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DYNAMITE FARMING.

SUGGESTIONS FOR TROPICAL AGRICULTURISTS.

Some time ago we drew attention to the possibilities of dynamite farming for Ceylon, and its usefulness in more rapidly clearing land required for cultivation, but the process appears to have made little progress in the island, although one local firm was to have introduced a new explosive ("Ergite") especially designed for farm work, and there was an experiment at Peradeniya some three months ago.. Farming by dynamite is not a new thing, and it is said that farmers in the Western States of America have regularly blasted their land for the past 20 or 30 years, and that bumper crops have attended their efforts. Until quite recently, however, it has been looked upon with suspicion by the British farmer, who has an almost uncanny veneration of the things his grandfather did, and a corresponding contempt for "new fangled notions," which though admittedly beneficial, are—well, new fangled. Despite his contempt, dynamite farming is now a recognised agricultural science and a thoroughly established principle for preparing the ground for crops. The natural elements of fertility in the soil are phosphoric acid, potash, humus and nitrogen compounds And these are far more valuable below the ploughable area. Ploughing benefits the soil to a depth of some six or eight inches, but the soil beneath that is never touched. Moisture cannot penetrate, and a necessary supply of water is denied the plant. Dynamite breaks up the ground to a depth of some five or six feet. below the ploughing depth. The method is simple. Holes are bored into the ground with an augur, three feet in depth, and 20 feet apart. A small dynamite plug is placed in each hole, and then the charge is fired. The ground should be fairly dry to give the best results; if too dry the explosion is not quite so effective, while if too wet the charge acts too deeply in the earth. In clay soils a slow propelling force is better, while in sandy soils, where there is a chance for the gas to escape, a quick force should be used. Top ploughing is still necessary; dynamite makes that top ploughing more efficient, and releases the nutritive values of the land which are never touched by the plough. It stand to reason therefore that not only will more profitable crops be secured, but that land hitherto unfit for cultivation will be brought under agriculture with success; good land can be better cultivated; hard land, and tough clay subsoils can all be utilised. Exhausted soils, with every atom of nourishment drawn from its surface soil will be reinvigorated by the loosening of the nutritive beds, and manuring will not be so necessary, if necessary at all. In swampy ground the clay subsoil that forms a water seal and prevents the surface moisture from draining away, can be removed. Irrigation ditches may be more easily constructed, and the force may be used in a hundred and one ways.

Its value has been long recognised by the far-seeing and the go-ahead agriculturist, but for some time there were difficulties in the way. Dynamite is a dangerous material to handle; it requires a little more care than is usually bestowed on the plough. It has moods and fancies, and ordinary dynamite, it was soon seen, was unsuitable for the rough and tumble work of dynamite farming. But other materials have now been evolved, and the latest are Ergite, and "Red Cross" dynamite. The latter requires a powerful shock to explode it, and can be handled with comparative safety. All such explosives are best fired by some method of electricity, for with the most reliable of explosives

there still exist such things as an occasional misfire, or a slow working charge. Care must also be taken to mark each particular plug, and to see that each charge is properly fired off. In the States it is averred that men are now engaged solely in this work, and with experienced men dynamite farming is perfectly safe, certain, and advantageous.

It would be an interesting experiment to see the system applied in Ceylon where the surface soil is of such a poor character generally, while it would also be equally interesting to see it applied as a clearing force for opening up new lands. Any Ceylon agriculturist who tries the experiment may rest assured that it is a tried system, and not one with its value yet to demonstrate.

RUBBER PLANTATION COSTS.

Notes from a Planter.

An interesting article on "Plantation Costs" appeared in your Journal of August 10th, 1912.

In this article it was pointed out that the cost of production must be considerably lowered in the near future if plantation companies are to hold their own against future competition. Unfortunately no reason was given in this article for the present high cost on some estates. The chief reason will probably be found to be that these estates have commenced tapping in some cases a very large number of young trees whose yield is, of course, at first very small, and that this has raised the cost all round. As these trees grow older and yield more, the cost will naturally go down considerably.

In analysing the chief sources of expenditure, viz., cooly, European and directorate, no figures are given to show what the reduction of each of these sources of expenditure would mean in the cost per lb. of rubber, and in this connection there are two statements in this article, viz., "only by continuation of the present high prices for rubber can the comparative high salaries (of Europeans) be paid," and again further on, "the cooly is more worthy of his hire than many others connected with the plantation industry," which appear to me to be misleading, inasmuch as they might cause the investor to believe that if only the European salaries could be lowered his dividends might be appreciably increased. In this article I hope to show that not only is the European more worthy of his hire than the coolie, but also the bearing on the cost per lb. of rubber which the reduction of either of these sources of expenditure would have.

Cost of European Supervision.

With directors' charges I am not concerned, and in most cases they would appear to be reasonable enough.

To begin with, let us take the cost of European supervision. On most estates the cost of European supervision approximates $1·00 per acre at the present time, though naturally this cost depends entirely on the amount of rubber in bearing, and we will therefore take it at $1·5, or 3s. 6d. per acre per month = 42s. per acre per annum. Taking the low average yield of 300 lb. per acre, the cost per lb. of rubber would be 1·68d., with a yield of 400 lb. per acre 1·26d., and with a yield of 500 lb. the cost per lb. would be approximately 1d. Supposing the salaries to be capable of being reduced by one half, the difference in the cost in the latter case would be ½d. per lb., and later, with a production of over 500 lb. per acre it would, of course, be less.

Coolie Costs.

Now let us take the coolie side of the question, and to illustrate the difference in cost on different estates, I will take the highest and lowest rates of pay which I actually know. The highest pay is 60 cents for 275 trees to Chinese, and the lowest is 28 cents for 300 trees to Tamils. Taking the yield per tree at 2 lb. per annum, and presuming the trees are tapped daily throughout the year, in the one case the tapping cost (apart from native superintendence) will be 39·8 cents, or approximately 10¼d. per lb., and in the other case 17 cents, or 4¼d., a difference of 6d. per lb.

This disparity of wages would therefore appear to be the crux of the matter, and the reason for the high cost on some estates, and it is only by combination of estates in the same neighbourhood that wages can be reduced or better value obtained from the coolies, since it is practically impossible for a manager to reduce his wages or increase his coolies' task if his neighbour is paying higher wages. If each estate was required to send in to the district associations or direct to the Planters' Association of Malaya statements showing the rate of wages paid to each class of labour for tapping, the number of trees in their tasks, number of cuts, etc., and if these statements were incorporated in a printed form by the Associations, it would be possible for managers and directors to see what wages were being paid in each district and what value was being obtained for the wage, and this would, I think, not only tend to uniformity of tapping wages, but would also tend to lessen the amount of crimping which at present exists. Where wages are high and estates favourably

situated, directors could request their managers to combine with other estates in the neighbourhood to lower the rate of pay.

With regard to crimping, latterly an attempt was made to bring in the discharge ticket system whereby no planter could engage local coolies who had not got a discharge ticket from their last estate. Since, however, coolies are now free the day they arrive on an estate, and can give a month's notice, and claim their discharge tickets at the end of the month, this system would appear to merely absolve planters from taking each other's labour, unless the discharge ticket were withheld, in which case the Government would undoubtedly interfere.

Now to return to the merits of Europeans *versus* coolies as regards their present rate of pay.

When I first came to this district Javanese coolies were earning $7 per month (and the dollar was then, I believe, worth 1s 10d), for eight hours' hard work in the fields. Today the same labour is being paid at the rate of $15 per month for four hours' work tapping. It may, of course, be argued that tapping comes under the heading of skilled labour, but with this I disagree. Coolies fresh from Java have been sent out to learn tapping for four days with experienced tappers. At the end of these four days they have been put on full tasks and have tapped without a mistake.

It would appear, therefore, that the coolie is not in all cases so worthy of his hire today as he was formerly.

Now, with regard to Europeans it is surely unfair to compare planters in Malaya with the tea planters of Ceylon, India, and Java, where the cost of living is approximately one half of the cost of living in Malaya. The tea plantations in these countries are mostly situated at higher elevations, and consequently the climatic conditions are much more favourable. The social life, especially in Ceylon, is more agreeable, and they have hill stations where planters can recruit their health after a severe attack of fever, and no doubt many deaths are due to the want of such hill stations in Malaya.

Rents and Taxes.

It is true that in the old coffee days planters in Malaya did not receive the salaries they are getting now, but in those days there were not many of them, and since nothing that they planted was profitable, they could hardly expect to receive even adequate salaries from their companies.

When the price of rubber falls to a very low level it may be necessary to reduce the salaries of Europeans, but in the meantime there are more important items which can be brought down, and not the least of these is the export duty. No one will perhaps blame the late Governor for initiating this export duty with a prospect before him of a serious loss in revenue from opium and a decline in revenue from tin, but, with the present prosperous condition of the Federated Malay States investors will indeed have cause to grumble unless it is discontinued.

The rent alone is in some cases more than 8 times as much as it is in Sumatra, where there is no export duty and where the labour and other conditions are most favourable.

When rubber reaches a low level it is difficult to see how we shall be able to compete with Sumatra under the existing conditions, and if these conditions can be changed, then surely now is the time to do it.

It does not seem to be a sound argument to say that the conditions under which land is held must be good because it was valued at £3 per acre during a boom period, and in making this statement Sir John Anderson may have forgotten that £1 of this sum can be accounted for by the premium payable to Government, expenses of selection, quit rent, survey fees, etc., and that land adjoining a planted area of which it forms part, must have additional value on that account.

Sir John Anderson greatly assisted planters with labour at a criticial time, and it behoves them to be duly grateful to him, but it is to be hoped that the same assistance will be afforded to them now to put them on more equal terms with the planters of Java and Sumatra.

Edward W. Bryce.

—*India Rubber Journal*, Oct. 26.

RUBBER IN QUEENSLAND.

At the Queensland Government Agency, 409, Strand, W.C., specimens of rubber grown in tropical Queensland are to be seen. Plenty of good land suitable for rubber growing may be had in the vicinity of most of the northern rivers of Queensland at from £1 to £5 or £6 per acre, freehold, and purchase arranged for on terms of four or five years. According to Mr H Newport, Instructor in Tropical Agriculture to the Government of Queensland, a worker opening up a 20-acre estate, doing the work himself—i.e., paying no labour, and living at not more than 20s. a week—can bring it into bearing for under £25 per acre, or, allowing for the purchase outright (freehold) of the land, about £30 per acre. The landed proprietor opening a 500-acre estate, and paying for labour and superintendence, etc., would require rather more than double this—viz., about £64 per acre.—*H. & C. Mail*, Nov. 15.

TEA IN 1911-12.

Survey by Messrs. Brooke, Bond, & Co.

Messrs. Brooke, Bond, and Co. (Limited), as usual at this time of the year, have issued a short history of the tea industry during the preceding 12 months. The statement is as follows :—

Monotony is generally considered something to be avoided, but there are few to be found who would object to a monotony of prosperity.

It must not be supposed from this remark that any one connected with the tea industry is in so prosperous a condition as to find it wearisome, but merely that the annual reviews for some years past have been able to report increasing consumption, and therefore to a certain degree increasing prosperity to those engaged in the production and distribution of tea....The strike at the docks and the uncertainty caused by the labour unrest almost paralysed trade for a time....The cost of tea has also been increased to the wholesaler by the advance in charges for handling, sampling, rent, &c., necessitated by the concessions made to the dock labourers.

Increasing Production.

As is probably well known to your readers, the greater part of the tea consumed throughout the world is grown in India, Ceylon, and China, the rest coming chiefly from Java and Japan. Small quantities are also grown in Burma, Natal, Nyasaland, Siam, the Straits Settlements, the Fiji Isles, Brazil, Jamaica, the United Statates, Mauritius, and the Caucasus, but almost entirely consumed locally.

India

produced a record crop in 1910-11, her exports being over 258,000,000 lb. This season she has exceeded that large amount, having exported over 264,000,000 lb. The whole of the increase came to the United Kingdom, A record sale of Indian tea was held in London, Oct. 14 and 16, when 66,465 packages, more than 7,000,000 lb, were brought to auction.

Direct trade from Calcutta to Russia was nearly 9,000,000 lb less than in 1910-11, owing to the bad harvests in Russia, which greatly reduced the purchasing power of the people. The trade with Hankow was also interrupted for a time owing to the Chinese Revolution. There is an important manufacture of 'brick' tea, for consumption in Asiatic Russia, carried on at Hankow. The 'bricks' are composed chiefly of China tea, but about 15 million pounds of Indian and Ceylon dust and fannings are usually sent every year to Hankow to mix with the China tea. Calcutta's direct trade to other foreign markets increased, particularly to Canada and the United States.

The following table gives the distribution of the exports from India during the last four years. The year is reckoned from June 1 to May 31, which is the period for which official figures are issued :—

	1911-12.	1910-11.	1909-10.	1908-9.
	Lb.	Lb.	Lb.	Lb.
United Kingdom	183739100	174100700	180083200	168093400
Australia ...	10038100	9595900	8604800	8936800
America ..	7253700	5606900	56099 0	5500500
Russia ..	31394700	40347500	30490500	24443100
Other ports ..	12672c00	10478800	10849503	12877800
Total from Nortbern India ..	245158700	240129800	233637900	220851600
Southern India	18985100	18255000	16616000	15243100
Total from all India ..	264143300	25838480	252253900	236094700

The increase in India's outturn is due much more to intensive cultivation than to extension of area, which is rendered almost impossible by the difficulty in obtaining coolies.

Ceylon.

During the year 1911 Ceylon produced nearly 6,000,000 lb more than in 1910, but during the first six months of the present year her exports were 328,134 lb less than during the first six months of last year. Imports of Ceylon tea into the United Kingdom during the last two years, reckoning from July 1 to June 30, were :—

1911-12.	1910-11.
106641000 lb.	105080000 lb.

an increase of 1,561,000 lb in the 12 months. The crop was distributed in much the same manner as the Indian, the bulk of the increase coming to the United Kingdom, less than during the previous year going to Russia and China, more to most other countries, and considerably more to Austria, Holland and Belgium. The smaller quantity of black tea sent to Russia was to some extent balanced by the larger amount of green taken by that country.

The quality of the crop has been barely average, a good deal of very poor tea having been turned out, due apparently to endeavours on the part of the planters to produce large quantities of tea in order to take advantage of the favourable markets. The largest London sale of Ceylon tea on record took place on August 13, when 50,047 packages (about 5,000,000 lb.) were brought to auction.

Much attention is being paid in Ceylon to the manufacture of green tea, large quantities of which have been sent to the United States, Canada and Russia. Shipments to the last-named country were, in 1911, double those of

1910, and nearly 20 times those of 1904. During the last few months, however, there has been a check in these shipments, probably owing to over-speculative buying previously. It is hoped that this check may be merely temporary.

Increasing Consumption.

Turning to the consideration of the Consumption of tea throughout the world, we find that it is increasing generally, in some parts considerably. One authority on the subject thinks that in order to keep pace with the increasing demand at least 20,000 acres, yielding 10 to 12 million pounds, ought to be added annually to the producing area. As a matter of fact very little new land is being planted at present, owing chiefly to the scarcity of labour. The supply of tea is being increased by intensive cultivation, whereby the old gardens are made to yield more than formerly. The quality of the tea thus produced is not, however, as good, so that it seems doubtful whether, on the whole, the system will be really advantageous either to the consumer or the planter. The supply of cheap low-grade tea will be increased, but the supply of fine tea will be reduced and consumers will more and more adopt the habit of drinking poor tea, which is not really economical or in any way desirable.

The world's tea consumption has been estimated at about 700,000,000 lb, but it is very difficult to obtain really reliable statistics, particularly as to the amount consumed in the countries of production.

Consumption in the United Kingdom increased during the year over 13,000,000 lb. The *per capita* consumption was 6·53 lb. at the end of 1911, the last date for which we have official figures. It is doubtless higher now.

The following table gives the amounts contributed by the various producing countries for Home Consumption, and also the percentage contributed by each, during the last two years. The figures are taken from the Board of Trade Returns to September 30 :—

	Year ended Sept. 30, 1912.		Year ended Sept. 30, 1911.	
	lb.	Per centage.	lb.	Per. centage.
India ...	166,831,749	56·50	165,040,707	56·00
Ceylon ..	90.929,153	31·00	91,352,715	3150
China ..	12,412,373	4·50	13,202,526	4·75
Java and other Countries ..	24,142,887	8·00	21,320.937	7·75
Total ..	294,316,162	100·00	290,916,885	100·00

PLANTING PROSPECTS IN TRINIDAD.

(To the Editor, *The Field.*)

Sir,—Gentlemen looking for opportunities of profitable investment in the Colonies might be glad to have their attention drawn to the British West Indies, and particularly Trinidad, where a number of well-known Englishmen have already purchased cocoa and other estates. Properties can be obtained to yield a present net profit of 10 per cent, and if care is taken to secure those with a good proportion of young cultivation the increase in yield and value will be rapid and considerable. In one instance, a plantation valued at £12,500 about four years ago, was revalued this year by the same valuator at £20,000, and sold at this figure. This is not an exceptional rate of increase on well-chosen properties. Prices in the best situation range from £5000, and in most cases a substantial sum could remain on mortgage. There is plenty of labour from India obtainable at moderate rates.

Cocoa is the most important product, the annual output running to close on 60,000,000 lb., worth at least £1,500,000. Already several well-known English and Canadian assurance companies are investing portions of their funds on the security of cocoa estates at rates little higher than would be accepted in England, which is satisfactory evidence of the stability of this industry. Under reasonably good management cocoa trees continue to bear full crops for 80 or 100 years.

Trinidad is an up-to-date British colony with a population of 359,000, a large number being English and Scotch families. The climate is very healthy. There is a good railway service, which is being rapidly extended by the Government. Electric tram cars, motors, telephones, and telegraphs are in general use, and there is a regular service with England and the United States by the Royal Mail Steam Packet Company's steamers and other lines. The social life is pleasant, and there are several clubs, sporting and social. In most parts sports, such as cricket, tennis, polo, golf, racing, and shooting is obtainable. The sea fishing is excellent. There are no fewer than 116 varieties of fish, including the tarpon, barracouda, carangue, and king fish, which are among the most sporting that can be taken with rod and line.

L. M. Hobson,

—*Field*, Oct. 26.

BASIC SLAG.

The expert evidence heard in the libel action, Gilbertson and Co. v. The Western Counties Agricultural Co-operative Association (Limited) was of vital interest to users of basic slag. This by-product in the manufacture of steel has worked its way into favour on its merits, and it is now one of the chief phosphatic manures. Many of the leading scientific and practical authorities were heard, but their evidence was strangely contradictory. The point in dispute was whether the value of basic slag depended upon the total phosphates it contained, or only upon the percentage soluble in a weak solution of citric acid, known as

THE WAGNER TEST.

The importance of the question is shown by the fact that, whereas advocates of the Wagner test estimated the value of a given material at 9s. per ton, the opposing witnesses put its value at as high as 45s. to 48s. The decision in the case, which was one for libel, does not throw any light upon the aspect of it which affects the farmer. He is left to draw his own conclusions, although the matter is of the greatest importance to him. The problem surely is capable of a definite solution. The names of the expert witnesses are sufficient guarantee that they are actuated only by the purest motives, and it might be suggested that they co-operate, perhaps with the assistance of the Development Commission, in carrying out an investigation which would settle once for all a question of great agricultural and commercial importance.—London *Times*, Oct. 28.

JAFFNA TOBACCO AND MR. FREEMAN'S REPORT.

Nov. 21st.

DEAR SIR,—In referring to the G.A., N.P.'s Administration report and to his statement that, however it may be improved, Jaffna tobacco is too gross for the European market, you say that Mr Freeman's opinion is likely to have a disquieting effect.

I presume that what Mr Freeman means by "Jaffna tobacco" is not all tobacco raised on Jaffna soil, but the variety of tobacco as cultivated there for generations. If so, his opinion is the same as that of most people. If any attempt is to be made in the North to grow tobacco there are two conditions necessary:—(1) a new variety of leaf must be grown—not the coarse "jat" required for making the Jaffna cheroot, and (2) the application of heavy dressings of cattle manure must be abandoned. With the production of a suitable leaf it would be possible to teach the Jaffna man how to "mild cure" his tobacco, in place of the barbarous method now in vogue, whereby the most objectionable qualities of tobacco are developed in a product that should be classed with such narcotics as "ganja" (Indian hemp). Dr. Chalmers is reported to have said that the Jaffna cigar as found in the bazaar—a black, evil-smelling object reeking with some added fluid to give it potency—was the chief cause of the degeneration, physical and mental, of the lower classes in Ceylon!

However this may be, I fancy that old Jean Nicôt, who gave his name to the plant (*Nicotiana tabacum*), would be horrified if he could see to what base uses the leaves are put in the North, of which no one who is not in the secret of the manufacture of the Jaffna cheroot knows.—Yours truly,

C.

FISH IN THE PUNJAB.

CONSERVATION OPERATIONS.

Attempts are now being made in the province to improve the supply of fish in the Punjab rivers and canals. Mr Howell, C S, has been on special duty in connection with this subject during the past year, and after studying the methods employed in America and Madras, he returned to the Punjab in December. The lines on which the conservation of indigenous species is to be attempted are three-fold. First the provision of adequate ladders at all weirs on the main rivers, which obstruct the free movement of migratory species; second, the protection of the spawning ground; third, prevention of the whole-sale destruction of fry and immature fish in the canals during closure. A disused supply channel of the Lower Chenab Canal at Chenawan is being adapted as a breeding and stock-pond for the more valuable cyprinoid species, such as *rohu*, *catla* and *nori*. There are probably, says the report, few countries in the world which can compare with the Punjab, with thousands of miles of harnessed rivers, as a field for rough-and-ready methods of pisciculture, and the indigenous species are mostly so hardy and so prolific that with reasonable protection through egg and larval stages they cannot fail to increase and multiply. Brown trout have been introduced into the Beas in

Kulu, certain tributaries of the Beas in Kangra, into the Giri and various other hill streams. It is probable that for the next few years the results will be considered disappointing, as

TROUT NEVER MULTIPLY AT THE MIRACULOUS RATE

which enthusiastic anglers expect. However, the species thrives well, in Kulu and Kangra, and makes very rapid growth, as yearlings of ¾ lb. weight, and four-year old fish of four pounds and over have been caught. The Kulu stock ponds have been enlarged and improved. The stock fish are in splendid condition and average about four pound in weight. They were hatched out in April, 1909. They spawned last winter, but mistakes were evidently made in handling the spawners, and only a couple of hundred eggs proved fertile. With the properly constructed hatching troughs which are being made, and with the aid of a trained hand from Kashmir, it is hoped to do better next winter. The 120 fry which represent the meagre, but not discouraging results of 1911-12, are doing well.—*Civil and Military Gazette.*

SMOKED RUBBER SCORING.

We are glad to be able to record a few transactions for forward sales of smoked sheet plantation rubber at 4s 4½d. for the first half of 1913 by the Federated (Selangor) Rubber Company and the North Hummock (Selangor) Rubber Company. For many years past it has been fully recognised that properly prepared plantation rubber in the smoked condition lasts longer, has superior physical qualities, and is in every way to be preferred as against unsmoked material. It is argued by some planters that the preparation of rubber in the smoked form is expensive. This may or may not be the case, but even if it were so, it would not alter our opinion. The planter should always aim at producing the best article, and should whenever possible take advantage of any views publicly expressed by manufacturers, who are notably reticent. Recent experiments have shown that high temperatures such as may be incurred in smoking are not always harmful to rubber when properly handled, and it may be easily possible to expedite the preparation of smoked rubber by adopting comparatively higher temperatures. The market is particularly short of smoked rubber from plantations, and we intend to encourage its preparation whenever possible, even though it may incur a little extra expense.—*India Rubber Journal*, Nov. 2.

RUBBER EXPERIMENTS IN BURMA.

The following are extracts from the report of the Director (Mr. J Mackenna) on the operations of the Burma Agricultural Department for the year ending the 30th June, 1912 :—

While the Forest Department is still supposed to be the Department of Government most interested in rubber cultivation, the general public seem to consider that the Agricultural Department should deal with it and, consequently, we have very numerous enquiries about this: so much so that we have this year issued a *Bulletin* and a leaflet on Para rubber. So far as Burma is concerned, the planting of new estates goes on with vigour in districts as remote from each other as Mergui and Myitkyina. Some, I am afraid, are doomed to failure; but it is impossible to check the optimism of the experimenters. There have been some disappointments with the germination of seed obtained from Ceylon and I would recommend the use of seed or, preferably, "stumps" obtained from the older Burma estates.—*Indian Trade Journal*, Nov. 28.

B. GUIANA SCIENTIST FOR MAURITIUS.

Mr. F. A. Stockdale, late Assistant Director of Science and Agriculture and Government Botanist of British Guiana, has arrived in England on leave prior to proceeding to Mauritius to assume the office of Director of Science and Agriculture, to which he was recently appointed. Mr. Stockdale was educated at Wisbech and Magdalen College, Cambridge, and entered the Colonial Service in 1905 as Mycologist and Lecturer in Agricultural Science in the Imperial Department of Agriculture for the West Indies in Barbados. Three years later he was transferred to British Guiana, where he has carried out important scientific work. He is the author of several works relating to fungus diseases of West Indian crops and the breeding and selection of sugar-cane seedlings.—*M. Post*, Nov. 15.

A NEW FRUIT FROM INDIA.

A consignment of a new fruit has been received at Covent-garden. It is called Jamra, and both in shape and size is like an ordinary pear, but is blood red in colour. Specimens were sold yesterday at one guinea each. —London *Times*, Nov. 12.

BOTANICAL GARDEN FOR SUMATRA.

Medan, Nov. 11.—According to the Batavia *Niewsblad* the Director of Agriculture has set out on a visit to Medan with the object of finding a suitable site for a Botanical Garden. It is stated that many of the larger planting Companies are interested in the project and have offered their land to Government in order to help forward the work. Such an institution would, there is no doubt, be a great help in experimental planting work and afford much information as to the most suitable methods of cultivation.—*Malay Mail*, Nov. 15.

TRANSPORT OF RUBBER STUMPS.

To West Africa from Eastern Plantations.

Some time ago we recorded an instance of conveyance of stumps from the East to Kamerun, in which 87½ per cent. arrived "live and in good condition." We have just received further advice of a consignment of 20,000 stumps from the East to Sekondi, West coast of Africa. In this case it appears that 18,800 stumps arrived in a live and good condition, the outturn therefrom being 94 per cent.—*India Rubber Journal*, Nov. 2.

MANUFACTURE OF EUCALYPTUS OIL.

Ootacamund, Nov. 16.—I understand that a well-known Madras firm means to open a large factory here for the distilling of eucalyptus oil on an extensive scale. There is a great future for such an undertaking, provided there is a sufficient supply of the mature eucalyptus leaf. The Cordite factory consumes a very large quantity of eucalyptus fuel annually, and since the eucalyptus is our main fuel supply, the plantations in the vicinity of the town are fast disappearing.—*M. Mail.*

RUBBER CENSUS OF NIGERIA.

A report by the Acting Governor of the Colony shows that Nigeria, in addition to Government plantations and numerous small plantations owned by natives, has 241,250 Para rubber trees established in large plantations, and 164,350 seedlings in nurseries. During last year the Agricultural Department distributed 80,900 seeds and 6,244 plants of this species.—*H. & C. Mail*, Nov. 8.

NEW PATENTS.

ESTIMATION OF WATER IN LATEX.

Mr. Thos. Cockerill's Important Invention.

The following specifications have been accepted:—No. 1,237 of February 22, 1912. Thomas Cockerill.—"Improvements in Apparatus for the estimation of water in latex." Abstract.—This invention relates to a means for estimating the amount of water contained in latex. In carrying this invention into effect an instrument of the hydrometer type such as is used for indicating the specific gravities of liquids is used. Instead of indicating specific gravities, however, the new instrument will indicate the water contents of the latex. This latter indication may be expressed by a scale which will directly indicate the parts of water contained in the latex or by a scale which will directly indicate the amount of wet indiarubber present in the latex an amount which varies according to the water contained in the latex, or by both scales.

The claims are:—(1) An apparatus or instrument of the type of a hydrometer for ascertaining the water or indiarubber contents of latex and which instrument is so marked or graduated as to give the desired information either directly by figures marked upon it or indirectly as for example, by the aid of a table of reference substantially as described. (2) An apparatus or instrument for ascertaining the water or indiarubber contents of latex, such instrument being of the type of a hydrometer and being so marked or graduated as to give the desired information by figures marked upon it, substantially as hereinbefore described. (3) The combination of the particular scale or scales as described and substantially as illustrated with an apparatus or instrument of the type of a hydrometer substantially as described and illustrated. (4) An instrument for ascertaining the water or indiarubber contents of latex, such instrument being of the construction hereinbefore described with reference to the drawing. One sheet of drawings.

PATENT SEPARATION PROCESS.

No. 1,308 of November 25, 1912.—Dr. Heinrich Colloseus.—"Improved process for the separation of caoutchouc guttapercha and balata from the milky juices containing these species of rubber." Abstract.—The inventor says:—The processes hitherto proposed may be divided into two groups. According to one group the precipitation of the said species of rubber with their substances from the milky juices is effected by the addition of acids of any origin, whereas according to the other group this precipitation is effected by the addition of substances having either a precipitating or salting-out action upon the solid particles contained in suspension in the milky juices. All those processes have the drawback that together with the rubber the albuminous substances are precipitated in a form in which they are readily decomposed and consequently cause a gradual disintegration of the caoutchouc. This invention has now for its object to avoid the said drawback by precipitating the albuminous substances in a form wherein they will keep permanently. The process according to this invention consists in effecting the separation of the rubber and its accompanying substances by subjecting the salt-forming constituents of the milky juices to a double decomposition. The claims are:—(1) A process for the separation of caoutchouc, gutta-percha, balata, and the like from the milky juices containing these species of rubber, which consists in adding to the milky juices first an alkali or other suitable equivalent, for forming water-soluble salts, and then precipitating the solid constituents of the milky juices by the addition of salts of the earthy alkali metals, earth metals, heavy metals, and the like, or their equivalents or mixtures thereof. (2) A process as claimed in claim 1, wherein the hydroxides or oxides of the earthy alkali metals, earth metals, or heavy metals are employed instead of the salts of the earthy alkali metals, earth metals, heavy metals or the like, for the purpose of precipitating the milky juices to which an alkali or the like has been added, or wherein the alkali or the like is added together with the said oxides or hydroxides, to the milky juices. (3) A process as claimed in claim 1 or claim 2, wherein for the purpose of effecting or promoting a fine subdivision, the milky juices are intimately mixed with an emulsifier (such as soap albuminous substances and the like) before, during, or after the addition of the alkali or the like, or the precipitants. (4) A process as claimed in any of the preceding claims, wherein a bleaching agent is added to the milky juices at any stage of the process. (5) A process as claimed in any of the preceding claims wherein the precipitation of the rubber is effected in the presence of an antiseptic (for instance, creosote, phenol, formaline or the like). (6) The improved process for the separation of caoutchouc, gutta-percha, and balata from the milky juices containing these species of rubber, substantially as hereinbefore described.

"SILVICULTURE IN THE TROPICS."

MR. A. F. BROUN'S WORK.

Mr. A. F. Broun, formerly of the Indian Forest Service; later Conservator of Forests, Ceylon; and lately Director of Woods and Forests, Sudan Government has just published his book on Silviculture in the Tropics, through Messrs. Macmillan & Co., Ltd., of St. Martin's Street, London, and in every respect it is a most useful work, both as a book of reference, and as a text hook of Forestry. The hook was originally intended to form one of a series of volumes on Agriculture in the Tropics, hut the lamented death of the editor led to the abandonment of the series. Considerable progress having been made with Mr. Broun's hook it has been published as an independent volume. The work is well illustrated, by photographs and diagrams, most of the former being taken hy the author and his gifted and popular wife, the ex-Ceylon Lady Tennis Champion; while the classification and indexing is of a very praiseworthy nature. A picture of the Ceylon screw pine, showing its stilt roots, has been gold hlocked on the cover.

Silviculture, it might he mentioned, is the art of applying the knowledge of the requirements of different trees, in tending and regenerating existing woods or in rearing fresh woodland crops, and in working them to the hest advantage of the forest owner. Many different factors and conditions have to be considered in this connection; it is here that the hook now discussed will prove its worth. The volume has been divided into four parts. Factors governing and influencing the existence of forests; formation and regeneration of woodland crops; training and improvement forests, and of special measures of maintenance and protection. Dealing with soil the author says the functions of soil in relation to plant life have not yet been fully determined. Of late years a good deal of attention has heen paid to the matter by American investigators hut tbeir theories have not been entirely accepted in England. Proceeding he gives some of the more established theories, and points out tbe difficulties which exist in the tropics of saying what constitutes deep or shallow soils owing to the much greater range of distrihution of moisture. In forestry artificial improvement of the soil hy means of fertilisers is hardly practicable, except over limited areas such as nurseries and plantations, and the crop therefore has to depend on the humus formed mostly from fallen leaves, fruit twigs, etc., and it will tberefore he seen what difficulties the sylviculturist labours under, and his handicapping which does not affect the ordinary culturist. Climate and "other local factors, such as the constant comparative humidity of the air as in the case of forests not very far from the sea, may cbange th e character of these forests. In Ceylon, for example, the forests growing within this zone are to a large extent evergreen.....From an economic point of view these forests are capable of yielding major produce such as timher and firewood, minor produce—and even in some cases rubber." The effect of climate is most carefully deat with; and the case of Ceylon with its fine gradations of climate and temperature, are frequently quoted in the chapter. The effect of locality is also dealt with at length, here again Ceylon is quoted a number of times in describing tbe variation of forest floras. Mr. Broun emphasizes that it is necessary for the forester in swamping areas to study his own forest flora, and not to try to introduce into sucb localities such species as are unable to struggle against stagnant humidity of the soil in these areas. The next chapter deals with plant and animal allies and enemies, excluding man and domestic animals, particular attention being drawn to fungus, which "leaf disease" destroyed the coffee plantations of Ceylon. Forest enemies are numerous, and after reading this chapter one wonders how ever the forest manages to tbrive at all. Rodents are very damaging: the author mentions an invasion of rats he saw at Nuwara Eliya in which young trees were attacked, and tbe hark eaten away to a height of four or five metres. Herds of cattle, driven into the forest, he thinks might he advantageous, provided that damage to young plants is not likely to be enhanced by this method. Elephants, of course, do a tremendous amount of damage, and for these pests ditching and fencing is recommended. The effect of man and domestic animals is also explained, as well as fires to which the writer attributes the origin of patanas of Ceylon. Mr. Broun gives valuable advice regarding the reafforesting of areas burned out or destroyes temporarily for cultivation of rice, etc. The theory tbat deforestation tends to reduce rainfall is also treated in a chapter dealing with the influence of forests, hut Mr. Broun, lays down no hard and fast definition of fact. and agrees that much has to be done before satisfactory data can be obtained. Forests, he does show, have a rain-retaining effect, and are useful to feed the supply of springs, and

in draining waterlogged soils. The chapter on the formation of forests is an interesting one, and the argument for and against pure and mixed crops is exhaustively discussed. The author in his succeeding chapters gives full information of the steps to be taken, and how to take them. The chapters on preparation, sowing and planting, nurseries, weeding, regeneration by seed and coppice, cleaning, pruning, felling, demarcation, the fixation of unstable soils etc., together with a combination of systems give full advice for both the planter, and the keen student of afforestation. Altogether the book is a most useful and valuable one, and should be in the library of all interested in land culture. He remarks with truth that even in tropical countries, where the growth of trees is rapid, it takes only a short time to fell a tree, but several years to grow another in its place. Mistakes, therefore, take a long time in being set straight, and no pains should be spared in avoiding them. And this book shows how those mistakes can be avoided.

The Ceylon photographs contained in the work are:—Moist zone evergreen forest in Ceylon; Wet zone undergrowth in a Ceylon forest; Wet zone: forest of Dipterocarpus in Ceylon; Wet zone, buttressed tree, Tetrameles nudiflora; Forest of wet upper montane zone; Littoral forests; Epiphytic fig; Hill sides deforested by fires and grazing (Patanas of Uva); A clearing for tea, and consequent silt in a river; and Teak planted in cleared lines.

THINNING OUT HEVEA ESTATES.

We have received a very detailed document from a planter resident in the East, whose knowledge and administrative capacity have long since been proved. He has formulated

A DEFINITE SCHEME

of thinning-out according to the original planting distance. We give a synopsis of his views which we think will be of particular interest to those having estates or blocks of land planted at the distances mentioned. As a preliminary he expresses the view that Hevea estates throughout the East are too closely planted, and that if Hevea trees are to be expected to yield rubber in constant and increasing quantities for twenty years or more they must be thinned down to from 50 to 70 trees per acre. This is coming very near the late Mr. Francis Pears' declaration in the Souvenir of the *India-Rubber Journal* regarding the minimum number of trees desirable.

Furthermore, he maintains that all areas carrying 100 trees per acre should be at once marked for thinning. It is as well to bear in mind that the advice of this esteemed planter is largely based on his experience in Malaya and Sumatra, where, as we know, the soil is particularly rich in plant food, and where climatic conditions favour very rapid growth. The advice to thin-out all areas having 100 trees is not in accord with the advice given by planters who have to deal with a much poorer soil as in Ceylon; in fact, as pointed out by some correspondents in

our last issue, in Ceylon there is a strong feeling that thinning out should not be done until the effect of cultivation has been proved, the planters holding that view stating that what cultivation cannot do, neither can wide planting.

THINNING 20 FT. BY 20FT.

In these blocks our Malayan correspondent suggests that trees having burrs, disease, etc., should be selected for thinning, and that the number should be reduced to 75 per acre. In this case he also believes in removing all badly-grown trees or any which do not yield a fair quantity of rubber, and irrespective of the appearance of the estate, he maintains that any exceptionally fine trees should be allowed full space for further development, presumably by the removal of all others. In gambling circles this might by some people be regarded as putting all the money on one horse.

THINNING 24 FT. BY 12 FT.

Here the same methods as in 20 ft. by 20ft. clearings are recommended, but the trees are to be reduced first of all to 100 per acre instead of 75 as in the previous case. The object for leaving a larger number of trees is that the existing trees, not being so well grown, do not in the meantime stand in need of so much space to develop in, and by the time they have filled the spaces caused by the removal of a number of trees further thinning can be considered.

It is, as he point out, quite obvious that the removal of 142 trees per acre from areas carrying 217 trees per acre as in 20 ft. by 10 ft., would reduce the yields of rubber per acre to an undesirable extent for some time. The same argument applies with a distance of 24 ft. by 12 ft.

OTHER DISTANCES.

He suggests that areas planted 20 ft. by 10 ft., should be thinned-out to 80 trees per acre, and those planted 30 ft. by 10 ft. down to 95 trees per acre. Where there are fewer than 100 trees per acre, such as 24 ft. by 24 ft., or 24 ft. by 20 ft., he suggests that only those trees which are giving little or no rubber, or which hamper the development good trees should be removed.

On closely planted areas, such as 18 feet by 12 feet, 15 feet by 15 feet 12 feet, by 12 feet, 18 feet by 15 feet, every alternate row may be removed, leaving distances of 18 ft by 24 ft, 30 ft by 15 ft, 24 ft by 12 ft, and 30 ft by 18 ft.

Here our correspondent expresses the view which we emphasized in our original editorial to the effect that it is difficult to out cut every alternate row in every instance, because rows selected for removal may have very good specimens and those which are retained may possess very bad ones.

TAPPING OF TREES SELECTED FOR REMOVAL.

It will be remembered that on this point many of our correspondents held divergent views. The majority were in avour of extracting as much rubber as possible from the trees to be thinned-out, but there were a few gentlemen whose opinions we value, who held that trees to be removed should be promptly uprooted and all parts removed and burnt. Our Malayan correspondent emphatically advises that all trees selected for removal be tapped heavily for six or nine months, and finally cut out, the last stage being executed, if possible, during the wintering or low yielding season in March-April. We welcome any further views which managers of estates may have on this very important subject.—*India-Rubber Journal*, Nov. 9.

A NEW SOURCE OF RUBBER.

"EUPHORBIA LORIFOLIA" IN HONOLULU.

Some interesting notes on *Euphorbia Lorifolia* as a possible source of rubber and chicle (resin) are contributed in the form of a press bulletin published by Mr. W. McGeorge, assistant chemist, and Mr. W. A. Anderson, superintendent of the rubber sub-station in connection with the Hawaii Agricultural Experiment station at Honolulu. While there is room for douht, says Mr. McGeorge, as to whether scientists will ever be able to duplicate the natural rubber with a synthetic product, it is almost an absolute certainty that a synthetic subhstitute will in the near future be made an article of commerce. Detailing the present rubber-producing trees he goes on to say that the attention of the station has been called to the plant above-mentioned, which contains an unusually large quantity of latex, and occurs in large numbers in the islands. So far as it known this particular species of Euphorbia is found in no other part of the world, being a native of Hawaii, and no information appears to be given as to whether it will thrive elsewhere. The latex is a white viscous fluid with a strongly acid reaction, and a rather pleasant aroma peculair to itself. It is highly combustible, quickly darkens on contact with the atmosphere ; it does not ferment readily and can be preserved indefinitely without even coagulation or separation, by the addition of a small quantity of formalin. At the outset it was found that most of the ordinary methods of coagulation were without apparent effect upon this latex. Acetic acid produces no appreciable coagulation even on long standing, while a host of other methods were

similarly successful. The action of heat prove the most promising method, but the latex requires several hours at a temperature of ninety degrees centigrade to become thoroughly coagulated. The resultant mass is extremely adhesive, but does not possess the strong cohesive properties of coagulated latex from Para or Ceara trees, and does not appear to contain a very large per cent. of caoutchouc, but to be composed iu greater part of resins. An analysis gives 15·80 per cent. of caoutchouc and 55·95 per cent. of resins. This compares with Ceara 75·72 per cent., and Balata 13·95 per cent. The summary of the information gained by some exhaustive experiments is that the best means of coagulating is by heat or spraying with alcohol. The constituents of most commercial value are the resins. The rubber is of inferior quality, but Mr McGeorge thinks it might find use as a low grade product. In the event of the latex being worked the insoluble residue of 40 to 50 per cent. would have as a means of its disposal a possibility of its sale as a fertiliser on account of its high nitrogen content.

Mr Anderson gives details of the working and tapping. The tree region is very dry with only twenty inches of rain per annum, and the elevation 3,000 feet. Tapping can be done every three months, and the latex flows freely and in large quantities. From six trees tapped in the fore noon two-and-a-half pounds of latex was obtained. The trees will live and produce latex through long and severe droughts; they reproduce freely, and can be tapped very much like the Castilloa tree, and about as often. Tapping on the full herring bone principle a man can tap 200 trees per day, and with an average yield of half that produced by the six trees referred to a man could thus collect 41·66 lb. of latex in a day.

With cultivation at a lower elevation, the tree might be able to produce a low grade rubber, but the Middle East industry cannot look for much competition from Hawaii.

THE MOZAMBIQUE RUBBER INDUSTRY.

There is said to be no industry in Portuguese East Africa with a brighter prospect than that of rubber exploitation. The rubber forests are extensive, and the landolphia vines from which the rubber is extracted are profuse. With organisation and working capital there is no reason why the export of rubber should not shortly increase to 500 tons annually, while the percentage of rubber to waste in the vines is small as compared, for instance, with the output of latex from a young Ceara tree, the abundance of the vine and its remarkable powers of recuperation are factors which more than make up for the low percentage. There are at present in use two native methods of extracting rubber. The first, that of incision or tapping, is followed by all natives south of the Zambesi Valley, and it produces a high-class rubber known as "Mozambique pink," second only, according to the United States Consul at Lourenço Marques, to best Para on the European market. The other METHOD OF EXTRACTION, KNOWN AS POUNDING, is generally followed in the Mozambique and other northern districts. There the bark is stripped from the roots of the vines, or from the vines, and is cooked over a slow fire and pounded until the bark is finally pounded out, leaving a mass of rubber in all stages of crudity. This rubber is known as Mozambique rooty. It is classed very low, but a large concern now working in the Mozambique district has perfected the system of pounding to the point of producing a rubber which is rapidly approaching the classification of Mozambique pink. A strange truth has come to light in regard to the landolphia, and that is that while vines are frequently killed by incisiou or tapping, this seldom happens with the vine which is cut down almost to the ground after maturity. It is also a notable fact that large parts of the root of a vine can be dug up and cut off without killing the vine. In the Mozambique district there are places where natives have been cutting roots from the samo vines year after year. The recognition of this fact will make an enormous difference in the estimates of the capacity of the forests. Most rubber areas in the province are well known, and up to a year ago they were all in the hands of the Government. The promulgation of the law of September 2nd, 1909, gave an impetus to private enterprise, and since the law came into force large districts have been taken up, and final title has been ceded by the Government on approximately 450,000 acres of forest. These large tracts are being worked mostly on a small scale, owing to lack of capital, and some are not being worked at all.

In the terms of the land law referred to above, it is most difficult, if uot

IMPOSSIBLE, FOR A FOREIGN CAPITALIST TO ACQUIRE DIRECTLY A TRACT LARGE ENOUGH

to give returns on a big investment, say 50,000 hectares(123,000 acres). Such a grant would be subjected to the approval of the provincial council, the Governor-General, and the home government, and would finally come up for auction. However, various local groups of Portuguese, with the ten

years' residence in Portuguese colonies prescribed by the said law as a condition to privilege, have established their claims, and combined their lots of 10,000 hectares (24,600 acres) to each individual, in large tracts of from 40,000 hectares (98,400 acres) to 100,000 hectares (246,000 acres) in extent. The rubber industry in Portuguese East Africa is not for the moneyless settler, however industrious. It offers big returns to the capitalist, by reason of the fact that he can work on a large scale. A concessionaire of say 50,000 hectares (123,000 acres) must split up his lands into five or six districts. Each district has a collecting station and a store, for the native had little idea of cash. When he has worked he must be paid in goods.

With the installation of machinery the semi-skilled labour of the native becomes less and less necessary. In a well-equipped concern his share in the production of rubber will be summed up in the simple work of gathering the bark of roots and vine. This can be done equally well by African or coolie. During 1910, rubber to the value of £75,000 was exported from the province of Mozambique, and this dropped to £42,500 in 1911. The great decrease in this important item can be traced to two causes—the break of the rubber boom and consequent collapse in prices, and the disturbed conditions which forced a duly organised rubber concern in the province to suspend operations during six months. The break in prices is by far the more important factor.—*Royal Society of Arts Journal*, Nov. 15.

RUBBER COAGULATION: MICHIE-GOLLEDGE PROCESS.

From a succession of experiments conducted over a considerable period, it has been found that to obtain the best coagulated rubber of good quality and even colour from a number of separate estates or divisions, where the latex is coagulated at different points, it is necessary that coagulation should be carried but on *uniform lines.*

A standard quantity of water should be added to the latex and a standard quantity of acid used in the coagulation.

To ascertain the proportions required proceed as follows :—

For a trial coagulation take say I gallon of the bulk and use the same quantity of acid and water as on the previous day and keep a careful account of the bulk (Latex+the added water).

Coagulation being complete, weigh the result in rubber, which after deducting for wet should be equal to one pound dry rubber per gallon of the liquid.

Should the result be less than this, reduce the water in subsequent lots (or charges) sufficiently to obtain the desired result.

Ten to thirteen drachms of one of the Glacial Acetic Acid to 6 of water per gallon of the bulk liquid (added water and latex) to be coagulated, will be sufficient to bring about complete coagulation, and, as stated above, an even colour may be obtained.

[The above explains itself and at a time when complaints of the unevenness of plantation Rubber is so very acute may possibly be of some assistance to those who are in difficulties.

To make an even break of rubber the latex should be standardised and this applies to rubber in any form—crepe, sheet, etc. The proportions given in above give the best results for practical commercial purposes.

If a very light amber is sought for the quantity of rubber, per gallon, may be slightly reduced. —Nov. 19th, 1912.]

Coagulation may be timed by a five minute glass and the whole process made mechanical from start to finish.

As soon as the sand has run out in the time glass dip into the coagulator without stopping the machine and remove the sponge, the balance if not ready, may be left a minute or so longer till water is clear. The time given above is a fair average but on some days less time is required than others.

The time taken in coagulating the first charge should be noted and be worked to for all succeeding charges for that day,

Careful attention should be paid to the speed of the machine—Don't drive too fast, Maximum 180 R. (30 R. of driving crank).

We are indebted to Mr G H Golledge for the following hints on his invention :—

The best distance apart to set the rolls of the Golledge hand holder is *3-64ths.* If more than one set of rolls are used the rollers should be set to a gauge to ensure the rubber being of equal thickness. Once set, the rollers need not be altered.

It is necessary to express as much water as possible without closing the pores. To effect this the rollers are so set by the makers that they cannot actually touch.

The back screws (those with the springs) should be screwed up, by hand, as tight as possible (no force should be used) and the *soft*

sponge from the coagulator passed through as quickly as possible, before it becomes hard.

Hard rubber must not he passed before unscrewing the back screws (referred to above) to give room.

At no time should the power required to turn the handle be beyond a youth who should he able to turn freely.—G. H. GOLLEDGE.

Gikiyanakande, 21st July, 1912.

[Note.—For the purpose of these instructions by "Glacial Acetic Acid" is meant full strength acid as supplied by the importers. "Acetic Acid" is a weak solution of the formerg].

AGRICULTURE AT THE BRITISH ASSOCIATION.

A contrihutor to the last *Tropical Agriculturist* records the fact that the British Association has elevated Agriculture to the dignity of a section, and goes on to say that the circumstance marks an epoch. The President of the new section, at the recent meeting held in Dundee, was Professor Middleton who traced the history of agricultural progress from the time of Fitzherhert, who was the first to arouse an interest in improved methods of culture in England by his "Book of Husbandry" published in 1523, by Middleton warns us against making the mistake of thinking that a better demand for products, or a rise in prices, brings about improvement in agriculture, which can only follow a change of system as the result of extended knowledge hased on new discoveries.

The state of affairs in England in the 18th century is very similar to that in Ceylon in the 20th. We read that in 1760 "implements of husbandry were rude, thorough drainage had not heen introduced, artificial manures (except crushed bones) were hardly known, oil cakes were scarce, grain was too valuahle to be given freely to cattle, in bad seasons live-stock had to starve so that men might he fed, in good seasons prices fell rapidly, credit was difficult to obtain and interest high." This description might almost he applied literally to Ceylon at the present time, so that agriculture as it exists among our indigenous population is fully two centuries hehind the times.

The following passage from Prof. Middleton" address goes to show that agricultural progress must run its course and cannot be hurried: "Improvements in the arts of agriculture cannot he rapidly introduced; there is first of all an experimental stage and when improved methods have been learned they pass slowly from district to district. Before any marked advance in the art can take place, there must, therefore, occur a period during which a foundation is heing laid. It was ahout 1760 that our population hegan to increase rapidly and it was then that agriculturists were called upon to produce more food. As we have seen, they were able to double the food-supply in seventy years. It cannot he doubted that this marvellous feat was rendered possible hy the pioneer societies of the preceding century, or that it was the spirit of the improver, which the early associations had fostered, that animated the men from whom Arthur Young and Sir John Sinclair learned. If in place of these enterprising agriculturists, whose improvements are described in the reports of the first Board of Agriculture, our shires had heen occupied hy the "dull-witted country gentlemen" referred to by Lisle, or the "upstart sparks" condemned hy Mackintosh, the history of this country must have been very different.

This gives us hope that the work hegun by our local Board of Agriculture, and passed on to the new Agricultural Department, will in the fullness of time succeed in replacing the "dull-witted" goiyas hy an intelligent and enterprising body of cultivators who will develop the natural resources of this favoured colony to their fullest extent.

NEW PRODUCT SUGGESTED FOR CROWN COLONIES.

For news to reach here from London *via* New York is scarcely the most direct route; but we have seen in no home newspaper some suggestions made in October before the Royal Commission under Sir E. Vincent, enquiring into the natural resources and trade of the British self-governing colonies. One American witness Mr. J A Evans, (of Messrs. Evans Sons, Lescher and Webb) had previously, hefore the British Pharmaceutical Conference, suggested the extended cultivation and production of drugs and essential oil-bearing plants in the British Empire. Before the Trade Commission, to which the suggestion was afterwards assigned for attention and enquiry though it concerns other than self-governing Colonies, Mr. Evans referred to the activities in drug cultivation in the German and Dutch colonies and United States. Reasons for systematic cultivation of drugs in the British colonies were found in the restricted areas at present producing and which subjected the drug to the local conditions at time of harvest-

ing the crop; in the fluctuations in supplies through weather, labour, demand and wars in the case of organised production as in Great Britain and Germany and through the additional influence of carelessness, superstition and fraud in unorganised collection as in South America, Western United States of America and the West Coast of Africa; in the greater difficulty of access to wild supplies (the nearer ones having been largely exhausted) with consequent advance in price; and in better quality resulting from systematic control, as shown by English and some Continental grown drugs, the former being richer in active principles and more carefully prepared for the market. Moreover, cultivation in our colonies would help Colonial ports and shipping. Mr. Evans mentioned, as examples of drug cultivation outside the country of origin, cinchona in Java, coca leaves in Ceylon, Java and the West Indies and ipecac in Selangor. He presented a very long list including camphor, etc., for Australia; asafetida, benzoin, gamboge, tragacanth, etc., for India; orange peel, cardamoms, castor seed, quassia, calabar beans, orris root, etc., for the West Indian Islands; copaiba, cardamoms, sarsaparilla, etc., for West Africa, and so on. Lastly we notice that the British Pharmaceutical Society's Museum curator Mr. E. M. Holmes suggested that cubebs might be grown in Seychelles, B.C. Africa, British New Guinea; pareira brava in British East Africa; quillaia bark in Uganda, Cape Colony and Southern Australia; orris root in Uganda and New Zealand; saborandi in Nyassaland and British New Guinea; euonymus in Great Britain and Uganda; sarsaparilla in Strait Settlements; podophyllum in New Forest and Norfolk, England; cascara in British Columbia and Great Britain; coto bark in British East Africa; socotrine aloes in British East Africa, Cape Colony and Somaliland; dragon's blood in North Borneo and British New Guinea; Siam benzoin in B.C. Africa and Burma; balsam of Peru in Ceylon, Honduras and Strait Settlements; and balsam of tolu in Strait Settlements.

PLANTING IN UGANDA.

(*To the Editor, "Straits Times."*)

Sir,—In regard to the letter of Mr Walter Graham, of Uganda, to "The Field," with reference to planting prospects in that country (published in your issue of the 22nd inst.) I think the accompanying letter, which I received a few weeks ago from the Director of Agriculture in Uganda in reply to an enquiry regarding the openings and prospects available there to planters with Eastern rubber experience, will interest you. As far as rubber planters are concerned, I think that Mr Graham's letter should be read side by side with that of the Director of Agriculture.—Yours, etc.,

PLANTER.

Johore, Nov. 23, 1912.

No. 425/P. 6/11.

Sir,—I have the honour to acknowledge the receipt of your letter of the 12th August asking for information about Uganda.

2. At present there are very few openings available, but planters are rapidly coming in chiefly to grow coffee and rubber. The Mabira Forest Co., Ltd., of 46 Leadenhall St., London, E.C., and the Hunter Moses Syndicate, Kampala, Uganda, are practically the only firms with more than two employees. The pay I understand begins at £200 with the usual allowances.

3. The cost of living on estates is probably about £150 per annum.

4. I am sorry that so little information can be given, but as most of the estates are under two years old, and there are so big companies working at present, probably it will be two or three years before many positions will be vacant such as you desire.--I have the honour to be. Sir, your obedient servant,

S. SIMPSON,
Director of Agriculture.

Department of Agriculture, Kampala, Uganda.
September 19, 1912.—*Straits Times*, Nov. 26,

COCOA-BUTTER SUBSTITUTES.

These are comparatively new articles of commerce, and it is surprising to hear that thousands of tons are being imported every year. Twenty or thirty years ago cocoa-butter was simply a by-product in the manufacture of cocoa. Today conditions are reversed: the cocoa-butter is the important article, and cocoa itself is really the by-product. Owing to the enormous demand for chocolate, in the making of which cocoa-butter is used, there is nothing like enough of this substance available; hence the call for such substitutes as palm-nut stearin. In consequence of the increase in the cocoa industry for the sake of the "butter" there are immense stocks of ground cocoa on the market that are practically unsaleable, and it is the low price at which this is offered that has tempted enterprising speculators to set on foot the many fancy cocoas that are now being so extensively advertised.—*Chemist and Druggist*, Nov. 9.

RIPE FRUIT.

When it has been proved that the eating of ripe fruits is a necessity for mankind in the Tropics, it seems a pity the majority of Europeans should know so little about the many varieties, and their divers uses. We naturally do lament the absence of home apple orchards with their health-giving burdens of fruit, and the wealth and profusion of luscious crops in our kitchen gardens.

One of the last noted housekeepers to leave our Colony after many years spent here was famous for the delicious guava jelly, which she made from the hard jambu fruit. There are sixteen kinds of jambu growing in the East, and some of these are in shape and colouring a most deceptive apple.

Passion Flower Fruit, so plentiful here, is a tempting dainty, and its relation in the Native States bears a fruit the size of a cucumber most valuable in jungle homes. The juice and seeds are squeezed out to be eaten, while the cook uses the rest of the fruit as a glorified vegetable marrow.

Papayas, when unripe make another good vegetable, and when ripe are remarkably wholesome. Of the pleasing qualities of mangosteens people here know all that is to be known even to their efficacy in removing the after-unpleasant effects of a durian feast.

A very fair imitation of gooseberry fool, and gooseberry tart, can be obtained by boiling blimbings in water and sugar. This plain little fruit is seldom used here except in curries and sambals.

Unwary visitors to the pineapple plantations, who come back with mouths smarting with blisters from eating the freshly cut fruit, would do well to always provide themselves with a tiny packet of salt; no remedy is simpler, as pineapple eaten with that is harmless.

Why more advantage is not taken by the ordinary housekeeper of the hot sun for crystallizing fruit is yet another mystery which we must discover some day.

RAMBUTAN JAM.—Cut the pulp from the stone. Boil the juice of the fruit only, with a little water and the weight of the fruit in sugar, and two cloves, a small piece of cinammon. When it has boiled, strain, and add the fruit. Then stew slowly until the juice is absorbed into the pulp, and the jam is ready.

RAMBUTAN STEW.—Boil together sugar and water, with two cloves, and a little cinammon stick. When boiling strain, then add the rambutan whole, and stew until the pulp comes off the stone easily; serve cold.

SOURSOP FOOL OR MANGO FOOL.—Peel the fruit, then boil with a little water till very soft. Then strain through a wire sieve, add sugar, and boil slowly until the juice becomes thick. This fool can be made into a jelly, or eaten with blanc-mange.

CRYSTALLISED PUMPKIN.—Peel the skin, cut the pumpkin into strips about one inch thick. Throw away the seeds. Soak for two hours in lime water, two spoonfuls of lime in sufficient water to cover the pieces. (This preparation of lime is sold in the market to eat with betel and is called Kapur halus.) Before cooking the pumpkin wash off the lime, first with cold water, then with boiling water. Boil the weight of the pumpkin in sugar, using enough water to dissolve the sugar. Then when boiling add the pieces of pumpkin and boil for quarter-of-an-hour. Turn out into a basin and leave the whole to soak for a day and a night. After this place the pieces to crystallize in the hot sun.

BANANA TRIFLE.—Boil some ripe bananas slightly, then mash with a fork, and mix with any kind of jam. Lay the mixture in a glass dish, and pour over it a good thick custard, and over that the whipped white of an egg, adding any kind of further decoration.

BANANA FRITTERS.—Make a batter of flour, milk, and butter, add a little bicarbonate of soda. Cut the bananas in half (length-ways), dip each in the batter and fry.—*S. F. Press.*

VALUE OF BEES IN COFFEE PLANTATIONS.

In a recent circular on Bee Keeping, published by the experiment station of Porto Rico, it is stated that :

"The coffee planters particularly have become interested in the raising of bees, not for the honey but because bees are very useful in pollenizing coffee in seasons when there is a great amount of rain during bloom. The pollen in the coffee is carried by the winds from flower to flower, but, if there is much rain, very little bloom is set as only the dry pollen is carried by wind; during rainy periods the bees visit the flowers and distribute the pollen in their honey gathering. Coffee plantations also afford excellent fields for bees to work in as honey is obtained from the coffee shade as well as from the coffee itself."

As it is well known that the mango fails to set fruit when heavy rains occur during the blossoming period it would be interesting to learn if the reason for this is the same as given above in the case of the coffee plant. If it is, no doubt the value of bees in a mango grove would be quite as considerable as that obtained by the coffee planters of Porto Rico.

We would like to hear from some of our readers who are keeping bees near bearing mongo trees.—*Cuban American*, June 15.

WATTLE CULTURE.

In his annual report (dealing with the year ended June 30 last) the Acting Conservator of Forests, Western Australia, makes the following comments on wattle culture :—

"The question of wattle growing for commercial purposes is again being taken up by the Department, and about 30 acres at the Ludlow have been sown with the seed of the broad-leaved Golden Wattle. This is a species largely planted in South Australia and Victoria on account of its bark being very rich in tannin, and which has been grown with very profitable results in those States. A few experimental plantations have already been formed in this State as object lessons to the public and with a view of encouraging settlers to plant the useless portions of their holdings. Unfortunately, however, so far, although many inquiries have been made regarding the culture of this valuable tree. I do not know of any plantations having been formed by private landowners, though the value of wattles, and the fact that they will flourish on poor land, is generally recognised. This species was introduced into South Africa years ago by means of seed obtained from Australia, and its cultivation has been the means of creating an important industry there, the export of bark having grown from 39 packages, valued at £11, in 1886, to 15,819 tons in 1905 valued at £92,911, and the yield of a few years ago from between 30,000 and 40,000 acres under cultivation in Natal was valued at £100,000 per annum. To come nearer home, in Victoria, wattle is at present very profitably cultivated, and has brought as much as £5 2s. 6d. per ton for bark obtained from trees stripped between the fifth and eighth year of planting. In Europe there is an almost inexhaustible market for Australian wattle bark. It commands a higher price than other barks, and there is little prospect of increased production injuriously affecting the exports, as the

experience for years past has been that the prices have risen very considerably. Wattles will grow and thrive on very poor country, and the poorest soil can be utilised. A heavy rainfall is not required, as they will do well with 10 to 16 inches of rain per annum. In various parts of this State there is poor land where the conditions are favourable to wattle culture, and where this tree could be grown with profitable results. It grows very rapidly from seed and the cheapest way of forming plantations is by broadcast sowing, the trees being subsequently thinned from time to time. When once a plantation has been properly established there will be no difficulty in obtaining a regular crop, for as soon as the trees are stripped natural reproduction will do all that is required, and a new crop will spring up again in a short time from the seed shed by the parent tree. A successful plantation will produce five tons of bark per acre, when the trees are fit for stripping, which at, say, £5 per ton means a return of £25 per acre. —*West Australian*, Nov. 16.

HOW TO BUD THE MANGO SUCCESSFULLLY.

DIRECTIONS FOR MAKING THE RIGHT KIND OF BUDDING TAPE.

In the Bulletin of the Department of Agricultura, Jamaica, T J Harris describes a successful method of budding mangoes. The essentials to be observed are as follows:—

"That both the stock and the tree yielding the buds be growing rapidly. That the bud wood be a little larger in diameter than the stock to insure the area on the under side of the actual bud being brought into close contact with the wood when tied in; if the bud wood be less in diameter than the stock, a hollow space will occur between these parts that should be closely applied; acting with this against success is the thinness of the bark of the younger wood and the consequent impossibility of tying in closely. That the bud be tied in tightly, especially at the points just below and above the bud proper, but yet not tight enough to crush or bruise the bark. That the piece of bark containing the bud be removed from the wood without bruising, bearing in mind that the bending will bruise or crush the cells of a plant. That the moisture be retained in the bud during the time required to join up by using tying material that will prevent evaporation, i.e., waxed tape. This is made by dipping three-eighths in. tape into a melted mixture of 1 lb. beeswax, a piece of resin the size of a hen's egg, and half a wine-glass of raw linseed oil; scraping off the superfluous wax with a dull knife after cooling. The bud wood should be near the stock to insure no time being lost between the taking off of the bud and its insertion in the stock,

The bud wood used should be 4 to 6 seasons old and 1 to 1½ in. in diameter, and in any case larger than the stock on which it is grafted. The piece of bark containing the bud in the centre is made about 3 in. long and three-fourths in. wide. Large seedling trees may be cut off and the sprouts arising from the stump budded. No more than three sprouts should be allowed to grow to each stump. In placing the bud on the stock care should be taken to make a space large enough so that the bud patch can be moved slightly from side to side and up and down. Union takes place under the bud and not at the sides. If the bud is still green two weeks after budding the whole of the stock above the bud may be cut off.—*Cuban American*, July 27.

PAPER PULP FROM BAMBOOS.

The Indian Forest Research Institute at Dehra Dun has for some years been conducting investigations into the value for paper pulp-making purposes of the many excellent grasses to be found in India. The problem of manufacturing cheap bamboo pulp has now been thoroughly investigated. In India the work has been undertaken by Messrs Sindall and Raitt, and in Manila by Mr Richmond, of the American Bureau of Science. Mr Sindall and his predecessors in India did not arrive at very convincing results, though, as we have before pointed out, Mr Sindall's book on the subject was printed on paper made from bamboo pulp. The position, we believe, has been largely modified by the later investigations of Mr W Raitt, the Government Cellulose Expert attached to the Forest Research Institute, whose report on the subject has recently been issued as one of the "Indian Forest Records," and which may not improbably lead to a new era not only in the Indian paper industry, but in the prospects of the world's supply of paper. Mr Raitt, in the opening paragraph of his report says:—"The results of a considerable number of trials and experiments by pulp and paper makers have also been published, but the general impres-

sion derived from a review of the whole is one of disappointment at the want of harmony in their conclusions. The one point on which they all are agreed is that bamboo yields excellent cellulose, but scarcely any two agree, even approximately, on the yield, which has varied from 33 to 50 per cent. on the soda consumption, which has been reported as low as 16 and as high as 40 per cent. or on the bleaching powder which has been quoted at from 9 to 40 per cent." There have also been other differences of opinion which Mr Raitt had either to harmonise or prove did not exist.

He has practically done the latter in his very interesting Report, the only portion of which that the general public is concerned with is the general conclusions that are arrived at. In this section Mr Raitt says that it is not necessary to discuss the question of suitability of bamboo fibre for the manufacture of paper. This has already been fully demonstrated by previous investigators. Every one who has handled such paper is agreed, he says, that it is admirably adapted for the purpose, and especially so for high class printing and illustration work requiring a close and even texture and surface, and a minimum of stretch and shrinkage under the damping operation. The only serious objection hitherto made to it was the cost of bleaching. With the two soda processes the cost was admittedly prohibitive, but the sulphate treatment removes this difficulty. Dealing not long ago with the same subject, on the report of an American expert, we found that he arrived at the same conclusion. The question of the suitability of bamboo pulp having been solved altogether, the question as to the cost of production for commercial purposes is then dealt with at length, and on this point again Mr Raitt's conclusions are the same as those of the American expert referred to, namely, that the pulp will have to be made in a locality at or near the source of supply. He then says :—"With the industry thus divided into pulp-making and paper-making proper, the future expansion of the latter is assured, and the extraordinary anomaly of a country teeming with raw materials and having good natural facilities for manufacturing them, and yet unable not only to supply its own demand for the manufactured article, but actually having to import partially manufactured material with which to produce the small amount that it does make, will cease." Not only will India be able to meet its own demand, but it will, possibly, be in a position to meet the demand of Europe and the Far East.—*M. Mail.*

RUBBER INDUSTRY OF BOLIVIA.

H.M. Legation at La Paz have forwarded a translation of a report on the rubber industry of Bolivia by the Argentine Chargé d'Affaires in Bolivia from which the following is taken :—

In spite of the lack of means of communication necessary for the proper development of the rubber industry, in has nevertheless made considerable progress during recent years. Rubber is produced in three principal regions, *viz.*, the Colonial Territory of the North East, the Department of La Paz, and the northern and eastern part of Santa Cruz de la Sierra.

In the Colonial Territory, on both sides of the Lower Beni, there are 26 hectares (65 acres) in exploitation, with an annual production of 22,000 arrobas (557,920 lb.—*sic !*). In the Upper Bens and Madre de Dios regions there are 9 stations which produce an average of 13,000 arroba (329,680 lb.) Beside these, numerous concessions, and even establishments, exist, the exact statistics of which cannot be obtained.

In the Department of La Paz, rubber is found principally in the Province of Larecaja, Muñecas and Caupolicán. Here the dominant species are "Hevea Brasiliensis" (*Siphonia elastica*), and "Manigoba." The latter exists in great abundance in a wild state in the Yungas, and develops with prodigious rapidity, growing 4 to 6 metres (16 ft. to 19½ ft.) in six months, and reaching in three years a diameter of 15 centimetres (about 6 inches), which is sufficient to permit the extraction of the rubber. The industrial centre of this region is the town of Sorata, capital of the Province of Larecaja.

THE LACK OF LABOUR

hinders the making of plantations on a large scale, which, according to the results obtained in several trials, would increase the production considerably since up to the present the rubber has only been obtained from natural forests.

In the Department of the Santa Cruz, the extent of rubber-bearing land is caclulated at 35,000 hectares (about 87,000 acres). The annual production amounts to 120,000 kilogs. (264,500 lb.), In this region the predominant specie is the "*Siphonia elastica.*" The species known as "*Peloto*" also abounds, bnt the product is inferior. The species which are found in Cochabamba are not so good as those mentioned above. Moreover, the natural difficulties and the lack of labour there have discouraged almost all those who had applied for concessions in that region.

The conformation of the country and the lack of means of communication render difficult, and in some regions impossible, the production of rubber to a degree proportionate to the wealth of Bolivia in this article. Furthermore, the scarcity of labour is almost absolute.

The region of Bolivia which is richest in rubber has, too, a formidable rival in Brazil. The deficiency of Custom Houses and frontier guards, and the difficulty of other communications, cause a large quantity of Bolivian rubber to be exported as Brazilian.

The Bolivian product is not distinguished in the European and New York markets, being included with that of Peru and Brazil, and classified as "Pará" and "Mollendo." Nevertheless, in the immense zone bounded by the rivers Abuná, Madre de Dios, Upper and Lower Beni on the one side, and by the Iténez and the Mamoré on the other, there are superb forests of "hevea" of well-known quality and abundance.

The quantity of rubber exported from Bolivia in 1910 amounted to 3,117,650 kilogs. (9,873,171 lb.), valued at £2,212,284.—*Board of Trade Journal*, November 28.

COCONUT CULTIVATION.

EXPERIMENTS AT PERADENIYA.

We have received from the Department of Agriculture, Bulletin No. 2, treating with experiments in Coconuts at Peradeniya by Mr. Kelway Bamber,—and undertaken at the initiative of Mr. J. D. VanDerstraaten, of Negombo. Mr. VanDerstraaten's suggestion, made at a meeting of the Committee of Agricultural Experiments in November 11, 1909, was that coconut trees be scientifically investigated as regards planting distances, habit of flowering and maturing nuts, and the time occupied during the various stages. It was decided to begin the manuring and other experiments in 1911, and the manures were first applied in February of that year. The trees, which were irregularly planted, were divided into lots of 35, or the equivalent of half an acre, making 15 plots in all. The trees on each plot were marked according to the number of the plot, viz., 1 to 15. They are all old, probably over fifty years, but would represent a fairly large acreage of similar coconut trees in Ceylon, so it is felt that any results obtained from the experiments would afford generally useful information. As separate experiments with young trees are necessary for the elucidation of certain other factors, these have been started both at Peradeniya at 1,600 feet elevation and at Maha-Illuppalama at 300 feet elevation, both about 50 miles from the sea; while it is also proposed to begin a further series in the different coconut districts of Ceylon. The objects of the experiments are to determine—

(1) Whether trees of about fifty years of age would respond profitably to cultivation and manuring.

(2) The best form of cultivation to be given.

(3) The effect of common salt, lime, potash, phosphoric acid, and nitrogen on leaf and fruit development.

(4) The effect of a complete artificial mixture.

(5) The effect of cattle manure from cattle tied round the trees in the native manner.

(6) The effect of a bi-monthly application of a rapidly available manure.

(7) The effect of green manures and mulching.

The following details are being recorded:—

(*a*) Dates of cultivation and manure applications with the cost of labour and manure.

(*b*) Dates of appearance of new leaves and flowering stalks and when the fruit-sets and ripens.

(*c*) The number of immature nuts dropped monthly, and the number of sound nuts dropped and gathered every three months.

(*d*) The weight of nuts from each plot after husking.

All the nuts from each plot are kept separate for one month before husking; then opened, and the weight of the shelled nuts, fresh and dried, noted; also the thickness of the meat. Half of the dried copra is sold every two months, and the other half pressed for oil and poonac, the weights and value of each being recorded. After the first period, when the ratio was the same as on the unmanured plots, the mulched plots continue to show a higher proportion of mature to immature nuts. The manured plots show a slightly improved ratio, while the unmanured plots have gone back to 3·96 immature for every mature nut. Taking the yields of ripe nuts only for each period over the manured, unmanured, and mulched plots, there is a marked improvement in the manured and mulched plots, while the unmanured have fallen off. The average number of mature and immature nuts per tree from all the plots for the first five months of the experiment was 6·76 and 15·8 nuts respectively; for the second period, embracing the wettest months, 21 and 16·8 nuts; and for third period of six months in 1912, including the dry period, 11·3 and 20·4 nuts. This is

equivalent for the year July, 1911, to June, 1912, to 32·3 good nuts per tree or 2,261 nuts per acre, which gave less than one candy of copra. The number of immature nuts averaged for the same period 37·2 nuts per tree, or 2,604 nuts per acre, and it is expected that the effects of cultivation will be to reduce this number of immature nuts and so increase the yield per acre. The appearance of new leaves and flowers we are told is very irregular, but generally at much shorter intervals in the latter half or wetter season of the year than in the first half. The average periods for the appearance of the leaves and flowers from January to June and July to December was 25 and 25 days and 20 and 28 days respectively, but there is a wide range of from 7 to 61 days, so that at present no conclusions can be drawn. The nuts were stored for one month after collection, and then husked and weighed. A certain number from each plot were then taken, the nuts broken, weighed and made into copra, which was also weighed. The milk was calculated from the difference between the weight of the husked and broken nuts. The weight of shells was calculated from the average weight of 1,000 shells of 273 lb., it being impossible to estimate directly, the copra being dried for twenty-four hours before the shelling could take place.

We have pointed out more than once that Peradeniya is the wrong place for experiments with coconut and are doubly gratified over the decision to transfer the field of operations to Chilaw, the richest coconut district in the island. Local coconut planters have been too long content to let well alone with the result that there is danger of Ceylon copra being altogether discredited in the London market. It may be, as our correspondent "B" points out in his interesting communication today, that Ceylon white copra is sold in the London market as Cochin but there is the evidence of Mr. N. J. Martin to prove that very inferior stuff is also exported from Ceylon. There has also been a marked deterioration of late in the quality of oil exported and if Ceylon coconut planters want to conserve the good name of the island in these respects and look after their own substantial interests at the same time they will have to take immediate action to prevent the export of inferior copra and oil. The number and variety of the points on which the meeting of coconut planters on Monday agreed to take action indicates how neglectful they have been in the past in regard to an industry which, on the authority of the Director of Agriculture, is the greatest planting industry in Ceylon.

STEAMING AND ROLLING TEA.

Among the papers read before the late Eighth International Congress of Applied Chemistry, held recently in New York, was one by K Sawamura, of the College of Agriculture, University of Tokio, in which he reported on an investigation on tea manufacture.

Why, in the manufacture of green tea, is it important to steam the leaves for a short time only? The answer was found to be that a short steaming was necessary to destroy an enzyme which, if left alone, would attack the coloring matter, and hence render it impossible to produce a green tea; but the steaming period must be short, to avoid killing othor enzymes which produce the fine flavor. This is another example of how men learn to do things long before the physiological chemist comes along with the reason why.

"What is the object of rolling the tea leaves in the manufacture of green tea?" was another question tackled by the Japanese scientist. Some have thought that rolling was merely to give the leaves a characteristic form and appearance. Others thought that rolling served to press out the juice so as to accelerate the drying, and still others thought it was necessary to break up the cells and so promote the solubility in the cup. To settle the matter, Prof. Sawamura made a number of experiments which showed that the chief effect of rolling was to increase the solubility of the tea leaves, and also that rolling, by pressing out the juice, hastened the drying.

The effect of refiring was also studied. Green tea is improved by refiring at 70 degrees C for one hour, but temperatures above 70 degrees C spoil both color and flavour. The best temperature for firing black tea was found to be 80 degrees C. Here, again, an excess of heat was found to be deleterious. Refiring decreases the amount of both tannin and theine.—*Tea and Coffee Trade Journal*, for Nov.

COPRA DUTY-FREE IN FINLAND.

The Board of Trade are informed, through the Foreigh Office, that a circular has recently been issued by the Customs Department at Helsingfors, permitting the duty-free importation into Finland (under No. 69 of the Customs Tariff) of copra, being parts of coconut kernels, not prepared or mixed with other materials. The circular defines copra, out of which oil is pressed, as "the pulpy portion of coconut kernels cut up into pieces and dried."—*Board of Trade Journal*, Nov. 28.

ARTIFICIAL RUBBER DRIERS ON ESTATES.

The managers of estates producing large crops are now much concerned in the drying problem. The difficulties on many properties are enhanced on account of the fact that most factory buildings are on too small a scale, and there is very little apparatus available to expedite the drying process. There are many well-known objections to the use of high temperatures in rubber drying, but it must not be forgotten that there are also very serious objections from the planter's point of view against too slow drying. Recently we have been told that the disadvantages of high temperatures have been somewhat over-rated; certainly we can agree that much rubber prepared under comparatively high temperatures has realised top prices, especially when presented in the form of thick, even-coloured, blanked crepe. There is undoubtedly conspicuous activity on the part of engineering firms in Colombo and elsewhere in the manufacture of artificial driers to deal with annual crops of 150,000 lb and upwards; we anticipate that engineering firms in this country will soon enter the field, and take a hand in the inevitable competition. Many driers are already in use, and have been proved satisfactory; others have been reported as too expensive to work with liquid fuel. All driers of the type indicated should be constructed to consume firewood, coal or liquid fuel, at the lowest possible cost.—*India-Rubber Journal*, Nov. 9.

OXALIS VIOLACEA.

Wellawatta, December 16th.

DEAR SIR,—While at an upcountry station the plants of the "Oxalis Violacea" used to grow rather luxuriantly in my flower garden. I found them really doing no harm to the hardier flower plants, but they choked up those of a smaller growth. They were eventually got rid of by forking them up, tubers and all, collecting them into some receptacle, drying and burning them. They should not be left lying about on the ground after being dug up.

On estates they are generally heaped up on different spots before being finally disposed of with the result that poultry or birds in search of insect food scatter them about, and the first shower of rain washes them far and wide. On a wet day, and on clayey soil, the feet of the coolies, to some extent, act as carriers—particularly of the seeds. Last, but not least, when being transported in baskets to be buried or burned, the earth containing seeds and tubers drop all along the way from overfilled baskets, or escape through the opening in the baskets.

The plants do seed, and I daresay rather freely in some elevations. But comparatively speaking—that is, in comparison with the seeding propensities of planting pests—I should say not prolifically.

I should also hardly call the "Oxalis Violacea" a pest, as with a little ordinary care, and if dug up before it flowers, it could be easily eradicated, and the plant itself is rather a delicate than a hardy one.—Yours faithfully,

G. EUS. P.

THE MOST SOUTHERN INDUSTRY.

Human endeavour (says a writer in "Chambers Journal") carries industry and commerce to strange corners of the world, and has been responsible for the establishment of industries in the extreme habitable limits of the globe. In the northern hemisphere a small community ekes out an existence on Greenland's icy, inhospitable shores mining a special earth which is shipped exclusively to the United States. The ships making for this inaccessible port experience adventures innumerable, as they start northwards in the early spring, and have to battle with fogs and icebergs every mile of the way. In the southern hemisphere, some 700 miles distant from Tasmania's coast, is the small islet known as Macquarie Island, which has received much attention because Antarctic expeditions, as a rule, make a point of calling at this lonely spot. The island is 22 miles in length by 5 miles in width, and is extremely rugged, yet it has become the centre of a growing trade. For centuries it has been the home of immense numbers of penguins; in fact, it is computed that there are some 80,000,000 of this genus on the island. An enterprising individual saw a chance to make money, and he leased the island from the Tasmanian Government and established a factory there for the extraction of penguin oil. The birds are killed and boiled down in huge tanks in batches of 800, and the oil barrelled and shipped to the Australian mainland, to be used in the manufacture of binder-twine. There is only one serious difficulty in the development of this industry. Macquarie Island does not possess a sheltered cove or bay where a depth of water will permit even the smallest ship to approach very close to the shore. As a result the vessels moor about half-a-mile off, and the produce has to be transported to them on rafts. Evidently the traffic is remunerative, as several ships in their efforts to secure a full cargo have come to grief in trying to reach the island.

THE PRESERVATION OF FISH.

A New Process.

A new process for the preservation of fish is now being demonstrated by the Henderson Fish Preserving Company at 57b, Leadenhall Market, E.C. The fresh fish are first placed in a cool chamber and then for three or four hours in sea water to which about 15 per cent. of salt has been added. In the preliminary cooling the temperature of the chamber is reduced gradually to 32 deg. F., while that of the brine tank used in the demonstration plant was about 14 deg. F. It is claimed that the brine treatment destroys or renders innocuous the germs of putrefaction in the fish, and that it removes the gases which assist decomposition. Samples of fish thus preserved have been sent to various restaurants and clubs, with the result, it is stated, that although the fish have been several days old when cooked and served, no evidence of the fact was discernible. The method is stated to be particularly suitable for use in the transport of fish during hot weather to inland towns without ice or refrigeration. The cost of the treatment is said to be about 3s to 6s per ton of fish. It is proposed to equip a trawler with the plant in order to demonstrate the value of the process in the various fishing ports, and afterwards to erect and equip some installations on land in the ports themselves.—London *Times*, Nov. 29.

In Bombay we hear little of attempts to improve the fish supply, but in Calcutta and in the Madras Presidency, there appears—perhaps, on account of necessity—to be more enterprise. Everyone must have heard, for instance, of the trout fishing in the Nilgiris. Sir Frederick Nicholson, in the Madras Agricultural Report, writes that the

TROUT HATCHED AND PLANTED OUT ON THE NILGIRIS BY MR. WILSON IN 1909-1910

had so developed by 1911 that the waters were thrown open to licensed anglers, and many fish were caught, the largest of which weighed 5½ lb; the head of fish is very large. The upper waters of the Bhavani and Moyar continued to be conserved against illegal practices, such as dynamiting, poisoning, etc., with the result that there is a marked improvement in the visible quantity of fish. As for marine fish farms, an experimental oyster farm at Pulicat was started late in 1910-1911, and is now holding many thousands of good oysters, mature though not exceeding 20 months in age. During the year

MR. HORNELL

examined and favourably reported on various sites suitable for ordinary marine fish farming in the lagoons and back-waters; a site containing an area of about 160 acres was finally selected at Tuticorin and has since been sanctioned by Government. This site has the advantage of accessibility and of continual supervision by the fisheries staff as well as of proximity to a large market; it is intended to examine the possibilities of breeding some of our best salt water fish in comparative activity and of studying the bionomics of as many food fish as possible as well as of the chank and pearl oyster. A scheme for the creation of a breeding reserve of pearl oysters on the Tinnevelly coast, and for inducing the growth of pearls, was also prepared and sanctioned.—*Times of India.*

NOVEL TUBE WELL.

Lahore, Dec. 12.—*The Civil and Military Gazette* publishes particulars of experiments carried out in the Punjab with a view to preventing water logging from canal irrigation. Experiments were made with tube wells near Amritsar, with a view to obtaining one which could be used to draw water from the soil in large quantities, yet without drawing sand. It was found that woven wire mesh while acting well at first, gradually became choked with sand. A novel form of strainer tube was then invented by Mr. Ashford, which was formed by winding wire round a skeleton tube in such a manner that narrow slits were left between the wires, the slits being sufficiently fine to prevent the passage of sand. The idea was copied from the method of manufacturing wire-wound guns. A strainer tube well of this type was sunk near Amritsar and connected with an electric centrifugal pump and a long series of experiments carried out with great success. It now appears that the way is open to apply such tube wells, to the work of unwatering water logged lands and also for irrigation purposes, where canal irrigation is not possible.

RED CAMPHOR OIL AS INSECTICIDE.

Dr. Sasaki, Professor of the Agricultural College of Tokyo University, has been experimenting with red camphor oil (one of the by-products of camphor), and finds that it is an effective remedy against wood-eating insects and white ants.—*Chemist and Druggist*, Nov. 30.