CINNAMON , Ceylon	Ordinary to fine quill	11d a 1s 8d		Calcutta	4s 6d a 6s
per lb	"	10d a 1s 7d	NUTMEGS —		2s 4d a 2s 6d
2nds	"	9½d a 1s 6d	Bombay & Penang		11½d a 2s 3d
3rds	"	8½d a 1½d		160's to 130's	6d a 11d
4ths	"	2½d a 6d	NUTS , ARECA cwt.	Ordinary to fair fresh	15s a 17s
Chits	"	5½d a 9d	NUX VOMICA , Bombay	Ordinary to middling	1s a 5s 6d
CLOVES , Penang	Dull to fine bright bold	4½d a 5½d	per cwt.	Fair to good bold fresh	7s a 10s
Amboyna	Dull to fine	3½d a 4d		Small ordinary and fair	5s 6d
Zanzibar	Good and fine bright	3½d a 3½d	OIL OF ANISEED lb.	Fair merchantable	6s 9d
and Pemba	Common dull to fair	1½d	CASSIA	According to analysis	3s 8d a 4s
Stems	Fair	1½d	LEMONGRASS	Good flavour & colour	3d
COFFEE			NUTMEG	Pingy 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 95s	CITRONELLE	Bright & good flavour	11d a 1-0½d
	Low mid. and low grown	75s a 82s 6d	ORCHELLA WEE —cwt.		
	Smalls	55s a 75s	Ceylon	Mid. to fine not woody	10s a 12s 6d
Native	Good ordinary	30s a 70s	Zanzibar	Picked clean flat leaf	10s a 16s
Liberian	Small to bold	37s a 45s		" wiry Mozambique	14s a 11s
COCOA , Ceylon	Bold to fine bold	90s a 105s	PEPPER —(Black) lb.		
	Medium and fair	80s a 85s	Alleppee & Tellichery	Fair to bold heavy	6½d a 6½d
	Native	70s a 78s	Singapore	Fair	6,5-16d a 6½d
	Middling to good	12s a 2s	Acheen & W. C. Penang	Dull to fine	5½d a 6½d
COLOMBO ROOT		nominal	PLUMBAGO , lump cwt.	Fair to fine bright bold	3s a 40s
COIR ROPE , Ceylon ton	Ordinary to fair	£14 a £19		Middling to good small	2s a 25s
Cochin	Ord. to fine long straight	£16 a £19	chips	Dull to fine bright	10s a 20s
FIBRE , Brush	Ordinary to good clean	£18 a £24	dust	Ordinary to fine bright	4s a 11s
Cochin	Common to fine	£7 a £9	SAFFLOWER	Good to fine pinky	65s a 75s
Stuffing	Common to superior	£15 a £33		Inferior to fair	40s a 60s
GOIR 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
GRONTO SEEDS , sift. cwt.	Fair to fine dry	2s a 3s	Madras, Logs	Fair to good flavour	£20 a £30
CUTCH	Fair	2s 8d	Chips	Inferior to fine	£4 a £8
GINGER , Bengal, rough	Good to fine bold	7s a 85s	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 £5 15s
B & C	Common to fine bold	25s a 33s	Siam	bold smooth	£7
Cochin Rough	Small and D's	25s a 28s	SEEDLAC cwt.	Ord. dusty to gd. soluble	53s a 59
Japan	Unsplit	24s	SENNA , Tinnevely lb.	Good to fine bold green	5d a 8d
GUM AMMONIACUM	Sm. blocky to fine clean	20s a 45s		Fr middling medium	4d a 5½d
ANIMI , Zanzibar	Picked fine pale in sorts	£107s 6d a £20	SHELLS , M. o'PEARL—	Common dark and small	1½d a 3½d
	Part yellow and mixed	£82/6 a £10 10s	Bombay cwt.		
	Bean and Pea size ditto	70s a £9 2/6		Bold and A's	
	Amber and dk. red bold	£5 10s a £7 10s		D's and B's	£4 1s a £5 7s 6d
	Med. & bold glassy sorts	80s a 100s		Small	
	Fair to good polish	£4 8s a £8		Small to bold	£5 12/6 a £7 10s
Madagascar	" red	£4 5s a £9		Small to bold	18s a £2 11s
ARABIC E. I. & Aden	Ordinary to good pale	35s a 60s	Mergui	Mid. to fine blk not stony	15s a 16s
Turkey sorts		67s 6d a 85s	Mussel	Stony and inferior	7s 6d a 11s
Ghatti	Pickings to fine pale	12s 6d a 35s	TAMARINDS , Calcutta...		
Kurrachee	Good and fine pale	52s 6d a 55s	per cwt.	TORTOISESHELL —	
	Reddish to pale selected	30s a 40s	Zanzibar & Bombay lb.	Small to bold dark	17s a 24s
Madras	Dark to fine pale	23s a 35s		mottle part heavy	
ASSAFETIDA	Clean fr. to gd. almonds	40s a 85s	TURMERIC , Bengal cwt.	Fair	26s nom.
	Ord. stony and blocky	8s a 25s	Madras	Finger fair to fine bold	
	Fine bright	1s a 1s 3d	Do.	bright	25s a 27s 6d
KINO	Fair to fine pale	65s a 75s	Cochin	Bulbs	20s a 21s
MYRKH , picked	Middling to good	33s a 55s		Finger	24s
Aden sorts	Good to fine white	35s 6d a 50s		Bulbs	7s 6d
OLIBANUM , drop	Middling to fair	25s a 35s	VANILLOES —		
	Low to good pale	17s a 20s	Mauritius	Gd. crysallized 3½ a 9 in	17s 6d a 27s
	Slightly foul to fine	16s 6d a 18s	Bourbon	Foxy & reddish 4½ a 8	15s a 22s
INDIARUBBER , Assam lb.	Good to fine	2s 10½d a 3s 2½d	Seychelles	Lean and inferior	10s a 13s 6d
	Common to foul & mx'd.	1s 4d a 2s 6d		Fine, pure, bright	3s 6d
	Fair to good clean	2s 3d a 3s 3d	VERMILION lb.	Good white hard	32s 6d a 33s
Rangoon	Common to fine	1s a 2s 4d	WAX , Japan, squares cwt		
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 September:—

Vol. XII.]

SEPTEMBER, 1900.

[No. 3.

THE BRANDING OF CATTLE.



It would seem impossible to exactly define where "firing" as a panacea for the ailments of dumb animals ends and branding as a cruel practice begins. In this island the native cattle doctor very frequently resorts to "firing"; indeed his surgery is almost entirely confined to the hot iron, to the neglect of the knife.

I would divide this subject into (1) Therapeutic branding, (2) Branding for identification, (3) Branding for artistic effect, (4) Branding for concealment of theft.

(1.) There are many ailments of the lower animals in which the use of the firing iron is advisable and even imperative. For instance, cattle have sometimes to be fied (*a*) round the eyes in cases of eye disease, (*b*) on the cheek for opening parotic ducts or for inflammation of these ducts, (*c*) round the root of the horns in cases of caries of the horn, (*d*) on the neck for dislocation, which, however, is generally incurable, (*e*) on the shoulder for lameness in that region, (*f*) round the knee joint for inflammation, spavin, rheumatism &c., (*g*) round the fetlocks for sprain, rheumatism, &c., (*h*) about the suffraginous bones for boney exostosis, (*i*) in the region of the loins for weakness or for sprain of the psoe mus-

cles (a rare complication in cattle), (*j*) point of the hip for fracture, (*k*) on the round bone for dislocation, (*l*) on the hock for spavin, rheumatism, &c., (*m*) hind fetlock and suffraginous bones for the same causes as in the case of the foreleg. Firing is sometimes done on the chest in place of setoning, but though both these forms of treatment have their advocates, they might well be replaced by the use of liniments or mild blisters which serve the same object, viz., to act as counter-irritants. Again, for the same reason the left flank is sometimes fired by the natives in cases of hoven or impaction of the rumen, but here also the practice might advisedly be dispensed with. The same might be said with regard to firing round the genital organs in cases of eversion. Firing is sometimes done round tumours and abscesses instead of opening them or externally applying some preparation to dissipate them; in this case, too, the practice of firing is not to be recommended. There should be no excuse for firing on the cannon bone as cattle do not suffer from splints.

It will thus be seen that the entire body is liable to be fired for various complaints; but it must be carefully borne in mind that no firing should be done in more than one place at one time. I might here refer to the empirical treatment of horses where blistering has been done at one time from the withers to the coronets in the forelegs, and in some instances also on the loins and both the

hinds. It is not only the branding of cattle by ignorant villagers, but treatment of and operation on animals generally by empirics and ignorant people as well, that call for suppression. What should be done as regards the branding of cattle is that every owner of stock must be required to possess a certificate to the effect that his animals, if branded, have been fired on therapeutic grounds,—and the certificates must be signed by a qualified Veterinary Surgeon or recognised (but better still *licensed*) *vederala*.

A. CHINNIAM,
Veterinary Surgeon,

(To be continued.)

RAINFALL TAKEN AT THE SCHOOL OF
AGRICULTURE DURING THE MONTH
OF JULY, 1900.

1	Sunday	..	Nil	17	Tuesday	..	·09
2	Monday	..	·08	18	Wednesday	...	·40
3	Tuesday	..	Nil	19	Thursday	..	·26
4	Wednesday	...	Nil	20	Friday	..	·14
5	Thursday	..	·02	21	Saturday	..	Nil
6	Friday	..	·02	22	Sunday	..	·60
7	Saturday	..	·02	23	Monday	..	1·56
8	Sunday	..	1·08	24	Tuesday	..	Nil
9	Monday	..	·50	25	Wednesday	...	Nil
10	Tuesday	..	·78	26	Thursday	..	Nil
11	Wednesday	...	·07	27	Friday	..	·10
12	Thursday	..	·08	28	Saturday	..	Nil
13	Friday	..	·89	29	Sunday	..	·51
14	Saturday	..	·06	30	Monday	..	·20
15	Sunday	..	·01	31	Tuesday	...	Nil
16	Monday	..	Nil				

Total. . 7·37

Mean. . ·24

Greatest amount of rainfall in any 24 hours
on the 23rd July, 1·56 inches.

Recorded by Mr. C. DRIEBERG.

PRACTICAL HINTS TO HORSE-OWNERS.

By A. CHINNIAM, O.S.V.C.

CHAPTER II. (Contd.)—FOOD AND FEEDING.

Guinea Grass is much liked by horses and is to be preferred to other cultivated grasses. It is easily cultivated, but during very dry and hot weather it requires to be irrigated or watered. The cultivation of this grass is carried on more or less throughout the island, but principally in the hill district. The percentage of moisture is less than in water grass, but it is proportionately rich in woody fibre, which is a necessary auxiliary to digestion.

Mr. Guthrie of the Department of Agriculture, Sydney, made the following analysis of *Guinea grass* when rather dry:—

Water	...	...	11·26	per cent
Ether Extract (fats, &c.)	...	...	10·65	"
Albuminoids	...	...	11·37	"
Carbohydrates	...	...	40·54	"
Woody fibre	...	...	26·08	"
Ash	...	...	9·50	"

100·00 "

Nutrient value = 53½. Nutrient ratio = 1 to 4

Panicum Molle (Mauritius or water grass).—This is a common grass in Ceylon and largely used for feeding cattle and horses. The percentage of water is great and hence the nutrient ratio is lower. During the rainy season most of the lowlands under this grass become flooded, and for that reason one has to be careful in the use of the grass, as it is believed that through feeding of horses on grass cut off flooded lands the parasitic worm known as *Filaria oculi* finds its way into the eye through the digestive organ. This grass has got to be dried a little before it is given to horses, as it is apt to cause colic if given very wet. Hence in rainy weather particular care has to be taken in feeding with water grass.

Jungle Grass.—Many horses in Colombo are fed on what are known as "jungle grasses." These grasses being very fine are preferred by most horses to cultivated grass. Wild grass is no doubt more nutritious than cultivated grasses, but, as it has a large quantity of roots to which a good deal of earthy matter adheres and is got rid of with difficulty, the grass has to be used with care.

I might here refer to lucerne (*Medicago sativa*) though it does not fall within the grass family (*gramineae*). Lucerne belongs to the order leguminosae on which the herbivora depend for their nitrogenous ingredients. It is cultivated in India for feeding horses, but it is not known among horse-owners in Ceylon. Those who can afford it feed their horses on lucerne in place of hay from Australia. There is no reason why lucerne should not thrive in Ceylon, and be used, especially in the hills, for feeding horses; as Mr. Nock of the Hakgala Gardens has shown that it grows and yields well in the Nuwara Eliya district. Experiments with lucerne at the School of Agriculture, Colombo, proved that it can be grown even in the hotter parts, but that it requires to be irrigated or watered in dry seasons.

POULTRY FEEDING.

The following notes on the subject of feeding poultry published in the *Fancier's Gazette* will repay perusal by those who are poultry fanciers:—

The kinds of grain which are richest in nitrogenous matter are known as leguminous, *i.e.*, beans, peas and lentils. These, however, are not very easy of digestion, and it would not do to attempt to feed poultry entirely on them, but limited quantities of pea meal and bean meal given in the soft food will prove very useful where an extra large quantity of nitrogenous matter is required. But, generally speaking, there is nothing like oats as a general food, both for chickens and for laying hens, as they are especially rich in nitrogenous matter, contain a fair percentage of minerals, and are lowest in the heat forming scale in comparison with barley and wheat and Indian corn. Indian corn is much more freely used in poultry keeping than it ought to be, because it is lowest in the scale of nitrogenous, and highest in that of heat forming. Let us, therefore, apply this information to the three main points.

Chicken Rearing.—Here we want to produce as large a frame as we can; the secret of success in rearing young stock being to grow a frame capable of bearing a heavy weight of meat when the

time comes for fattening. If we give too much fattening food to chickens when they are growing, the tendency is for them not to develop in frame as they otherwise would. The best foods, therefore, for chickens are oatmeal, with a little pea-meal and a percentage also of lean meat. This latter must be varied according to the circumstances under which they are raised. Chickens which are kept in the country, and have access to a wood or copse where they can obtain plenty of insect life, will need very little, and can be fed almost entirely on oatmeal, whereas those which are kept in town will need to have this want supplied by the addition of lean or fibrine meat. On the whole excellent results would be obtained by feeding little chickens alternately on biscuit meal, with meat at one time and groats or coarse oatmeal the next. As they grow, of course, the food can be changed, and they can have whole oats instead of groats, and a more liberal percentage of lean meat in proportion. Lean meat contains roughly about 25 per cent of albuminoids.

Laying Poultry.—For the production of eggs poultry also need a large percentage of nitrogenous matter, as this is required for the formation of the egg; they also need a little extra supply of mineral matter. Now oats are always fairly rich in mineral matter, whilst meat fibre and fish are rich in albuminoids; therefore, it will be found that on the average a somewhat similar diet to that recommended for chickens will suit the laying hen. In actual practice I have found that poultry will lay better upon oats than upon any other corn.

The Fattening Fowl.—Here we do not need to give frame-growing foods at all. What is wanted is to increase the amount of flesh and fat. This can be brought about by giving a surfeit, and by preventing exercise, which tends to the distribution of heat and prevents the accumulation of fresh bodily substance. Fatty, starchy and sugary foods are recommended for fattening purposes. Thus fat meat residues, Indian meal, potatoes, rice and cow's milk are amongst the best foods for fattening purposes. Many people of experience recommend oatmeal to be given with milk for fattening purposes, and that is excellent. Oatmeal contains if anything more fat forming matter than Indian meal, and is to be preferred to that on account of its effect upon the colour of the fat. I ought to point out that oatmeal, too, not only contains a considerably higher percentage of albuminoid and fibrine matter than Indian meal, thus being suitable for all the three purposes which have been enumerated, but it does not contain so high a percentage of starchy or heat giving matter, and thus is more easy of digestion than is Indian meal. Oats possess a much higher value as a general poultry food than they are reputed to possess by a very large percentage of the poultry-keepers of my acquaintance. If poultry-keepers would use whole oats more freely than Indian corn and wheat as an evening food for their stock they would obtain better results.

STABLE MANURE AND FRUIT TREES.

The Fruit Grower gives some wholesome advice regarding the indiscriminate use of stable manure in fruit cultivation, which growers would do well

to take to heart. We reproduce below the pith of the article under reference:—

Where fruit trees are fed heavily with stable manure they can never be depended upon to produce the best fruits in abundance, and the more that is fed to them, the more insipid and watery will the fruits be. Though nitrogen is necessary, it is only necessary in proper proportion and in conjunction with other elements needed to produce the best results. The tree will not grow without nitrogen, but that is no reason why it should be fed to the trees in excess or in unequal proportions to the other elements. Still it must not be forgotten that often the trees in those soils which contain the largest proportion of nitrogen give fruits which are more watery, and the skins of which are only partially coloured, when contrasted with the fruits grown on the soils containing less nitrogenous materials. So long as the wood growth of the tree is ample each year, remember that the soil contains enough nitrogen and does not need any more fed to it. Lime and potash work wonders in the orchard, and there is no doubt in our mind that were our plantations dressed with applications of lime, muriate of potash and superphosphate, they would yield far better fruits and crops than they are in the habit of doing under the present out-of-date system. We warn our readers against the free use of stable manure in fruit culture, or rather, we repeat our warning—for this journal stands out as the only one in which this idea has been persistently advocated—for we are sure that the dosing of fruit trees with nitrogenous material is a gross error, and if the land is made over-rich, with the organic substance stable manure contains, there can be but one result, and that is an increase of wood growth at the expense of fruit. The dung feeders are simply ruining their fruit trees every year that they nauseate the soil with this foul-smelling compound. They are starving their fruit trees really, inducing weak and diseased growth, and in due course the trees will become producers of third-grade fruits, which are a source of annoyance to dealers and of loss to the producers. Here our views are in striking contrast to those of our contemporaries. They advocate the digging of a big hole, into the bottom of which large supplies of dung must be shot, and after covering this with soil they set the roots over this bolus. They argue that in time the roots will reach the manure, and that it will furnish the tree with ample plant food for many years to come. The argument, to our mind, is not convincing. We say, use no manure when planting, and particularly no stable manure. Feed in due course with surface feeding, and thus induce the roots to spread out near the surface. That is the way to secure plentiful crops of large fruits.

CEYLON TIMBERS AS COMPARED WITH ENGLISH TIMBERS.

The July number of the *Imperial Institute Journal* contains an interesting report by Professor Unwin, F.R.S., on Ceylon Timbers. We presume the report is based on tests applied to the collection that was sent to the Ceylon section of the Imperial Institute some 8 or 9 years ago. If

so, and considering the age of the specimens (which we think should be noted) the report is a most favourable one for Ceylon timbers. We quote as follows from the report:—

The precise combination of qualities required in a timber for special purposes, including facility of working, uniformity of structure and freedom from defects, appearance, durability, and other qualities, is not to be determined from mechanical tests alone. Further, the results of mechanical tests of the same timber vary with the locality in which the timber is grown, the conditions of felling and seasoning and other circumstances, to a greater extent than is commonly supposed. In some 2,000 tests of different logs of long leaf pine made for the Government of the United States, which had all been selected by the forest officers and subjected to the same treatment, it was found that the crushing strength varied from 2.04 to 4.40 tons per square inch; the coefficient of transverse strength from 1.90 to 7.25 tons per square inch; and the heaviness from 28 to 65 lbs. per cubic foot. Hence very definite deductions from any set of tests on a limited number of logs must be subject to correction.

For European timbers I take the following values as representing fairly what is accepted as the averages of such results as are trustworthy:—

EUROPEAN TIMBERS.

Name of Timber.	Heaviness in pounds per c. to c.	Crushing strength, pounds per S. inch.	Transverse strength, pounds per S. inch.	fc	fb
	w.			w.	w.
Oak	52	10,000	12,000	193	230
Elm	34	10,300	8,000	320	235
Ash	47	9,000	13,000	191	277
Red Pine	37	8,300	8,300	157	224

Broadly speaking the strength of timber increases with its heaviness. The most valuable timbers for structural purposes are those which have considerable strength without excessive weight. The pine timbers so largely used are not only easy to work, but they have good strength in proportion to their heaviness. In the above table the strengths have been divided by the weights per cub. foot and the results are given in the last two columns. Compared in this way, Elm is superior to Oak, and even red pine is not much inferior.

TABLE OF CEYLON TIMBERS.

Name of Timber.	Heaviness in pounds per cubic foot.	Crushing strength, pounds per square inch.	Transverse strength, pounds, per square inch.	fc	fb
				w.	w.
LIGHT TIMBERS. UNDER 42 lb. per c. ft.					
Sapu	41.4	3,490	7,820	84	188
Vinakku	40.4	4,290	9,610	106	234
Lunumidella	20.4	3,200	5,720	157	280
Walukina	32.4	6,100	9,010	188	280

MEDIUM TIMBERS. 42 to 60 lb. per c. ft.

Panakka	...	54.9	9,200	12,960	167	236
Dawata	..	47.3	5,920	10,820	125	228
Jak	..	43.4	7,550	6,840	174	167
Del	..	48.1	6,500	9,310	135	193
Suriyamara	...	57.0	9,300	14,600	163	256
Ilanthai	..	48.9	6,170	7,790	126	159
Mendora	..	59.7	5,810	13,710	98	230
Ubberiya	...	56.7	7,620	10,090	139	178
Tawenna	..	46.1	7,660	8,070	166	175
Margosa	..	47.3	6,640	11,480	140	214
Halmilla	...	49.9	7,630	15,450	153	310
Suriya	..	50.3	6,230	11,660	124	233

HEAVY TIMBERS. Over 60 lb. c. ft.

Gurukina	..	62.6	5,350	8,740	86	140
Satinwood	...	64.3	7,500	13,780	116	214
Milla	...	60.9	6,630	14,760	109	242
Ranai	..	63.3	5,800	10,570	92	167
Chomuntiri	..	75.5	6,530	14,490	86	152
Nedun	..	70.8	8,700	16,040	125	226

Taking the light woods, it is clear that as regards strength in proportion to weight, Lunumidella and Walukina stand best. The remarkably light wood, Lunumidella, is not absolutely as strong as red pine, but in proportion to its weight it is even a better timber. Walukina is weaker than ash, and about the same strength as red pine.

Of the medium woods, Halmilla is strongest in proportion to its weight, and Suriyamara stands next. Ubberiya, which Mr. Stone thinks well of, is somewhat weaker than oak, but it has a greater transverse strength than elm. Tawenna has nearly the same mechanical properties as Ubberiya. Suriyamara is somewhat stronger than either of these.

The heavy timbers do not give very high results. Satinwood has greater transverse strength than oak, but the strength in proportion to weight is not so good. Milla and Chomuntiri have a little greater transverse strength, but their crushing resistance is low. Nedun is the heaviest, and, for cross breaking, the strongest timber. But its constants obtained by dividing the strength by the weight are not so good as those of European timbers.

I know no tests of the shearing resistance of European timbers along the fibre which are trustworthy. But the following results of tests at Watertown Arsenal may be used for comparison with the tests of Ceylon timbers.

Shearing Strength.

Lb. per sq. in.

Ash	--	--	458 to 700
Red oak	--	--	726 to 999
Yellow pine	--	--	286 to 415
Spruce	--	--	253 to 374

SHEARING STRENGTH OF CEYLON TIMBERS.

Name of Timber.	Shearing Strength along fibres.	
	Lb. per sq. in.	fs
LIGHT TIMBERS.		
Sapu	--	753
Vinakku	---	486
Lunumidella	---	478
Walukina	---	337
MEDIUM TIMBERS.		
Panakka	---	745
Dawata	---	1,075
Jak	---	672
Del	---	1,236
Suriyamara	---	1,283

Name of Timber.	Shearing Strength		fs. w.
	Lb. per sq. in.	along fibres. fs	
Ilanthai	—	1,013	20
Mendora	—	620	10
Ubberiya	—	1,066	18
Tawenna	—	1,084	23
Margosa	—	1,326	28
Halmilla	—	830	16
Suriya	—	927	18
HEAVY TIMBERS.			
Gurukina	—	948	15
Satinwood	—	1,903	29
Milla	—	1,004	16
Ranai	—	925	15
Chomuntiri	—	1,333	18
Nedun	—	1,486	21

In a few cases the shearing resistance is rather low for light-wood timbers. In most instances, however, it is as high as, or higher than, that of timbers commonly used. Amongst the medium timbers there are seven which have greater shearing resistance than American oak. The figures in the last column show the relative values of the timbers as regards shearing strength.

[The following are the botanical names of the timbers referred to:—

- Sapu, *Michelia champaca*
- Vinakku, *Pterospermum suberifolium*
- Lunumidella, *Melia dubia*
- Walukina, *Calophyllum bracteatum*
- Panakka, *Pleurostylia Wightii*
- Dawata, *Carallia integerrima*
- Jak, *Artocarpus integrifolia*
- Del, *Artocarpus noblis*
- Suriyamara, *Albizia orodattissima*
- Ilanthai, *Zizyphus jujuba*
- Mendora, *Vatica Roxburghiana*
- Ubberiya, *Carallia calycina*
- Tawenna, *Cryptocarya membranacea*
- Margosa, *Azadirachta indica*
- Halmilla, *Berrya Ammonilla*
- Suriya, *Thespesia populnea*
- Gurukina, *Calophyllum Burmanni*
- Satinwood, *Chloroxylon Swietenia*
- Milla, *Vitex altissima*
- Ranai, *Persea semecarpifolia*
- Chomuntiri, *Heritiera littoralis*
- Nedun, *Pericopsis Mooniana*.—Ed. A.M.]

RESOLUTIONS OF THE INTERNATIONAL CONGRESS OF VETERINARY SURGEONS, 1899.

For the following Resolutions respecting the diseases of stock and their prevention (agreed to at the 7th International Congress of Veterinary Surgeons, held at Baden-Baden, July, 1899,) we are indebted to the *Cape Agricultural Gazette*:—

I.—PREVENTIVE MEASURES AGAINST THE SPREAD OF EPIZOOTICS IN CONSEQUENCE OF INTERNATIONAL CATTLE TRADE.

The Seventh International Veterinary Congress considers an effective fight against epizootics, in the interests of the individual States as well as of the public economical welfare, both useful and desirable. The means to be employed are a uni-

form application of scientific principles and an efficient regulation of the veterinary department, of the intelligence department respecting epizootics, and of international cattle trade.

But the Congress, considering the difference in the economical development and the conditions of traffic as well as the dissimilitude of veterinary organization in the separate countries, does not think the moment has yet come for laying down definite principles of an international agreement.

II.—THE PREVENTION OF FOOT AND MOUTH DISEASE.

It is in the interest of an effectual prevention of Foot and Mouth Disease:

- (1) by all and every means to prosecute the scientific investigation of this disease;
- (2) to exclude the infected district from free traffic;
- (3) to submit the traffic in cattle for sale to a strict veterinary police control in such a way, that the cattle of cattle-traders should be placed under the inspection of the police before sale;
- (4) that buttermilk and all other remnants of milk should not be supplied habitually from the co-operative dairies until they have first been submitted to such a temperature as shall insure the extinction of infectious matter;
- (5) that the authorities should be required to order in certain cases the slaughter of animals, the proprietors receiving compensation for the resulting loss;
- (6) to regulate in the whole country, as far as possible, the initiation, the continuation and the completion of the needful veterinary police rules, whereby special weight is to be laid upon the strict carrying out of the separation and disinfection of the clothes of the attendants, etc.

III.—THE NEWEST SUGGESTIONS FOR AN EFFECTUAL MEAT INSPECTION.

- (1) The Congress desires to draw the attention of the Governments of the States officially represented to the necessity of the general introduction of compulsory inspection of meat.
- (2) None other than certificated veterinary surgeons can be summoned as professional men to inspect meat. In places where it is still impossible to establish a regular veterinary service, lay inspectors with limited powers may be provisionally appointed. These must be trained for their profession as much as possible by veterinary surgeons in the larger slaughter houses, be examined by the State, and constantly be controlled in the exercise of their function by veterinary surgeons. Only veterinary surgeons should be appointed as professional inspectors of meat and as the directors of slaughter houses and cattle sheds.
- (3) Instruction in meat inspection at the veterinary colleges must be improved and

extended. Meat inspection should be made as far as possible the object of practical examination for a veterinary diploma.

This examination too must take place for the obtaining of the diploma as a veterinary surgeon. Moreover, it is required in this case, that the candidate has worked at least 8 weeks in the meat inspection of a large public slaughter house, standing under regular veterinary supervision.

- (4) As a matter of principle, all inspection of meat must be founded on sure scientific bases and experimental rules, which should be agreed upon by an international understanding.
- (5) Inspection must be extended to all kinds of butcher's meat and be introduced everywhere. It must include all beasts for the butcher and every kind of meat that serves for human food and public use, whether it be destined for human food and public use, whether it be destined for public sale or private consumption.
- (6) The efficiency of meat inspection is only perfect in those places where public slaughter houses exist together with compulsory slaughter. On that account, their erection in as many communes as possible is advisable.
- (7) It is necessary for the inspection of fresh slaughtered meat coming from outside :

- (a) that the flesh of cattle and horses should be brought in at least in quarters, that of swine only in halves, and that of all other animals in an undivided state : and further,
- (b) that the most important intestines should be in natural connection with the meat.

Fresh meat introduced from foreign countries is subject to the same requirement.

Preserved meat from foreign countries can only be imported if it is kept in a trustworthy, sanitarily unsuspecting manner, and its harmlessness can be affirmed with certainty.

- (8) Meat authorized for consumption after inspection must be marked in a proper manner (stamping, leading, etc.).
- (9) Meat proved to be harmless but of inferior quality must be sold under declaration at certain places ("Freibänke") under the supervision of the authorities.
- (10) The introduction of a universal and compulsory insurance for slaughter cattle under State control is urgently required in the interest of meat inspection and the stamping out of cattle diseases.
- (11) The results of meat inspection should be collected for scientific and economical purposes in statistics arranged on a definite plan, in which international uniformity should be aimed at.

ARTIFICIAL CHANGES OF PHYSICAL PROPERTIES OF SOIL.

(Continued.)

Thus, while the methods noted are effective in removing the hurtful excess of water, they may bring about a condition of dryness which in most cases, especially where rain is scarce, and in time of drought is unfavourable to growth of maximum crops. To do away with this difficulty, which militates against the best interests of rational tillage of land, such means of regulations ought to be adopted as will either cause the water to drain off more slowly, or allow of complete stoppage of all flow temporarily. The former can be attained only imperfectly, because in the end all the water not held by the soil is removed; in the latter case, however, with proper care the moisture may be thoroughly utilized in accordance with the nature of the soil and the requirements of the crops. Drainage cannot be controlled effectively with open ditches, but it may very readily be done in case of under drains by calculating the diameter of the drain pipe on the basis of the quantity of water that percolates through hard, heavy soil. According to the experiments of the author, this amounts to 0.008 cubic meters, or 0.8 litre per second and hectare (= 0.56 pint per second per acre). With this as a basis, and starting with the smallest feasible diameter of pipe (4 cm, or 1.6 in.), the drainage system may be so constructed that part of the moisture may be kept in the soil for a long time. This, however, hardly answers the purpose, since the humidity of the soil, especially during the period of plant growth, cannot be fully controlled. Hence it is recommended that open ditches be provided with board dams and drains with flood gates, by means of which the flow of water may be interrupted either partly or entirely, as the occasion may require. This method is simple and easily applied in all ordinary forms of drainage. The higher portions of a dangerously moist field should be reserved for grains and hoed crops, while the lower parts are used for crops which possess a high power of evaporation (such as meadows). Even in this case, however, the plants will suffer, if the moisture in the soil exceeds 70 to 80 per cent. of saturation. The temporary pools which form on very fine grained soils during heavy rains must be removed either by direct withdrawal of the water (water furrows), or by such means as will bring about a diminution of the water capacity; in other words, an increase in permeability or an increase of evaporation from the soil. In the first case effort must be directed principally toward producing a crumbly structure through cultivation and manuring, as suggested above, since by this means the water-holding capacity of the soil is reduced and percolation promoted. On extremely fine-grained soils (clay soils, black-earth), which in their unmodified condition offer the greatest resistance to the passage of water and become thoroughly moist only with the greatest difficulty, this process is indispensable in order that the precipitation may be of any use at all to plants. A favourable modification of

the water capacity and penetrability of such soils may also be brought about by admixture of soils of opposite physical characteristics, as, for instance, coarser grained soil (sand). By this means stiff soils are rendered more easy to cultivate, and are more readily changed into a condition of separate grain structure.

Enlarging the surface of evaporation, as is done in ridge and hill culture, is another means of preventing harmful accumulation of water in soils. By this means, also, a portion of the rain water is removed from the reach of the plants by flowing into the furrows between the rows.

Close planting also assists to some extent in reducing the moisture in the soil by increasing the amount of water drawn from the soil by the crop.

It is a mistake to allow wet soils to lie fallow, especially in wet seasons, because the conditions in fallow soils are much less favourable to evaporation than in cultivated soil. Allowing soils to lie fallow, however, is not harmful; on the contrary, it may be useful if the soil during a previous long drought has become dry to a considerable depth.

Lack of moisture in a soil may be corrected either by direct application of water (irrigation) or by increasing the absorptive power of the soil. Irrigation is to be recommended in all cases in which the water supplied by precipitation is insufficient for the production of maximum crops. The point at which irrigation becomes necessary varies in different localities and is determined by the energy of evaporation, the water-holding power of the soil, and the distribution of precipitation. In the warmer climates we may assume, as a rule, that when precipitation is less than 24 to 28 in. irrigation is required for maximum crops, while in colder localities in which evaporation is less rapid and crops smaller, on account of the low temperature, the limit may be placed at about 16 in.

With regard to the treatment of soils which have little water capacity, great permeability, and favourable conditions for evaporation, the aim should be mainly to keep the ground water at a proper level, or, if this is not possible, to increase the water capacity of the soil.

The latter may be accomplished by admixture of fine-grained, earthy materials (clay, loam and marl), or by increasing the percentage of humus through liberal applications of manures of organic origin (stable manure, peat, &c.). Another, though less effective, means is rolling the soil, provided it be followed at the beginning of dry weather, by harrowing, hoeing, &c. to reduce evaporation.

For soils of small water capacity such operations as limit evaporation as far as possible are generally recommended. Too frequent ploughing of the soil should be avoided, and ploughed land should be harrowed as soon as dry weather sets in, to reduce the surface of evaporation as much as possible. If the soil becomes too hard, as may happen as a result of violent rains or of rolling, loosening of the surface (harrowing, hoeing) is of great advantage in reducing evaporation and thus retaining moisture in the soil.

Furthermore, hill [or ridge culture is to be avoided, since in this case evaporation is greater than in level culture. Close planting should not be practised for the same reason. Allowing the soil to lie fallow may result in the storage of moisture in the soil, but it is recommended only when the soil is dry to a considerable depth. Finally, mulching or covering the soil with a layer of dead vegetable matter (stable manure, straw, &c.) reduces evaporation from the soil for a time at least.

CLINICAL NOTES.

BY A. CHINNAH, G.B.V.C.

I performed successful operations on three dogs suffering from cancer of the penis. In all three cases castration was performed in addition to the ablation of the cancerous growth from the parts. The following letter from Colonel Webster testifies to the fact that my mode of operation has been attended with successful results:—

Berwick House, Cinnamon Gardens,
4th August, 1900.

I have much pleasure in stating that Veterinary Surgeon A. Chinniah was called in to attend my dog, which was suffering from cancer, on the 2nd June, 1899, and after performing an operation—removing the immediate cause of the disease on the 8th September of the same year—was able to perform a further operation resulting in the cure of the dog.

(Signed) H. G. WEBSTER, Lieut.-Col.

CULTIVATION OF THE ARECANUT IN BOMBAY DISTRICT.

(A Note by Mr. J. W. Mollison, Deputy Director of Agriculture, Poona.)

The palm is a native of Cochin-China, Malayan peninsula and Islands. It is cultivated throughout tropical India, but does not thrive at any great distance away from the sea.

Betel palms, cardamoms, and pepper are the chief crops grown in the garden lands of Kánara. In old-established gardens there may be a few jack-fruit and cocout trees, also plantains, limes, coffee bushes, and pineapples. These gardens are chiefly found in Sirsi and Sidádpur taluks and in the whole Collectorate extend to some 17,000 acres. They generally occupy the bottom lands of narrow valleys. The most favourable situations are in valleys which have the slopes on both sides fairly extensive, moderately steep, and covered with forest growth. The forest growth gives beneficial shade and shelter, and supplies the gardens with branchwood, leaves, and litter for manure and other purposes. The garden land extends usually in a narrow strip along the course of any particular valley and is subdivided according to ownership. Bottom land which is open and cleared appears to be more suitable for rice beds than for spice gardens. Some garden occupants also own rice lands, but most commonly they only cultivate garden land. An owner may own three or four acres, sometimes more, often less. All garden owners are Haviks—a shrewd and hardworking,

well-behaved class among the Brahmins. They are supposed to have come originally from Mysore. Their methods of cultivation are almost identical in all gardens, and presumably are ancient in origin. The methods adopted are successful in practice, and although they appear at first sight extraordinarily antiquated to a casual onlooker, they may, like other time-honoured Indian practices, be found on full enquiry the most suitable for the existing natural conditions of the district. The Haviks are well-to-do, as evidenced by their commodious well-built houses, which in many cases are roofed with Mangalore tiles.

The narrow strips of spice gardens follow the course of the old nálas which drained the valleys before the gardens existed. When the gardens of any particular valley were first formed, the bed of the nála was levelled and also the bottom land along its course. Since that time the slopes on either side have been gradually cut away and many of the old gardens are now bounded laterally by almost perpendicular cuttings 10'—20' in height. These cuttings present a complete barrier against trespass by man or beast and shelter the gardens from storm and wind. The occupants' house and buildings are close to the garden, above the cuttings, usually in a cosy fairly dry situation. A garden is entered by descending a steep narrow pathway or by rude steps which lead to a plank-bridge over a ditch at the bottom. The rainfall of the district is heavy, and the positions of the gardens are such that much drainage water must pass through them. Drainage is thoroughly arranged for by main ditches cut along the course of the garden strips and by cross minor ditches which carry water to the main drainage channels. The main channels are bridged here and there as required by long slabs of stone or by three or four pieces of palm-stem placed side by side. The heavy rainfall and the flood of drainage water in the monsoon undoubtedly wash much of the garden land away, and more particularly so if the soil is not of a particular kind. The most suitable soil is called locally *kagdali*. This is a yellowish-red or reddish-brown earth which usually exists in deep beds as the side cuttings of the garden show. In these cuttings rock of a soft nature sometimes obtrudes a few feet below the surface, but more often the whole depth of cutting is soil-like in character, and appears in layers which vary somewhat in consistence. There are no definite lines of demarcation between layers; but near the original surface generally there is sometimes a gritty or gravelly section which is considered inferior. Further down there is a layer which presents a shaly appearance which deceives the eye. At first sight it appears hard, durable or rocky, but a piece can easily be broken off by the hand, and if squeezed or rubbed crumbles into an impalpable powder which feels moist and soapy. This soil material as seen in the cutting has a peculiar metallic lustre, but when crumbled is simply a fine argillaceous yellow earth extremely retentive of moisture, and which under pressure becomes consolidated, so that running water does not readily remove it. It is easy to understand

that a soil of this class is suitable for a spice garden. It does not matter much whether the soil is naturally fertile or not, because the yield of the crops grown is mostly affected by the quantity and quality of manure directly applied. As regards the soil the chief point is that it must be of such consistence that it can withstand the denuding effect of flood water and be so retentive of moisture that little or no irrigation is required in the fair season. In many gardens irrigation is not required even in the hot weather. At this time a trickling stream fed from natural springs may be seen running along the main channels or a perennial nála passes by the main channels through the garden. The soil is thus kept continuously moist. In such garden ferns and mosses in great profusion and variety grow along the drainage channels. In other gardens not so favourably situated a little irrigation may be required in March, April, and May, and this is arranged for from a tank or tanks usually built of stone and not very capacious, which tap the waters of natural springs.

In laying out a garden, the soil is first levelled and then the drainage channels are made. The main channels are about four feet deep and four or five feet wide at the top with sides having an easy slope to the bottom. The minor cross channels are one foot wide and about 18 inches to 2 feet deep. These channels are exactly parallel. They are distant from each other 12 to 15 feet. The space between is called *bharan*. The *bharan* has a rounded surface. It is highest in the middle, thus rain water drains freely to the channels. A pathway runs along the middle of each *bharan*, or rather by usage the middle of each *bharan* becomes a pathway. On each side of the pathway, in old-established gardens, a line of alternate betel palms and cardamoms is found with pepper plants trained on the stems of the palms. The palms are 6 to 8 feet apart in the rows. It takes, however, many years of patient labour before the garden gets to this stage. When a new garden is made the *bharans* are thoroughly dug and weeded. Plantains are planted along the water-courses. They give some direct return for expenditure incurred, but the object in planting them is to provide shade for the betel palms. When the plantations afford sufficient shade, pits 2½ to 3 ft. square and 2½ ft. deep are made. Leaf manure and pieces of plantain are put in the bottom of the pits and then excavated soil partly filled in. The young palm trees four or five feet high and three or four years old are planted in these pits, and sufficient of the excavated earth put round and pressed on the roots to keep the plants straight.

(To be continued.)

ON THE FORESTS AND WASTE LANDS OF CEYLON.

BY A. F. BROWN, ESQ.,
Conservator of Forests.

The lowcountry wet-zone is the country *par excellence* of the Dipterocarps. In the Chilaw and Kurunegala districts, and in the Northern portion of the Colombo district, they are represented only by *Dipterocarpus zeylanicus*,

but further South and East they increase in number and species until, in many cases, they form almost the entire forest. No doubt, several new species will have to be added, and even since the first volume of Trimen's Flora has been published fresh discoveries have been made, a case in point being the *Stemonoporus* (? *Vatica*) *Lewisii*, which was found by Mr. F. Lewis of the Forest Department at about 1,000 ft. altitude above Pelmadulla. The curious almost wingless fruit of *Shorea lissophylla* was also found near the Bentota river in the Western Province. The forests of this zone, where they have been saved, are to the eye the most magnificent of the whole island, the trees often reaching a height of 100 feet to the first branch. On this account the trees are often difficult to identify, and it is probable that many are still unnamed, especially as it is not always possible to hit on new species at the time when they are in flower or fruit. The most beautiful of these forests is probably the forest of the Hiuidun Pattu, in the Southern Province; in it the most important Dipterocarps are *Dipterocarpus hispidus*, which in the South almost replaces *D. zeylanicus*, *D. glandulosus*, *Shorea oblongifolia*, *Doona trapezifolia*, which extends up to about 3,000 ft. above sea level, *D. cordifolia*, *D. macrophylla*, *D. congestiflora*, which produces a valuable timber, *Hopea discolor* and *Vatica affinis*.

Vatica Roxburghiana is found near streams and in lands subject to inundation in the Western Province and in Sabaragamuwa, while *Vateria acuminata*, which also loves the neighbourhood of water, is found on more rocky ground. The Dipterocarps which are able to ascend to an elevation of 4,000 ft. are *Doona zeylanica* and *D. Gardneri*, and *Stemonoporus Gardneri*, which has been found up to nearly 5,000 feet.

Among the natural orders, which are also widely represented, are the Guttifere, the Ebenaceæ, and the Sapotaceæ. The first-named is represented chiefly by the ironwood *Mesua ferrea* and *M. Thuaitesii*, by *Calophyllum spectabile*, *C. Burmanni*, which extends into the dry country, *C. bracteatum*, *C. tomentosum*, *Garcinia cambogia*, *G. morella*, (the gamboge tree), *G. terpinophylla*, and *G. echemocarpa*, which latter grows up to 6,000 ft. elevation. The Ebenaceæ are particularly abundant in the forests of the Adam's Peak Range, and in the Pasdun and Hiuidun Korales.

Ebony, as has already been mentioned, is found in small quantities in this zone, but the most important tree of this family, which is unfortunately almost extinct, the Coromandel or Calamander wood of commerce, *Diospyros quaceta*, is still found here and there in the Pasdun Korale and in the Hiuidun Pattu. Attempts have been made for several years to obtain the fruit in order to propagate the species artificially, but, although rewards have been offered, none has been obtained.

The other most noticeable trees of this family are described by Mr. F. Lewis, who has made a special study of them. In the wet forests, extending from the mountain known as the Haycock into the Sabaragamuwa Province, the most noticeable example of the Ebenaceæ are *Diospyros posia*, *D. Gardneri*, *D. insignis*, and *D.*

Thuaitesii. The first of these is found up to 3,000 ft. altitude, while the last, though endemic, is restricted to the areas of high rainfall. *D. pruriens* is found very sparingly in the wet forests towards Adam's Peak, and in one place in the Western Province. A remarkable species, possibly a form *D. Ebenum*, locally known as 'Kallu kiria,' occurs at the foot of the Rakwana hills, and is conspicuous by its black lace-like heart-wood, but little is known of its flowers or fruit. One of the most common, but valueless, of the order is *D. insignis*, which extends up to 2,000 feet altitude in the West of Ceylon.

The Sapotaceæ are also well represented, especially in parts of the Matura district. The most important are *Chrysophyllum Roxburghii*, *Isonandra lanceolata*, *Bassia fulva*, *B. nerifolia*, which lines the banks of rivers, *Palauquium petiolare*, *P. grande*, which extends into the mountain zone, and *Mimusops Elengi* which is also found in the dry zone. Among the more noteworthy trees belonging to other natural orders, the following are characteristic of this zone:—*Dillenia retusa*, *Wormia triguetra*, *Cullenia excelsa*, *Elæocarpus serratus*, *Kokoona zeylanica*, *Canarium zeylanicum*, *C. brunneum*, *Lasinthera apicalis*, *Pometia eximia*, *Caxapnosperma zeylanicum*, which in places forms almost pure forest, *Pericopsis Mooniana* near water-courses, *Adenantha pavonina*, *A. bicolor*, *Pygeum zeylanicum*, *Carallia integerrima*, *C. calycina*, especially in the Galle district, *Anisophyllea zeylanica*, *Homalium zeylanicum*, *Symplocos spicata*, the three *Myristicas* (*M. laurifolia*, *M. Horsfieldia* and *M. Iriya*). Various species of *Cinnamomum* and *Litsea* are also abundant; and, among the Euphorbiaceæ, *Bridelia retusa*, *B. Moonii*, *Aporosa latifolia*, *A. Lindleyana*, *Ostodes zeylanica*, *Chaetocarpus castanocarpus*, and *Macaranga tomentosa* are the most common; while among Urticaceæ there are numerous figs, *Artocarpus integrifolia*, *A. nobilis*, and *Trema orientalis*. Among the shrubs which characterise this zone may be mentioned *Humboldtia laurifolia*, *Maesa indica*, *Agrostis tachys longifolia*, *A. Hookeri*, *Izora coccinea*, *Ardisia Moonii*, &c.

Most of the palms of Ceylon are found in the zone. The most important by far is *Caryota wens*, the toddy and sugar of which provide many jungle people with means of existence. The Talipot palm (*Corypha umbraculifera*) found in several forests, especially in the Kurunegala district, and is noteworthy for the enormous panicle of flowers which the male tree produces, and for its leaves, which are used for umbrellas, fans, mats, &c. The *Nipa fruticans* is characteristic of brackish waters, while several species of *Calamus*, with the help of their hooked tendrils, climb to the summits of the highest trees.

Among the characteristic climbers may be mentioned *Coccoloba fenestratum*, *Ancistrocladus Vahlii*, *Entada scandens*, *Acacia concinna*, *Strychnos cinnamomifolia*.

The most beautiful orchid of this zone is the *Dendrobium macartheae*; and among the most interesting ferns may be mentioned *Gleichenia linearis*, which covers large extents of country, *Blechnum orientale* and *Nephrolepis exaltata* which, after the first-named, are the most

common, *Cyathæa sinuata*, which is only found in the Southern Province, *C. Walkerii*, the tree fern of the lowcountry, *Thamnopteris Nidus*, the so-called Bird's-nest fern found generally on trees, *Asplenium rutæfolium*, *Diplazium lanceum*, *D. Schkuhrü*, *Aspidium Thwaitesii*, *Lactæa deparioides*, *Niphobolus Gardneri*, *Pleopeltis pteropus* (var. *minor*), *Tænites blechnoides* (in the, Matara District), *Drymoglossum heterophyllum*, *Stenochloena palustris*; *Polybotrya appendiculata*, *Gymnopteris variabilis*, *G. contaminans*, *G. subcrenata*, *G. quercifolia*, *Acrostichum aureum* (generally not far from the sea in swampy places), *Schizæa digitata*, *Angiopteris evecta*, *Ophioglossum pendulum*, and *Helminthostachys zeylanica*. *Botrychium d. ucfolium* and *Oleandra musefolia* extend into the mountain zone.

The forests of this zone are of by no means so large in extent as those of the dry zone; they usually occur in isolated blocks, covering ridges and separated by stretches of chena or by paddy fields. The most important blocks are the forests that in former days formed part of the extensive Sinharaja forest; they are situated in the Galle district of the Southern Province, the Pasdun Korale of the Western Province, and the Kukul Korala of the Province of Sabaragamuwa. The lower forests of the Adam's Peak range also belong to this zone.

GENERAL ITEMS.

A bulletin of the Kansas Agricultural College advises that dairy cows should be always fed after milking, and never just before or while milking. One reason given for this advice is that there are odours from the feed that may be absorbed by the milk direct, or if there are volatile matters in the food they will taint the milk, while if the food is given after milking, these volatile matters are worked out before the next milking. A cow properly trained will give more milk when she devotes her whole attention to giving milk than when she is fed during milking time.

A correspondent to the *Cape Agricultural Journal* offers the following advice for treating fowl cholera which many will be glad to have:—Take one large tablespoonful of Little's Dip and mix it with *three gallons of soft water*, and in the mixture soak some wheat, lock up the fowls, and give them the wheat to eat and some of the same water to drink. Three or four days of this treatment will stop the epidemic. The treatment, it is said, has been always found successful.

The same journal states that one pound of bisulphide of carbon will destroy all the insect life in 100 bushels of grain in a bin, or will be effective in 1,000 cubic feet of space. It forms a dense gas, heavier than the atmosphere, and

consequently it not only permeates the grain but finds its way into all the crevices in which the insects breed. To preserve grain for sowing the best plan is to keep it in an iron tank or tin lined box, if it can be made airtight, and place on the top a piece of cotton saturated with bisulphide of carbon, then close it down, taking care not to let the fumes come in contact with a light. The grain can be left like this till required for sowing and will be perfectly safe from weevils and the germinating power in no way injured.

One of the latest remedies for ants is gasoline. Pour about half a pint into the ant hill and set it on fire. The gasoline will instantly spread throughout the ant hill, and as the heat on the surface increases the gas will generate from the utmost recesses and the fire destroy the ants. Half a pint will burn from three to eight hours and kill every ant in the largest nest and all that attempt to enter it from without.

The following recipe, from a Sydney paper, is said to be a certain remedy against rats, mice and cockroaches:—Take 1 lb. of flour, 2 tablespoonfuls of oatmeal, 4 to 6 oz. of plaster of Paris; mix. dry and place in pans or plates on the floor, in cupboards, &c. Securely cover up all other food in the house and take care that children and pet animals do not have access to the mixture. A correspondent says that he tried the mixture in an old store and killed 600 rats in three nights!

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF AUGUST, 1900.

1	Wednesday	.. Nil	17	Friday	.. '01
2	Thursday	.. Nil	18	Saturday	.. Nil
3	Friday	.. Nil	19	Sunday	.. '05
4	Saturday	.. '28	20	Monday	.. '18
5	Sunday	.. '97	21	Tuesday	.. '05
6	Monday	.. '04	22	Wednesday	.. '10
7	Tuesday	.. '28	23	Thursday	.. '01
8	Wednesday	.. Nil	24	Friday	.. Nil
9	Thursday	.. Nil	25	Saturday	.. Nil
10	Friday	.. '01	26	Sunday	.. Nil
11	Saturday	.. '11	27	Monday	.. Nil
12	Sunday	.. Nil	28	Tuesday	.. Nil
13	Monday	.. '02	29	Wednesday	.. '27
14	Tuesday	.. '09	30	Thursday	.. '48
15	Wednesday	.. '06	31	Friday	.. '07
16	Thursday	.. Nil	1	Saturday	.. 3'87

Total..7'96
Mean.. '25

Greatest amount of rainfall in any 24 hours on the 1st September, 3'87 inches.

Recorded by C. DRIEBERG.