



CHARLES SHAND.

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“PIONEERS OF THE PLANTING ENTERPRISE IN CEYLON.”

(*Second Series.*)

CHARLES SHAND:

PLANTER AND MERCHANT:—1842 TO 1890.



NOT many colonists now living have had a longer connection with the island of Ceylon than CHARLES SHAND, the subject of our brief memoir. Mr. Shand's grandfather, a native of Edinburgh, migrated to Liverpool to establish his

sons in business, and there they engaged in the West India trade in sugar, &c., so that in the previous generation the family had been connected with tropical products, though not with the island of Ceylon.

Charles Shand's father and mother (Francis and Mary Shand) were both Scotch: the former born in Edinburgh and the latter in Aberdeen. Mr. Charles Shand was born in Liverpool on the 20th November, 1819. He was educated in private schools until he was fifteen years of age, and was then apprenticed for seven years to one of the principal Brazil mercantile firms in Liverpool. Mr. Shand was well grounded in his school, and we remember his challenging an English Public School lad of the present generation to compete with him as an old man, in his acquaintance with standard classics. Mr. Shand is one of the very few surviving free burgesses at Liverpool not disfranchised by the Reform Bill. "At the termination of my apprenticeship in January, 1842," he says, "I took up my freedom as a burgess of Liverpool, as I was entitled to do,

from having served free men for seven years. I could have claimed it by birth, as I was born 'free' of the city. The firm I served wished me to remain with them; but I decided, if my relatives would support me, to go out to Ceylon as a coffee planter, being induced thereto by the reports of my uncle, Sir William Reid.

"My father had died when I was very young, so I had to look to his brothers for assistance to carry out my wishes. This was granted, and I left for Ceylon at the beginning of February, 1842, arriving by the overland route in the middle of April, a fact which exemplifies the striking advance which has been made since the early years of Her Majesty's reign in shortening the time occupied in journeying to the East, railways and ocean steamers being then in their infancy. I went through France by diligence to Marseilles, and there embarked in a steamer which touched at all the Italian ports to Lyra, one of the Greek Islands, and then on to Alexandria. After staying there a few days, I went to Cairo *via* the Mamoundieh Canal and the Nile in a little steamer called, I think, the 'Jack O'Lantern.'* I remained a week at Cairo, visiting the pyramids, and going to the top of the highest, and seeing all that was to be seen in the neighbourhood of Cairo. I was accompanied by a young

* Just as we did nearly nineteen years later, in October, 1861, on our way out to Ceylon!—Ed. T. A.

man of about my own age, who was going to Bombay. He had been appointed Chaplain to the 2nd Queen's Regiment; he was a very good fellow, having been educated for the Medical profession, but qualified for the Church, on the offer of an appointment. However, all this has nothing to do with my experiences of Ceylon, but it illustrates the length to which Memoirs of my life would extend, if I amplified the incidents upon which you wish me to expatiate." [We only regret that Mr. Shand has not given some more of his travelling experiences in these early days, especially of his journeying through France.—ED.]

"We left Cairo at 5 o'clock one afternoon, in the middle of March, travelling on donkeys, as all the vans were at Suez waiting for the arrival of the steamer in which we were to take our departure for Bombay. We reached Suez at 8 p.m. the next day, having made the 84 miles' journey in 27 hours! We changed donkeys only once. We arrived more dead than alive; but I insisted upon our agreement not to stop more than two hours at the half-way house, being adhered to, much to the indignation of my companion. By travelling in this way, instead of waiting for the vans to arrive at Cairo, we secured the choice of berths in the Government steamer.

"On arriving at Bombay I met the Messrs. Worms and Rigg, and we were fellow-passengers to Colombo in the Ceylon Government steamer 'Seaforth,' commanded by George Steuart, who afterwards became the head of the firm of George Steuart & Co., under the *agis* of his brother James, who was the Agent of Arbuthnot & Co., of Madras, and Master Attendant of Colombo."

What follows conveys a vivid description of coffee planting in the "forties":—"On my arrival," Mr. Shand continues, "I travelled about the country (Kandy and Badulla) in company with my uncle, the late Sir William Reid. After looking about me in search of land, I went down into Sabaragamuwa *via* Haputale; and, after visiting the different parts of the district, I bought 600 acres of land and settled down at Rakwana, which I planted as a coffee estate." [The joke used to be that Sir Wm. Reid—an experienced Demerara coffee planter—who chose the finest block of land in the country for his own estate, in Spring Valley, Badulla,—selected a very poor lot for his nephew and passed through all Haputale in order to settle on much inferior Rakwana; but the fact was that there being no roads, the frightful distance of Haputale from any port, and the difficulty of getting coolies to stay there in the early 'forties,' drove the prospectors nearer to Colombo.—ED.]

"There was a good deal of sugar planting going on at that time. I bought 1,200 acres of land in the Rayigam Korale with the intention of trying sugar planting, but afterwards gave up the idea and sold the land. Before I planted the sugarcane, I ascertained that the climate and the soil of Ceylon was not adapted for the profitable cultivation of sugar. It grew well enough, but the yield was only about 2 tons an acre for the first year, and afterwards even less. The canes would not ratoon and required replanting every two or three years. Consequently, all the sugar estates came to grief, and about half a million sterling was lost by the planters. I went to Colombo to wait until the Rakwana land was ready to be opened. There was no way of getting to the land at Rakwana, which was about 90 miles from Colombo, but by walking. The roads were impassable for horses for want of bridges. I commenced to open the Rakwana land at the end of 1842, and planted it in June of the following year, when I was joined by my brother, Mr. T. L. R. Shand. I remained a coffee planter until 1848, when, owing to the commercial panic of the previous year, all sorts of produce went down to a very low point. I then commenced business as a merchant, and in 1850 I established a firm in Madras, sending my brother there to manage it. I continued in business in Colombo until 1862, when I came home to England and remained at home till 1875, when from circumstances well-known I went out again for three months. I returned again with my family in 1876, and remained there till 1890, and have now been at home seven years."

In 1849 Mr. Shand went over to Cochin, passed over the Nilgiris, stopping at Ootacamund about a month, and paid his first visit to Madras. The travelling dawk was in those days a very comfortable and easy way of travelling, all that was necessary being to deposit £25 with the Government at the Post Office, and they put all the relays of bearers on the road at the traveller's disposal, and he never had any trouble. Mr. Shand evidently had a very pleasant recollection of his journey by dawk down from Madras to Tuticorin, where he embarked on a native boat for Ceylon. The boat being, however, unable to make headway against the S.-W. monsoon, they had to put back, and on the return voyage—[tell it not to Mr. Harcourt Skrine!—were shipwrecked on Hare Island. Mr. Shand had therefore to dawk down to Pamban and go from Pamban on to Negombo. In 1853 Mr. Shand married Miss Symons, daughter of Mr. Symons (father of the present popular Secretary to the Colombo Chamber of Commerce). All the nine children of the marriage are still alive.

Mr. Shand in 1855 or 1856 took a contract from the Government to construct a bridle road from Rakwana to Pelmadulla, a distance of 16 miles, for the sum of £5,000, undertaking to buy 5,000 acres of forest land to provide the money. He afterwards sold this land which formed the Aigbirth, Gilgarron, Deveronside and several other estates. At one time he held the estates of Springwood, Barra, Everton and Rangweltenne, but has sold them all with the exception of Rangweltenne:—"Everton to the Gen Notary" in 1870 and Springwood and Barra to the Asiatic Produce Company in 1889, and the latter have recently sold to the Tea Corporation of Ceylon.

Like everyone else Mr. Shand and his family were hard hit by the fall of King Coffee, but they were among the first to convert their plantations into tea. They also went in for cinchona which was only too successful, so much being produced by the colony that it became an unprofitable cultivation.

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Mr. Charles Shand was one of the most enterprising, long-headed merchants that ever came to the East. His natural buoyancy and equableness of temper in prosperity or adversity stood him in good stead in any time of excitement or speculation such as followed on the American Civil War. We have heard that Mr. Shand's first happy stroke as merchant was in buying up all the native coffee available in Ceylon at a time when it was very low in price (in 1849), shipping it (of course *via* the Cape) to London where, seven or eight months after, it was sold at a splendid profit, coffee having risen in price as Mr. Shand had anticipated. We come next to the Civil War (1861-63) when Mr. Shand through his Madras and Colombo Firms made a rapid and large fortune by his dealings in Tinnevelly cotton, the cotton crop of the Southern States being shut in by the blockade. Almost our first bit of work in Colombo in November 1861 was to frame and print a Telegraphic Code for Mr. Shand—three copies only—for Tinnevelly cotton. "Up to what rate shall we go per lb.?" "Oh sixpence is ample." "Just as easy going to a shilling."—"The day Tinnevelly cotton is at 6d., I'll retire":—so spoke Mr. Shand when that staple was 2½d.; but within six months, if we remember rightly, our "shilling" code was useless, for Tinnevelly cotton had run up to *eighteen pence*! Mr. Shand had cargoes by sailing vessels sold half-a-dozen times over between Tuticorin and London. He was by far the boldest buyer in Colombo at that time; after him coming Messrs. E. J. Darley (Darley, Butler & Co.); Alex. Gibson (Alstons, Scott & Co.); and J. C. Fowlie—all of whom made ample fortunes in cotton. Mr. Shand had some strange experiences:—one of the

most curious followed on his agreeing to go partners with a big Madras landed proprietor in a cotton cargo. When the ship was half-way home, a rumour spread that the blockade was broken. Mr.—came in terror and tears to Mr. Shand to say he would be ruined, that he, a planter, &c., had no right to go speculating in cotton, and implored to be released of his share. Mr. Shand agreed. The blockade rumour proved false; the cotton got safely home; and Mr. Shand (then in London as well as his quondam partner) stood for an enormous profit, when he received a formal demand from Mr.—for his half share. He took the letter and papers to Mr. (afterwards Sir Hugh) Cairns, who decided that although morally Mr.—had not a leg to stand on and was besides a rascal, yet legally (through want of formality in cancelling the agreement) he would be certain to gain in any Court. Accordingly, Mr. Cairns advised Mr. Shand not to go to law, but to pounce down on Mr.—, give him a bit of his mind, and then offer him so much down. Mr. Shand did so; he called on and abused Mr.— up and down, and indicated how he would expose him in Court; but finally said "to be done with it I offer you"—say £5,000 (perhaps half or one-third of the half profits), and Mr.—jumped at the offer rather than face exposure!

During the interval between the failure of coffee and success of tea, Mr. Shand—even when well on to 70 years—during his last stay in Colombo, was indefatigable in experimenting with new products, among the rest with fibrous plants; and he tested, with machinery of his own invention, nearly every fibre-yielding plant in the island with the result that our little Ceylon aloe (*Sansevieria Zeylanica*) gave the best results, though not enough to make it pay at that time.

Another curious experience of Mr. Shand was his gifting (as a pleasant fancy) his Rakwana Coffee estates to Mrs. Shand when leaving Ceylon with his "cotton" fortune in the "sixties." Most fortunate accident! For when through business complications with the Messrs. Collie, London, Mr. Shand lost all that fortune, the despised Rakwana properties came in very handy as being free of his personal estate!

During his long residence in Ceylon Mr. Shand had never more than a day or two's illness, a fact which he attributes to the climate being suited to those who are able to move about the country or to those in Colombo who take plenty of exercise combined with moderate living.

Mr. Shand himself was one of the most active as well as cheerful men we have ever seen. His brisk step, cheery voice and pleasant laugh were missed in the Fort of Colombo when he left for England in 1863; and the same was

true when he finally quitted Ceylon in his 71st year in 1890. He is now in his 79th year and continues to take a great interest in Ceylon affairs, though his health will not permit of his moving about as freely as he did ever since he went home until very lately. He carried on a brisk correspondence in the *Observer* some months ago on the Currency question, pointing out how China Tea must score at the expense of Ceylon, with silver and exchange so much in favour of the former. The latest letter we have had from the veteran was still clearly written and hopefully expressed. For industry, cheerfulness and indomitable pluck, few Colonists ever came to Ceylon who equalled Mr. Charles Shand: may his shadow never grow less!

MAY TEA BE PROFITABLY GROWN IN THE (AMERICAN) SOUTHERN STATES. ?

It is not a question whether individual plants may not be successfully grown so as to present interesting and beautiful objects, in landscape or other gardening, nor whether small patches of the hardier varieties of tea may not produce sufficient leaf to supply the limited demands of a household, or even those of a country neighbourhood. Those problems have been satisfactorily answered long ago, in several of the Southern States. The price of labor and the yield per plant are not important factors under the latter conditions. Several large profits have been reaped on the imported commodity before it is sold over the village counter; and no account of the value of the labor expended in raising and preparing the domestic article is apt to be taken.

But the problem to whose solution much time and attention have been expended at Pinehurst, viz: the economical raising of tea on a comparatively large scale, is confronted by several serious obstacles, and much more than the past few years must be devoted to experimental work before a satisfactory solution may be obtained.

First and foremost is the difference in the price of labor between the tea-producing countries of the Orient and the Southern States of America. It costs almost as much to pick, with us, of fresh leaf sufficient to make a pound of tea as it does to raise, pick and pack the same quantity of by far the larger part of the teas sent to us from Asia. There are, therefore, two alternatives presented to the would-be American tea-grower; he must raise the quality of his product above that of the cheaper Oriental grades, or he must reduce the cost of production below that attained by us. The former course has been steadily maintained at Pinehurst, and with promising results.

The establishment of a productive tea garden involves very considerable expense. A well appointed garden, of good quality and of large leaf production, with few vacancies and of vigorous growth, a sufficient body of reliable laborers, and a suitably equipped factory, cost a great deal of money and attention. That these conditions are essential in the production of good tea must readily appear on a little reflection. A well appointed tea garden implies favorable conditions of soil and exposure to the sun with protection from windy blasts and the avoidance of stagnant water about the roots of the plant. *Good quality* means that the plants have been raised from the best seed attainable or capable of being grown in the local climate. It is certainly necessary to distinguish at least three sorts of tea plants. The Assam unquestionably leads. It derives its name from the north-eastern province of British India which was wrested from Burmah early in this century. It was found growing to the height of thirty

feet in the dark, steaming jungles along the banks of the Brahmapootra river, where the atmosphere was always damp and frost unknown. Its leaves are bright green and large, often attaining a length of seven or more inches, and broad in proportion. Few regions elsewhere appear to be favourable to the growth of this variety, although long ago the forests of those jungles have given place to well ordered tea gardens, where the indigenous plants bask in full sunshine—a requisite for the remunerative production of tea crops. The attempt is being made at Pinehurst to cultivate some of this variety; but the severe weather (15° F.) to which this section of South Carolina is liable, makes success less than probable. It may be that fully hardened and woody plants are capable of enduring such extreme cold, and that by grafting or otherwise, a slightly lower type may be obtained for successful use. At the other extreme is the Chinese variety. Not that all or even the greater part of Chinese tea plants should fall under this category, for unquestionably very many deserve far better treatment; but as the type exists to a considerable extent in China, and especially in its colder provinces, the name may be retained. This variety is a low, bushy shrub, slow of growth, adapting itself to a great range of climate, and capable of withstanding frost, snow and ice. The leaves are of a dark green color, tough and small, *i. e.*, from two to three inches in length and quite narrow, (lancet shaped). This stunted and generally unprofitable description of tea plant is supposed to be the result of the exposure of the better varieties for centuries to dry and cold climates, and to a lack of proper cultivation.

Intermediate between the Assam and Chinese types stand the so-called "Hybrids," and reproducing in their countless varieties the characteristics of both the parent sorts. Strictly only few of them have been obtained by the direct hybridization of the before mentioned varieties; most of them are the result of endless crosses of different kinds, as also of the effect of climate and cultivation. It has been observed at Pinehurst how few tea plants are not susceptible of great improvement in form, productiveness and quality by liberal cultivation; and that gardens of widely different origins exhibit, under the same treatment, a tendency to produce a local type of leaf, with marked and distinctive characteristics.

It is generally held, especially by English authorities, that those hybrids which stand nearest, by origin and in their nature, to the Assam, are to be more highly prized. There are substantial reasons for our advice to plant only the best seed that can be grown in each locality. The Assam plants produce, in their own climate, about twenty *flushes* a year, whereas the average number of pickings in China do not exceed more than three or four. And it may be well to here explain what is meant is meant by a "flush." The work of the tea planter is to produce from the seedling and as rapidly as possible a vigorous bush of from two to five feet in height, according to the variety of seed. He then proceeds to deplete the plant of by far the greater part of its foliage, which is usually done in the cold season. Nature makes a prodigious effort to restore the natural equilibrium between roots and foliage, and with the advent of warmer weather, throws out from every branch a vast number of tender shoots and leaves. The planter immediately plucks off as much of this young foliage as his experience has taught him to be wise, *i. e.*, without injury to the vitality of the plant or loss to the subsequent pickings. For the struggle between him and the plant goes forward through the entire season. These successive crops of young leaf are termed "flushes." The wise planter will not strip the plant of young foliage at any picking, and thus there is a steady gain in the size of the tea plant during the growing season. With the return of cold weather, a more moderate pruning is resorted to, severe pruning being enforced only every three or four years. The length of years that a tea plant can endure this struggle is uncertain, but it should, under favorable circumstances, produce at least ten good yearly crops.

Large leaf goes further than small leaf, (both being tender, for that is an indispensable condition for making good tea.) The young plants, whether grown from seed *in situ* or transplanted seedlings from the nursery, should fill out the gardens at regular intervals, determined chiefly by their expected growth, varying from three by four to six by six feet, where plowing is used. Vacancies occur from the death of individual plants; they should be as few as possible, as they waste the land and increase the labor of cultivation and gathering. A vigorous growth depends upon the productiveness of the variety of plants used, on the climate, the richness of the soil and the cultivation. As regards temperature, the best climate for tea is a warm one, ranging during the year from 45° to 90° F., and without sudden and great variations or severe wind storms. The rain-fall should be abundant and evenly distributed throughout the year. But it is essential that copious rains and frequent fogs should occur during the warm season when the flushes are produced. The rain-fall in the countries best adapted for raising tea ranges from 75 to 150 inches and more per annum. Nevertheless it is possible to remuneratively grow tea in medium climates with lower averages of both heat and rain-fall. Indeed, were this not the case, it would be idle to attempt the cultivation here with an average temperature of 65° F., and an annual rain-fall of 56 inches. The question then probably turns on the two points already mentioned, viz.: the dearthness of labor and the liability to extreme cold in the winter. The occurrence severe cold in the winter may so weaken the vitality of the choicer sorts of tea that the crop of the following season may be reduced by the amount per acre that marks the limit of profit. An average production per acre of Indian and Ceylon gardens, in good bearing, is about 400 pounds of cured tea annually; although instances are not infrequent of 700 to 1,000 and even more pounds under the most favourable conditions of cultivation and climate.

The tea plant is an enormous feeder. If the soil does not afford abundant food, artificial enrichment must be resorted to. Liberal fertilization augments not only the quantity but improves the quality of the leaf, as has been demonstrated experimentally at Pinehurst, especially on poor and medium lands. The picking of the leaf on a garden of twenty-five acres will keep a small force of say twenty children almost continuously busy during the season. With patience and attention, the colored children in the Southern States quickly learn to perform the task satisfactorily. In the earlier flushes, they are taught to pick only the unexpanded leaf bud at the end of the shoot (the "Pekoe tip.") with perhaps the one or two next and very tender leaves. Later in the season, the number of leaves to be picked may extend to three or four. It is a pretty sight to see the gathering of the leaf by the children.

A suitably equipped factory is indispensable to even a moderate-sized garden. For the present only black teas are made at Pinehurst; and, consequently a brief description of what is requisite for their manufacture must suffice. The first step is the withering of the fresh leaf. This is effected by thinly spreading out the leaf on floos or trays, so that every pound shall cover about ten square feet. As each pound of finished tea represents four and one-fifth pounds of fresh leaf, it will be seen that an output of one hundred pounds of dry tea per diem requires about four thousand square feet of withering surface—in itself an expensive item. The purpose of withering is to render the fresh leaf susceptible of being rolled without breaking. As it comes to the factory it is crisp and elastic; it crackles when compressed in the hand; when bent, it immediately resumes its former shape. Withering requires a light, airy room, but it is better to exclude direct sunlight. A few hours sometimes suffices for the change, but usually a whole day's exposure is necessary. When sufficiently withered the leaf has lost its elasticity and feels like an old kid glove; no longer will it crackle when compressed, nor will it regain its shape.

Fresh leaf has neither distinctive taste nor odor. Withered leaf has a faint odor; peculiar, but not suggestive of the finished tea. By rolling (either by hand or machinery.) the oily cells in the leaf are broken up and the juice expressed upon the surface of the leaf. There it becomes foamy from the action of the air and the continued rolling. An oxidation begins, which is prolonged by exposure to the air. By rolling and oxidation (formerly and erroneously termed fermentation) are developed the strength and, in part, the flavor of the tea. The rest of the flavor and the fragrance are the result of the final process of "firing" or drying. It has been found advantageous to substitute machinery for hand power in most of these operations, especially where the production is sufficient to warrant the expense of buying and erecting the especially devised machines. And aside from economy in production, the greater uniformity of product and the more attainable cleanliness of the manufacture are commendable features. In the rolling of tea leaf, a capable man can handle thirty pounds a day; a "Little Giant" rolling machine can do as much in half an hour, and takes the labor of one mule to accomplish it. The total cost of a factory suitable for the daily production of fifty pounds dried tea may be estimated at \$1,500 to \$2,000.

It has been thought advisable to dwell on the expensiveness of tea production, as letters are constantly received asking for such information. There should be added the loss which follows from impairment of seed on the long journey from the East, whereby only one box in four comes to hand in good order, as also the remuneration of the skill and attention which must patiently and constantly oversee every step in the growth and manufacture of this product. And thus, even if the raising and manufacture of tea in the United States be divested of all fancy, and the utmost economy be practiced, it will be seen that the obstacles and expenses to be overcome are very considerable; indeed so considerable that any serious competition with Asiatic producers on the lower and medium grades is simply out of the question. What, then, are the grounds which justify the continuance of experimentation in this direction? And the only satisfactory answer that can be given is, that thus far experience appears to justify the original hope of our ability to grow high grade teas remuneratively. Thus far, we have established at Pinehurst very fair tea gardens from choice imported Chinese and Japanese seed. From them, we have produced both the green and black teas, of a quality which readily commands one dollar or more in the retail market. The gardens have few vacancies, and the plants have a luxuriant growth. There are also a number of gardens raised from hybrids that were introduced many years ago into this country by the national government. Unfortunately they exhibit the effect of neglect, in having largely relapsed towards the Chinese type. They require rigorous pruning, often the extirpation of refractory individuals, the promotion of a more favourable secondary growth, and liberal cultivation; under these conditions they give excellent results. Other gardens of Formosa, Assam, and the best hybrids from India and Ceylon are yet too young to afford reliable data. There can be no question of the luxuriant growth of the hardier sorts, nor that the quality of the product and its reception by the public entirely meet with our fullest anticipations. But not enough experience has been gained to form an estimate of its productiveness per acre (or per plant) of the gardens; nor can any positive statement be given as to the success of the two lines of experimentation to improve the general quality of the plants, by importing different varieties of the more tender sorts, until that variety be found which combines the utmost quality with the ability to stand this climate, or by direct propagation by cuttings and grafting to reproduce the best individual plants in the already established gardens. It was to be expected that our experiments must encounter many obstacles and cause many disappointments. But there has been

enough success thus far to warrant their continuance. Ultimately it is hoped to attempt the manufacture of those very highly esteemed and priced teas which are rarely met with outside the countries where they are grown; and simply, because of a light "firing," they do not stand distant transportation. They should be drunk shortly after manufacture. This is a field where the American grower need fear no competition from the Orient. Such teas must demand a high, very high price; but if better than can be otherwise obtained, there will be no scarcity of buyers.

CHARLES U. SHEPARD.

Pinehurst, 1896.

COFFEE PLANTING IN MADAGASCAR.

In 1871, the late Mr. Alfred Guenot, of Vatmandary, tried large plantations of coffee in Mahanoro District. The plants grew very well, and if that gentleman had succeeded in the enterprise he would have certainly been one of the richest man who ever attempted serious planting in Madagascar. Some time after, in 1872-73, a kind of fever passed through the district of mahanoro, the disease unknown until that time, acted so strongly on the brains of the inhabitants, that an epidemic immediately broke out: it was planting coffee; almost every one wished to plant, and planted coffee; that plant responded to the desire of the inhabitants and grew luxuriantly; unfortunately this did not last long. What often happens in such cases soon occurred, namely, deceptive appearances, and then disillusion. Coffee had been, it is true, planted on a large scale, but no one provided for the means of maintaining it. *Planted artificially, the care of bringing up the child was left to Nature alone.* In a short space of time large plantations of coffee has been made, but alas! they did not last long. In a few years, after a few crops all the plantations had disappeared. Almost all the coffee-trees had died. No one searched for a remedy, or to discover the cause of the disease. All contented themselves with saying, "The coffee plantations are destroyed by a disease." Only one planter, Mr. Jean Comte, now in Tamatave, was in the habit of manuring the coffee-trees yearly. Well, he prescribed his plantation, and we remember, long after the disappearance of the other plantations, having twice accompanied him on his estate situated at Ambodiriana Lohariana and saw the coffee-trees in a very fair state of vegetation. When the late war took place and Mr. Comte was obliged to leave Mahanoro, his plantation was in full crop, while long before there remained only stumps of trees on the estates of the other planters. In our opinion, the coffee-tree was destroyed by a disease which could be summarised by these words: *want of nourishing elements.* We think that the coffee-tree could be planted and would succeed on the condition that the plantation be manured yearly, *even twice a year, if possible.* The soil of this country possesses an incredible degree of vegetation, but, by the very fact that the vegetation is so active the soil becomes impoverished quickly. *Since artificial plantations are made, Nature ought also to be aided artificially.* The late M. Alfred Guenot, who had lost so much money in planting coffee, was of opinion that coffee ought to be tried again and was preparing to do so, when unfortunately he died. The same sort of coffee: s that which was cultivated at the time could, we believe, be planted afresh—the tree is not sick, since on all estates where coffee was planted, it is observed that a few have escaped owing, undoubtedly, to having been planted in richer veins of soil. In the villages and yards one notices a few coffee-trees growing nicely, probably taking their nutritive principles from the manure formed naturally in these places. It is a good idea to introduce the coffee of Lileria here, but it is no reason why the ancient sort should not be planted again. In 1880 the coffee in white shell was worth 3 dols. per 100 lb.; at the present time, one could hardly, by offering 11 dols. or 12 dols., obtain 100 lb. of the same produce. Most of the foreign community, if not all, make use of tea now.

We have also observed that coffee flourishes here in places sheltered from winds, and ever so little *umbrageous.* We believe that the plant would do very well as interlineary plantations.—*Madagascar News.*

COFFEE CULTIVATION IN BRAZIL.

The following on the subject of the cultivation of Coffee in Brazil, published in the *Revue Coloniale*, is taken from a report addressed to the Minister of Foreign Relations of France by Mr. Viener, on his return from South America:—

The largest coffee-planting region is found between latitudes 18 degrees and 25 degrees south; but it extends much farther north, and coffee raising is carried on in an immense territory, embracing 25 degrees of latitude and 24 degrees of longitude.

In the beginning of this century Brazil exported only a very small quantity of coffee, but now it is the principal coffee-producing country of the world.

The following statement shows the increase of the Brazilian coffee trade since 1,800, from the ports of Rio and Santos alone in bags of 60 kilograms (133 pounds) each.

1800	..	..	..	13
1817	..	..	..	66,985
1820	..	..	..	97,489
1830	..	..	..	484,222
1840	..	..	..	1,037,981
1876	..	..	..	3,765,122
1895	..	..	..	6,508,768

In 1895 the crop was estimated at 7,000,000 bags; in 1896 it was even larger.

The coffee plant is not indigenous to Brazil, but it is today completely acclimated. One finds, it is true, in the forests of Botucato (State of Sao Paulo) a so-called wild coffee plant (*Coffea amarello*), but they are without doubt plants that have come up from seeds carried by birds or monkeys. The cultivated variety is called in the country *coffee vermelho*. The height of the plant varies from 2 to 5 metres and the stem measures from 40 to 70 centimetres in circumference.

The processes of cultivation vary according to the locality. Thus in the province of Ceara, according to a pamphlet by Mr. Joh, quoted from by Mr. Viener, the coffee plant is always started in green-houses. The roots are transplanted at the age of two years, preferably from January to April, and are planted at a distance of from 10 to 12 palmos (the palmo is equivalent to about 9 inches). They begin to yield at four or five years. The season for gathering the crop is not always the same; on the other hand, it has quite a long duration, varying somewhat according to the heaviness of the rainy season, which generally begins in May or June and ends in August.

The beans are placed on a paved floor (uncovered), called in the country *fachine*, and the drying lasts from thirty to thirty-five days. In the State of Ceara the old system of decortication by grinding by millstones (*rodieros*) turning in a stone trough is still employed. This method leaves much to be desired, for many of the grains are crushed by the weight of the stones. The cleaning and burnishing are done usually by hand.

In the States of Sao Paulo and Minas Geraes the cultivation of coffee occupies vast areas, and the treatment of the coffee after the crop has been gathered is done in a much more perfect manner than in Ceara, by the most improved machinery.

The largest *fazenda* (plantation) in Brazil, and perhaps in the world, is the Dumont plantation (State of Minas Geraes) established by a Frenchman, whose name the plantation still bears. The total extent of the property is 30,000 hectares, 6,150 of which are planted in coffee. The number of plants in 1896 was 4,718,000.

The cultivation is carried on by Italian emigrants, of whom there are 8,000 employed. Each year the extent of this plantation grows, and the production becomes larger and larger.

In 1895 the yield from the Dumont *fazenda* alone amounted to 4,100,000 kilograms, and that of 1896. rose to 4,500,000 kilograms. This plantation was sold three years ago to a Brazilian company for the sum of 12,000,000 francs.—*The American Grocer*.

LUCERNE (ALFALFA) CULTIVATION.

Extract from 'Hand-Book of Experimental Station Work,' published by the Department of Agriculture, United States, in 1893 (pp. 10—11.)

LOCALITIES SUITABLE FOR CULTIVATION.—A perennial forage plant, resembling clover in its feeding value, habits of growth and effects on succeeding crops. Under favourable conditions it will live from eight to fifteen years and does not run out as clover does. It has long been cultivated in Europe and is grown quite extensively in California and some of the other Western and Southern States. It seems probable that it may be introduced with advantage into many parts of the Southern States east of the Mississippi, and over a wide tract of the more arid regions of the south-west. It has been grown successfully for several years at the station at Geneva, New York, but in recent experiments on thirty farms in different parts of Vermont, it was very largely winter-killed.

While a southern climate is more favourable to Lucerne, numerous experiments have shown that it will do well in many localities in the Northern States, and, when established, will produce from three to five crops each season for a number of successive years. "Lucerne is specially adapted to dry climates and withstands drought much better than ordinary clovers." For this reason it is largely relied on in Colorado and California, especially where irrigation is used.

A NITROGEN-COLLECTING CROP.—Lucerne is one of the plants which collects Nitrogen from the air. It also gathers a considerable amount of Phosphoric Acid and Potash. At the New Jersey station in two years Lucerne grown on 1 acre collected 553 lb. of Nitrogen, 98 lb. of Phosphoric Acid, and 586 lb. of Potash, valued at 124 dollars.

If Lucerne and its products are properly utilised on the farm, it cannot be considered an exhaustive crop, but rather one which transforms the raw materials in soil and atmosphere into products for man's use.

SOIL PREFERRED.—*Culture.*—Lucerne prefers a light sandy or loam soil, with a sub-soil through which its long roots can penetrate. In some cases its top root down 12 to 15 or even 20 feet. At the New York station, however, Lucerne has been successfully grown on a clay soil. On such a soil greater pains must be taken to secure a good stand, but, when the plant is once established, the character of the sub-soil is of more importance than that of the surface soil. Use fresh, pure seed. Sow at any time when the ground is in suitable condition, and when there will be time for the plants to become well established before they are subjected either to drought or extreme cold. The soil should be thoroughly prepared and the seed sown at the rate of 15 to 20 lb. to the acre. If sown broadcast, about the latter quantity will be required; if in drills, the former amount will be sufficient. In the north spring seeding is advisable, but in the south it is better to sow in the autumn.

IRRIGATION.—In regions where irrigation is necessary, the Colorado station advises that the water should be applied to Lucerne before cutting, because thus the reaper does its work more effectively, and the growth of the succeeding crop is stimulated. A relatively large amount of moisture is required the first year in order to secure a good stand.

HARVESTING.—Lucerne should be cut during the first period of good weather after the blossoms begin to appear. If allowed to stand too long, its stalk becomes hard and woody, and succeeding crops are likely to be diminished. If designed for hay, it must

be carefully cured and housed, for otherwise its leaves will drop off and only a mass of bare stalks be left.

VALUE AS A FEEDING STUFF.—During a single season Lucerne furnishes a large amount of nutritious green forage relished by all kinds of stock. It should be partially wilted or mixed with hay or straw. In the dry regions of the west it is much used for pasturage, especially in the autumn, but there is more or less danger that it will cause the cattle to bloat or that the plants will be killed by close pasturing. Cattle, sheep, and horses relish Lucerne hay and seem to thrive on it.

Chemical analyses and digestion experiments show that Lucerne compares very favourably with red clover both as green fodder and as hay. It may be used either for fattening or for milk. To secure a well balanced and economical ration, Lucerne, which contains a large proportion of *protein*, should be fed with corn, wheat, oats, straw, root crops, etc., which contain relatively large amounts of the other food ingredients (carbohydrates and fat). In many instances farmers might profitably raise Lucerne as a substitute for the wheat bran, cotton-seed meal, and other materials which contain large amounts of *protein* and which they are now buying in order to utilise the excess of carbohydrates produced in corn and other crops.

DISADVANTAGES.—(1) It is not easily established; (2) it is less hardy than clover; (3) if allowed to grow too long its stalks become hard and woody; (4) except in dry regions cattle cannot be safely pastured on it; (5) it requires peculiar treatment to make good hay.

ADVANTAGES.—(1) When established it does not run out; (2) it withstands drought much better than clover; (3) it grows rapidly and may be cut early in the season; (4) it gathers a large amount of nitrogen from the air as well as from the soil, and is therefore very valuable as a fertilising crop; (5) it furnishes several large crops of green fodder each season; (6) when properly cured it makes an excellent hay; (7) it is relished and digested by all farm animals and is an excellent flesh and milk producer; (8) it makes muscle rather than fat, and is therefore valuable to use with corn and other fat-producing crops to make a well-balanced ration for cattle.

In brief, experience at the stations and elsewhere indicates that Lucerne is valuable as a feeding stuff and as a fertilising crop, but that it requires peculiar conditions of climate and soil for growth and careful culture and curing to make it a profitable crop. It is worthy of repeated and systematic experimental tests by farmers, even though in some regions and on some farms it should prove a failure.

DISEASES.—(*Pseudopeziza medicaginis*).—This fungoid disease is found in nearly every place where Lucerne is grown. Usually it does not attack the plant until the second year's growth when the plant is able to survive the disease. Sometimes, however, it completely destroys seedling plants. The disease shows itself as minute dark-brown spots of irregular shape upon the green or discoloured leaflet. The centre of each spot forms a small pustule. In this are developed the spores, which are set free by the breaking of the epidermis. The disease readily survives the winter and may develop year after year in the same field. In serious cases covering with straw and burning alone stopped the disease. It may be held in check by frequent cuttings.

LUCERNE ROOT-BOT.—(*Ozonium auricomum*).—The fungus causing this disease has been identified as the same as that causing the "root rot of cotton." It attacks the crown of the plant and works down for 6 to 10 inches, completely killing it. In the field the disease spreads in almost a perfect circle, at a rate of 50 to 60 feet during the season, killing every plant. It is thought that sowing salt plentifully or applying kerosine over the infested spots will kill it out, thus preventing further spreading. The disease is worst in dry, hot weather.

In the Appendix to the *Handbook of Experimental Station Work* (pp. 386, 388 and 397) the following is

given as the averages of the 23 chemical analyses of Lucerne:—

	Water.	Ash.	Protein (N x 6.25).	Fibre.	Nitrogen-free extract.	Fat.
As GREEN FODDER.						
Fresh air-dry material	71.8	2.7	4.8	7.4	12.3	1.0
Water-free substance	Nil.	9.4	17.1	26.2	43.9	3.4
As HAY AND DRY COARSE FODDER.						
Fresh air-dry material	8.4	7.4	14.3	25.0	42.7	2.2
Water-free substance	Nil.	8.1	15.6	27.3	46.6	2.4

Fertilizing Constituents of Feeding Stuffs:—

	Moisture.	Ash.	Nitrogen.	Phosphoric acid.	Potassium oxide.
Green Fodder ...	75.30	2.25	0.72	0.13	0.56
Hay or Dry Coarse Fodder ...	6.55	7.07	2.19	0.51	1.68

To contrast with the above Sorghum Fodder may be here shown from the same table of analyses of Fertilizing Constituents of Feeding Stuffs:—

	Moisture.	Ash.	Nitrogen.	Phosphoric acid.	Potassium oxide.
Green Sorghum Fodder ...	82.19	...	0.23	0.09	0.23

—Agricultural Ledger.

THE LONGEVITY OF SEEDS.—M. Charles Naudin contributes to the *Bulletin* of the Société Nationale d'Acclimation de France a paper on "The Longevity of Seeds, and their Preservation in the Earth." Seeds, says he, are known to remain for an indefinite length of time, even for several centuries, in the ground without germinating, owing to atmospheric or other causes. M. Naudin instances, as a case of suspended germination, a packet of earth from the Sahara, which spread over a flower bed, and duly watered, was found to contain seeds of *Helianthemum*, which grew, and bore yellow flowers. The inference is, that an apparently barren region yet contains in its soil seeds which, were the climate to become more humid, would rapidly transform it to one of vegetable fertility and luxuriance. M. Naudin mentions, in further confirmation of his opinions, that in 1895 he received a few seeds from Gaboon packed in some of the soil of that place. This earth, less than two pounds in weight, was placed in a flower-pot, whence, in a fortnight, sprang twenty seedlings all belonging to the *Cucurbitaceæ*. The stems and branches of these plants grew to a length of from 20 to 24 feet, and it is hoped that they will put forth bloom, thus showing the genus and species. From this accidental yield, it is supposed that soil more carefully selected would give still richer results. In the many cases where plants cannot be brought to Europe in good order, where they die on the voyage, or are immature or past their prime, it is suggested that a sample of the earth selected from some likely spot in their vicinity should be sent over in their stead, and might he found to contain fertile seeds of the species desired. If this, says M. Naudin, seems a proceeding based too much upon chance, like that of a fisher casting his net at a venture, this difference may be pleaded: the botanical collector is no more sure of finding what he seeks, but in all probability will obtain something new and acceptable. Finally, it must always be borne in mind how easily packets of earth can be transported from place to place without any attention on the journey.—*The Gardeners' Chronicle*.

PLANTING NOTES.

ORANGE CULTURE IN CEYLON.—We understand that there has been a considerable importation of good orange plants lately for distribution and trial in different districts. The plants are very choice ones and were selected from a special nursery, and that they cost very nearly R500 laid down at Colombo. They were securely packed in small bags, with the nursery soil, and looked quite fresh and green, but without a single leaf. They promise to do very well, and we shall be glad to know results of their successful cultivation up-country. The native orange (by the way, is it indigenous?) like other native products, is not systematically cultivated by the Sinhalese. It is generally believed that oranges grown on the hills are not so palatable as those grown in the low-country, and that the Salpiti Korale, Kotta, and the neighbouring villages, produce the best oranges, as the soil there is best suited for their culture. Up-country, we are told, the plants thrive well, but the oranges do not taste so well as those grown in the low country, though Nuwara Eliya and the Uva Province produce fairly good specimens. Of course, the oranges grown in Ceylon and India are quite unlike those from Australia and the West. Our oranges, however ripe they may be, as a rule preserve their verdant hue and do not take on a yellow one, while the taste is a sharper and more refreshing one than the sweet flavour of the oranges met with in Europe. We understand that a large quantity of oranges are imported into Australia during the summer from Italy and Spain, and there is a growing demand for them in the Colonies. Should, therefore, the experiments now being made up-country prove a success, there should be no reason why Ceylon should not compete in the Colonies with Spain and Italy. It is a pity that a few lemon plants were not imported as well. The Australian lemons are simply exquisite, and they have a much finer flavour than our Ceylon limes. There is every reason to believe that lemons could be cultivated in our island as well as oranges.—The orange fungus is a great pest in some districts: the introduction of lady-bird beetles would speedily stop that.

PLANTING LIFE IN BRAZIL.—Mr. T. L. Villiers, the Ceylon planter who recently proceeded to Brazil as the Manager of the Dumont Coffee Company's estates there, has returned to Ceylon. His description of planting life in Brazil is not attractive:—

"Mr. Villiers went with Mrs. Villiers to the estate, but found the life there rougher than he anticipated and very different to a planter's life in Ceylon. The heat, he says, was very trying, almost as bad as Colombo, and yellow fever was very prevalent in the neighbourhood, so that he managed to get his agreement with the Company cancelled, and left Brazil after a very brief stay. His description of planting life in Brazil is interesting. There are very few English in the country, and they are not popular with the indigenous population. There was a European family on the Dumont Company's property—the Secretary and his wife—but the nearest European doctor was a 16 hours' railway journey away, and the labourer is Italian, with little in common either with the cooly or with the planter. The little narrow-gauge railway that traverses the San Paulo district is the principal means of communication, but there is an accident on it nearly every day, so that, while it is useful for freight, passengers prefer to go round to Rio by sea, as being slower but safer. Brazil coffee growing may be profitable, but is evidently not an occupation for a married Ceylon planter, or for anybody who is not prepared to rough it a good deal."—*Planting Opinion*, October 16.

THE "QUEENSLAND AGRICULTURAL JOURNAL," Vol. I., Part 5, November, 1897.—Contents:—Agriculture, Dairying, The Orchard, Botany, Apiculture, Tropical Industries, Bacteriology, General Notes, Statistics, The Markets, Farm and Garden Notes for November, Orchard Notes for November, and Public Announcements.

GEMMING—AND GEM-SEPARATING.

Ever since we made the acquaintance in London of Mr. W. S. Lockhart, M.I.C.E., M.I.M.E., and saw his patent Gem-Separator at work, we have been anxious to see his invention tested in the Gemming Fields of Ceylon. Quite two years have elapsed since we first heard of the formation of a Prospecting Syndicate in London having a strong Board and ample capital with the object of purchasing and utilizing the Patent Rights of the Gem-Separator for Ceylon. But we have still to learn of actual work having been begun.

It is, of course, quite possible that, taught by his experience in Burma,—where Mr. Lockhart was at one time connected with the famous Rubies Company, and which he left in order to invent and perfect the separating machine he felt to be indispensable to success,—the patentee prefers to make quite sure of his invention, as well as of his position in Ceylon, and of the certainty of getting at the best fields, before he consents to make a start. Delay, therefore, we hope, will only strengthen the assurance of eventual success; for, by recent news, it appears, the time is drawing near when Mr. Lockhart himself proposes to visit the island, no doubt in order to give a fair start to the Gem-Separator and to learn where it can best be applied.

Of the machine itself, though we do not mean at present, to attempt an exact description, we have only praise to give from what we saw of its work. It is simplicity itself. We saw a bucketfull of such clay as our sapphires are found in, mixed up with a handful of small gems, carefully counted, and the whole thrown into the hopper of the machine; and in a wonderfully short time we had the full quota of precious stones deposited in a glass case below the machine, having, through the process worked clear of the clay by their specific gravity. When taken out they were found to be correct in number. So with minute grains of gold thrown into a mass of detritus which seemed to swallow them up, never more to be seen separately; but passed through the hopper and machine, the result was equally satisfactory, and not a grain was missing.

Not only therefore was it demonstrated that masses of clay or gravel containing precious stones or precious metals could be speedily treated in the machine; but that there was the most absolute guarantee against theft, hitherto the chief drawback experienced by all Europeans embarking in the gemming industry in Ceylon. Mr. Lockhart has said that he is prepared to deal with from 50 to 500 tons of gem-bearing earth per day per machine—a quantity ample to test the best fields around Ratnapura, or in the Rakwana and Matara districts. We feel sure that when the trial is made, the result will be satisfactory in bringing to light, and that very speedily, any gems or gold there may be in the soil treated; and we therefore consider that the introduction of Lockhart's Patent Gem Separators will mean the commencement of a new and important development in the history of Gemming—an industry going back beyond the Christian era—in Ceylon.

Since writing the above we have learned from the local Agents, Messrs. Lewis Brown & Co., that a Mr. Goldie was engaged some months ago, to take charge, it is supposed, of the interests of the Syndicate or Company in Ceylon. A call of capital has also been recently made. We may therefore hope for some active steps

erelong; but, unless machines are on their way out, they may be too late for operations during this North-East monsoon, and so lose the best of another year.

SCHOOLS OF AGRICULTURE IN ITALY.

Several agricultural schools have of late years sprung up in various parts of Italy, the most important in the Naples district, says Consul Neville-Rolfe, being that of Portici. The school has been in existence about 24 years, having been originally established by the province, but it was taken over by the State, and re-established by the Royal Charter in 1885. A portion of the disused Royal Palace was given over to its use, the spacious grounds, gardens, and useful group of farm buildings being especially adapted to that purpose. The instruction is conducted by sixteen professors, each of whom takes his own branch of the subject, as chemistry, botany, horticulture, zoology, entomology, geology, farm accounts, meteorology, physics, forestry, irrigation, &c., and lectures upon it. The course occupies three years, after which students who satisfy the examiners obtain the degree of *Laureato Agronomo*, or bachelor of agriculture. Besides the lectures, practical instruction is given in the field, and the making of cheese, wine, and oil is systematically carried on. It is, in short, an agricultural university; 670 scholars have passed through the school, of whom 228 have obtained degrees, and there are 21 freshmen inscribed for the coming year. Most of the laureates become professors in other colleges in Italy, and some have gone to other places, such as Cairo, Buenos Ayres, and San Francisco. One very useful branch of the institution is the exhibition of agricultural machinery, upon which the future of Italian husbandry depends so much, and another, the dissemination of pamphlets by the various professors on their special subjects. Of these last there is a very interesting one by Professor Italo Giglioli, the head of the school, on the importation of Italian fruit into Great Britain. He begins by stating that the total importation of fruit into the British Isles has risen from £5,977,351, in 1880, £7,287,566, in 1890, with a steady annual increase. Besides this, in 1890, nuts to the value of £622,936 were imported. In 1890, only 4 per cent. of the fruit imported into Great Britain came from her own colonies, and 8 per cent. from Italy, but the Professor is strongly of opinion that while the colonies have increased their export to a very large extent, the next decennial period will show that Italy has not been idle, and that with more attention to cultivation, packing, and means of transport, the Italian fruit will obtain a more influential place in Great Britain, which is shown to be the most influential fruit market in the world.—*Journal of the Society of Arts*, Oct. 1st.

PRESENT PROSPECT OF TEA
PLANTING IN FIJI.

Only two estates of any importance have been opened in these islands, *i.e.*, Alpha and what is now known as the Wainunu Estates. The former was started by the late hon. J. E. Mason, M.L.C. When he had to cease planting Arabian coffee owing to its destruction by leaf disease (*Hemileia vastatrix*) in 1884, he turned his attention to the cultivation of tea on high lands at the north end of Taviumi. The altitude was sufficiently high, about 1,000 feet, the land of good quality and the right nature to produce the best quality of tea, a result fully attained by Mr. A. J. Stephens who undertook the management for Mr. Mason.

Unfortunately while Mr. Mason was on a visit to England and acting as Commissioner for Fiji to the Indian and Colonial Exhibition he died, and the finances of the estate going into other hands, while the manager was unable to get suitable and cheap labourers, the plantation, originally about 400 acres, dragged along until 1895, when the proprietors decided to put

no more money into it. Mr. Stephens also thought that the restrictions placed on the employment of Fijians excessive for the minimum pay fixed by law is put at 8d. a task or day or a lump sum of £5 per annum which is absurd, as a man may do no work for it; while the cost of introducing the labourers on to the estate amounted to over £3 each, £1 5s. of which goes to the Government as commutation taxes and stamp fee; generally 10s. per head being also paid to return the men to their homes, while in addition to all this the planter has to feed, supply soap, tobacco, hospital medicines and housing to the labourer. The aggregate cost under these conditions amounted to from 1s. 3d. to 1s. 6d. per day per man according to the system and food supply at the command of the manager; about double the cost of the labour employed at similar work in India and Ceylon. Under these circumstances Mr. Stephens went back to Ceylon and is opening a tea plantation half of which he owns himself.

Of the Wainunu Estates, Masusu had a very chequered career from the start in 1884 through the vagaries of Mr. Barratt's partner. Up to 1894, Mr. Barratt being mainly a working partner, at this time was left with this and Mr. Simpson's Na Dua Estates on his hands, and with better machinery just to hand he hoped even with Fijian labour and their high cost to make the industry pay. Na Dua Estate of 80 acres had just been planted by the late Mr. G. H. Simpson and with the tea planted on Masusu (Mr. Barratt's original work) of 100 acres a surplus would be left for export after two years' operations. Excellent tea has been turned out and the high grades sell well in Fiji. The Pekoe and broken Pekoe are equal to the Ceylon teas the writer has tasted in Melbourne.

On the 18th ultimo, in company with hon. J. M. Borron, the writer paid a visit to these Estates and Mr. Barratt gave us full particulars of his experience at Wainunu. As Mr. Barratt had anticipated in 1895 and 1896 he had a surplus of several thousand pounds of tea, and for 1896 and 1897 he had a larger surplus mainly of low grade teas. A quantity of the first surplus was sent to the colonies and sold in competition with Indian and Ceylon the average price was about the same as that of ordinary Eastern teas which left no margin for the higher cost of production here on account of labour. On all other points the advantage of land, driving power of machinery (by a Pelton wheel), transport (by water), and timber for packing, are in favour of Fiji. Again the consumption of tea in Fiji is from forty to fifty thousand pounds of tea per annum, but only about half this quantity is used of Wainunu tea for the reason, given by Mr. Barratt, that on account of the low grade teas being admitted at the same rate of duty as the better kinds, the very inferior kinds are sent here from the colonies as trade stock. As to the best class of tea he is satisfied that he could hold his own under present conditions in the Fiji market. Mr. Barratt told us that he and his partner had had enough of Fijian labourers at present cost of them and unless liberal concessions were made quickly by the Government they would be compelled to close the place. Mr. Barratt, in reply to a question of Mr. Borron as to the suitability of coolies for the tea industry said, that if they had a larger capital to obtain a special class of labour mainly composed of women, their husbands and children, with a large percentage of the latter for picking tea, so that they might bring their area up to about 400 to 500 acres it would pay over 15 per cent interest on capital.

There is an abundance of land at Wainunu, thousands of acres unoccupied by natives heavily timbered and watered, with a luxurious vegetation different to any other part of Fiji and as fine as any in the world. The Estates under discussion have over 400 acres and plenty of adjoining land which they could attach at a low cost. Any altitude may be got and all sorts of tea manufactured. Large cutters come up the river to within a few yards of the factory and load for Levuka and Suva. The factory has two tea rollers, green sorter cutter, sorter and graders of the latest patterns, a large

first-class sirocco, and splendid fittings recently erected (for labour saving purposes) to work the green leaf. The quarters for manager, overseers and labourers are excellent, and much taste has been displayed in arranging the homestead and grounds. A stream of water has been tapped in the hills and brought down in iron pipes to drive a powerful Pelton wheel capable of developing eight horse-power which drives all, and could drive more, machinery.

The closing of this, the last of the tea estates aiming for an export trade, would be a very serious calamity and might extinguish all means of advertising or bringing under notice a product which would utilize large areas of land fit for no other purpose and employing labour unsuited to sugar cane cultivation.

—*Fiji Times*, Sept. 11.

W. J. EWINS.

ANOTHER PLANT FOR FIBRE:

"CALOTROPIS GIGANTEA"—THE "WARA" OF THE SINHALESE.

It turns out that the mission of Mr. MacDonald to Bombay and Sindh has to do with testing the fibre-yielding property of *Calotropis procera*, a well-known plant growing wild over Sindh and the Punjab. In this connection, a correspondent of the *Indian Forester* for September (see below) pleads for the testing as well of the fibre of *Calotropis gigantea*, a common plant in Southern India and Ceylon. We shall therefore be much interested in the result of Mr. MacDonald's mission; for, the latter plant—the "Wara" of the Sinhalese and also well-known to the Tamils under three different names, see below—is a very common plant in our lowcountry as the following account from Dr. Trimen's "Flora Zeylanica," shows:—

C. gigantea, *Br. in Ait. Hort. Kew.*, ed. 2, ii. 78 (1811). *Wara Singalese*; Manakkovi, Errukalai, Urkkovi, Tamil.

An erect shrub or small tree, reaching 10 ft., bark yellowish-white, furrowed, branches stout, cylindrical, more or less covered with a very fine, adpressed, cottony pubescence.

Waste ground and roadsides, &c., in the lowcountry; very common, and often gregarious, Fl. all the year; pale violet or nearly white within, greenish-white outside, column pale blue.

Throughout India, Malaya, S. China.

Has a slightly fetid odour when bruised. The whole plant is very full of milky juice, which is given as a remedy for leprosy. The bark of the root (which is an official drug in the Indian Pharmacopœia) is employed as an alterative tonic. A very good fine fibre is obtained from the stem and used for fishing lines. The long hairs on the seed form a beautiful silk-cotton, used for stuffing. Charcoal for gunpowder is made from the stems at Jaffna.

CALOTROPIS PROCERA AND GIGANTEA.

You will probably be interested to hear that a representative of a firm (Messrs. Boyle and Company, London) is on his way to Bombay for the purpose of undertaking experiments in extracting fibre from the *Calotropis procera*, a plant, the fibre of which has been known to be of excellent quality for the past twenty years or more.

A small consignment of the fibre was sent to Messrs. Boyle and Company to be reported on, who then asked that some of the stems of the plant might be forwarded to them to ascertain whether the machinery they possessed could treat and decorticate the fibre from the stems. There was no use of course in doing this as by the time the stems reached England, they would, it was known, be too dry, for the purpose of experiment. On being in-

formed accordingly Messrs. Boyle and Company resolved to send a representative to India with machinery to decorticate the fibre if possible on the spot, and their representative is now on his way to Bombay via Singapore. He will probably be here in the cold weather. The step Messrs. Boyle and Company are about to take is a bold one, and it clearly shows that they consider the fibre to be extremely valuable.

The next question is, is there a sufficient quantity of the fibre available in India at present from stems to enable an export trade on a large scale to be carried out, should the experiment turn out a success? *Calotropis procera* grows wild all over Sind, and it is also to be found, it is believed, in the Punjab in this state. *Calotropis gigantea*, the larger plant and one which yields the larger quantity of fibre in proportion to the cut stems, is common according to Brandis "in South and Central India, Burma and Bengal, Gorakpur, Oudh, and in great profusion in an isolated locality in the Siwalik tract near Kali Dugri below Naini Tal."

The fibres from both the *C. procera* and *C. gigantea* are equally good. As at present arranged Messrs. Boyle and Company's representative is to proceed to Sind to undertake experiments with *C. procera* there, and the Government of Bombay have very kindly issued instructions that all the local Revenue and Forest officers in Sind are to render Messrs. Boyle and Company's representative any aid that may be needed for the purpose of conducting experiments with the plant there. It may be, however, that there is a better field for such experiments in other parts of India. If so will Forest officers in India and Burma or any others, through the pages of this Magazine, kindly let it be known, and will they also state (1) whether *C. procera* or *C. gigantea* grows in their Districts, (2) if so to what extent and (3) whether there is waste land available for the cultivation of the plants?

Such information, if it be not too much trouble to obtain, will be extremely useful and valuable at the present time, and I shall be greatly obliged if some, at any rate, will condescend to come forward with it.

As *C. gigantea* yields a larger proportion of fibre to the cut stems than *C. procera* and as there may be an equally large quantity of the plant available as in Sind for immediate experiment, in some other district of India or Burma, it might be advisable after the completion of Messrs. Boyle and Company's experiments in Sind for their representative to go elsewhere.

An interesting monograph on *Calotropis gigantea* was written some years ago (1878) by Mr. Strettell, Deputy Conservator of Forests and he described it as being indigenous in Sind. He was in error here, for the plant which is to be found in that Province is *Calotropis procera*. Mr. Strettell in this paper shows how much more valuable the fibre of *C. gigantea* is than jute and how much easier the plant is of production. As regards its facility for producing and reproducing itself there can be but one opinion. I have seen it (*C. procera*) growing on the summit of rolling plains of sand away from the Indus and on fallow kharif land near this river. It coppices freely and in about 12 months the cut stems are again ready for the extraction of fibre.

My experiments in Sind were conducted, it ought to be mentioned, with the aid of Ranger Dulpatri who obtained the cut stems for me and the fibre was stripped from them in my presence.

In 1891 Messrs. Ide and Christie, Brokers, of 7 Mark Lane, London, valued the fibre @ £15 to £23 per ton. In Mr. Strettell's time the market value of the fibre was £30 to £40 per ton.

I imagine its present market value must be rather in accordance with Mr. Strettell's figure or perhaps higher judging by the action of Messrs. Boyle and Company who are sending out a representative at their own cost and armed with machinery for conducting experiments on the spot. They were not invited to come out here, but merely asked to report on the quality of the fibre and its market value. Their enterprise is certainly very commendable.

15th September, 1897.

G. M. R.

—*Indian Forester*.

COCONUT CULTIVATION AND MANUFACTURE OF THE OIL IN SOUTHERN INDIA AND CEYLON :

WHY SHOULD COCHIN OIL SELL 36 PER CENT BETTER THAN CEYLON ?

HOW TO IMPROVE THE CEYLON COPRA.

A most practical question, and one that has been far too long neglected, is raised in the enquiry with which we head our remarks, Can there be any permanent unchangeable reason why "Cochin" coconut oil should fetch, on an average, 36 per cent. more value in the London market than the coconut oil from Ceylon? Cochin is three degrees farther from the equator than Colombo; but in most respects must have a climate and soil very similar to that of our West Coast, save that its dry season is said to be longer. Applying to a Colombo friend with prolonged experience for an explanation, we have been favoured with the following interesting remarks:—

"The superiority of Cochin coconut oil over Ceylon oil is due to the superior whiteness and quality generally of the Cochin copra as compared with Ceylon copra. Although the S.-W. monsoon rains from end May to August are very heavy in the Cochin State, there is a larger number of dry months than in Ceylon and it is in these dry months, that the coconut kernels are dried in the sun only, which gives a whiter and better copra than the average of Ceylon, and as Cochin oil is made from this whiter copra, this accounts for its superiority. It is not supposed that the Cochin coconuts are practically better than Ceylon nuts, but that the superiority of the Cochin oil may be attributed solely to the better climate, and to the superiority of the preparation of the copra from which the oil is made. Cochin oil is believed to contain a larger proportion of stearine than Ceylon oil, and hence its special suitability for the manufacture of fine candles such as those made by Price's Patent Candle Company, which are so well and favourably known to the public."

We give next an interesting communication,—which, in reality, prompted our enquiry—that reached us by a recent mail from a very old Colombo merchant long retired from the island; we have filled in the figures of rainfall and temperature for our West Coast as desired by him. He writes as follows:—

"Has the question ever been raised and discussed wherefore there should exist such a material difference in the value in Europe between Ceylon coconut oil and the oil shipped from the Western Coast of India? It is quite worth discussion. Though a difference in climate may account for part of the difference in value, there are methods in the cultivation of the nut and the preparation of copra which, if attended to in Ceylon, should increase the production of nuts and improve their quality and, therefore, the value of the oil. The climate of the West Coast of India differs greatly from that of Ceylon. The southwest monsoon beginning about the middle of May is generally one continuous downpour until about the first week in August; during which period mostly 100 inches of rain are measured, some 20 more inches falling during other parts of the year. In Ceylon the average fall in the low-

Prices in London (6th October) Ceylon oil £22; Cochin oil £29 10s at £30.

country ranges from 90 inches at Galle, 88 at Colombo, 68 at Negombo to 54 at Chilaw. The temperature in Cochin ranges from 80° to 90° Fahr.; whilst on the sea coast in Ceylon the thermometer averages only about 79 at Galle and Puttalam and 80 degrees at Colombo. In both particulars there is therefore a considerable excess over Ceylon.

"The cultivation of the coconut palm for nut-production and copra-making, so far as these terms are applicable to Ceylon, is much influenced by the character of the natives of the two countries. The Sinhalese are not a painstaking people; the natives of South India are more intelligent and will take very much more trouble in all the work of their hands. No doubt the natives of both countries recognise the good old proverb, that 'the coconut tree likes to hear the people talk,' and the good effect of burning the dry fallen leaves underneath them to destroy injurious insects. The Indian 'prunes' his trees: that is, he cuts away the old stalks which have borne nuts. For cultivation a very simple process is practised, viz., breaking up the soil about the roots generally into little heaps, into which are brought the ashes of burnt leaves, at the time when the immediate advent of the monsoon is apprehended. Both these simple processes increase the yield of nuts, so that in ordinary years there is a bunch of ripe fruit, often of 12 nuts to be gathered every month.

"The making of copra is a careful operation in India; and far otherwise in Ceylon. The nuts when opened are not placed on the bare ground in the sun or exposed to a fire; but clean mats are put down to which the women attend, taking them in at night or covering them over on the approach of rain. The pressing of the oil by the checku is the same in both countries*; but even in this part of the process the Indian is the superior in cleanly methods.

"These few hints are given for what they are worth. It is not supposed our native friends in Ceylon will change their methods; but European proprietors and superintendents of coconut plantations by accepting these recommendations may increase the produce of their trees and improve the quality and value of their oil. Sometimes a red tint is observable in the oil. This arises from too long delay between the gathering from the tree and the conversion of the kernel into copra by exposure to the sun; especially when the nuts in their husks are piled in heaps in the open air, germination having commenced within the shell. These should be carefully avoided, germinating nuts being discarded. What is desired is a clear colourless oil when finally pumped into the casks for shipment, to procure a white solid sample when offered for sale in London or at the Continental Ports."

We now return to the practical question with which we opened. Surely, we may say we have as good coconut palms in Ceylon as on the Cochin coast; as good soil and a climate equally favourable at least in the districts North of Colombo (and in Batticaloa and Jaffna?); and if this be granted what is to hinder equally good copra being prepared here? It seems to us that the explanation must be found in the greater care exercised by the natives of Cochin in their handling and drying of the copra—a fact that is testified to by both our mercantile

correspondents, and that it should be quite possible, say in the Maravila and Chilaw districts, if not in the Negombo district—to prepare with a little extra care, copra equal to that of Cochin.

For instance, not only can Negombo, Maravila and Chilaw (including Rajakadalawa) boast of most luxuriant palms growing in fine soil; but even Cochin can scarcely show a much larger number of dry sunny days during which copra might be prepared. We find that the meteorological record for the several centres of coconut cultivation in Ceylon runs as follows:—

Name of Station	Average annual total:			Side of Ceylon.
	Rain-fall	Rainy days	Dry days	
Colombo	88.52	171	194	West
Heneratgoda	93.84	148	217	West-inland
Kalutara	86.03	151	214	South-West
Galle	91.47	206	159	South
Matara	68.26	49	266	South
Negombo	67.11	98	267	West
Chilaw (Horakelle)	65.45	92	273	North-West
„ (Rajakadalawa) 5½	106		259	North-West
Puttalam	46.36	78	287	North-West
Kalawewa	50.14	76	289	North-Central
Kurunegala	84.12	168	197	Central (low-country)
Jaffna	47.68	72	293	North
Batticaloa	54.85	101	264	East

From the above we would specially select the Negombo, Chilaw, Kurunegala, Jaffna and Batticaloa districts and ask, for what reason—if sufficient manual care be taken—as good and attractive copra cannot be prepared from the coconuts in each of these as in Cochin? We have heard, indeed, of plantation copra from Batticaloa being pronounced very superior to ordinary Ceylon. Is this an established fact? If there is no other remedy, would it not pay on some of our plantations to import some natives of Cochin accustomed to manipulate the coconut kernels for copra in that State?

We await the opinions, or experiments of practical planters in the districts referred to, from whom we shall be glad to hear on the subject; for surely, if increased care in preparation increase the price of a great part of Ceylon oil even ten or twenty, much more by thirty-six per cent., there is ample reward awaiting the experiment. One point may be raised as to the greater proportion of stearine in Cochin coconut oil; if this be due to soil, we should have to get samples from Cochin to analyse and compare with our Ceylon coconut soils*; but we cannot believe there can be much difference in this respect between the best of our West Coast and the Coast of Cochin. The difference is most likely to arise from the more careful cultivation of the palm, the plucking of ripe nuts only, and the watchful manipulation, as already described, of the kernels to secure the best copra. All this should be within the reach of coconut estate proprietors in Ceylon, at least in some of the districts we have selected as most allied to Cochin in climate and soil.

CEYLON VS. COCHIN COPRA.

On the subject of the above article we have drawn up the following questions and circulated them among authorities in Colombo who have not already given us their opinions:—

The first set of answers to reach us, is from Messrs. Volkart Brothers, and this firm with

* We suppose there are European oil-preparing mills at Cochin as at Colombo?—Ed. T.A.

* There is a valuable chapter of analyses for "Coconuts" (soils, nuts, oil, &c.), in Cochran's "Ceylon Manual of Chemical Analyses."—Ed. T.A.

prolonged experience both here and in India, shew clearly that much more might be done with Ceylon copra :—

1. Yes ; Cochin copra is never smoked or kiln-dried, always sun-dried ; hence the oil, that is pressed out of it, becomes whiter.
2. Our opinion is that if the same method in preparing and drying copra as at Cochin, were practised in Ceylon,—Ceylon oil would equal Cochin oil or nearly so.
3. Certainly.
4. -----.
5. Jaffna and Batticaloa.
6. For merchants and mill owners it makes but little difference, whether ordinary or white oil is being shipped. It would certainly be to the interest of planters, to adopt Cochin methods and send people over to study these or employ Cochinese here.
7. We are the largest shippers of copra from Ceylon and employ Malabar people to superintend drying etc.
8. Calpentyn, Jaffna and Batticaloa supply the best copra ; Madampe the worst.
9. -----.

Per Pro. VOLKART BROTHERS,
A. BOHLMANN.

THE CALEDONIAN (CEYLON) TEA ESTATE LIMITED COMPANY

Is generally discussed in the home press. It is reconstructed and enlarged from the Company started by our old friend and veteran colonist, Mr. Alex. Ross—one of the best planters who ever came to Ceylon—and he along with Sir Alfred Dent and Mr. Wm. Gow constitute the Directors of the new Company, while his son Mr. J. S. Ross is Manager out here, the Secretary being Mr. H. F. Stanley and offices at 11, Old Broad Street. The capital is £200,000 with a first issue of £110,000 in Preference, Ordinary and Debentures. Here is the criticisms of the *Daily Chronicle* on this issue :—

Only the profits for one year are given, which, from the three most advanced estates, amount to nearly £7,000. There is no valuation given of the properties to be taken over, but taking the price of the uncultivated land at £10 per acre, and the land under cocoa at £30 per acre, the price of the land under tea, including the factories, buildings, and machinery, is under £55 per acre. The present issue will leave £7,000 available for working capital, and the remainder of the capital is held in reserve for the future extension and development of the estates. The future of this class of company is largely a question of management. Tea companies are, as a rule, only applied for by those who have a certain amount of local knowledge and experience of the trade, who can be trusted to look after themselves.

The prospectus has a good deal of interest to Ceylon readers :—

This Company is formed to take over as going concerns the properties of the Caledonian (Ceylon) Tea Plantations, Limited, consisting of the Venture Estate, situate in the Bogawantalawa District, and the Selegama Estate, situate in the Matale District, also to acquire as going concerns the Kahawatte and Waveena Estates, both situate in the Matale District, and the Lawrence Estate, adjoining the Venture property in Bogawantalawa, and to acquire other estates in Ceylon and elsewhere as favorable opportunities occur.

The acreage of the estates now acquired is as follows :—

	In full bearing.	Planted and in partial bearing.	Timber clearing	Forest.	Cocoa.	Total.
Venture	399	0	5	12	—	407
Lawrence	450	50	—	65	—	565
			Forest and Chena.			
Selegama	200	300	—	530	—	1030
Waveena	20	220	—	46	—	286
Kahawatte	—	—	—	236	160	396
Acres	1060	570	5	889	160	2684

All the above land is freehold, except about 140 acres of uncultivated land on the Kahawatte Estate, which is leasehold. The greater part of the land planted with tea is situated at a high altitude in Bogawantalawa, one of the finest tea-producing districts in Ceylon, and the remainder is situated in Matale, a district which has lately come into great favor for tea planting.

The net profits of the Venture and Selegama Estates for the season ending 30th June, 1897, and of the Lawrence Estate for the year 1896, with a total crop of 465,000 lb. of tea from 1,060 acres, were nearly £7,000. None of the young tea on the above-mentioned 570 acres was then in bearing.

The yield from the estates now acquired for the present season (1st July, 1897, to 30th June, 1898) is estimated by Mr. J. Stanley M. Ross, the manager of the properties, at 535,000 lb. made tea. Taking the rate of exchange at ls. 4d., and assuming that the tea will realise an average equal to that of last year (which may reasonably be expected, as the bulk of tea is produced at a high altitude), the profits should be approximately £7,500, which amount, after providing for the debenture interest and preference dividends, as well as London expenses, should leave a surplus sufficient to pay a dividend of about 8 per cent. on the present issue of ordinary shares. The profit should go on increasing as the 570 acres of young tea mature and come into fuller bearing, and there is still a large reserve of land available for planting.

A considerable portion of the Kahawatte Estate is believed to be suitable for the cultivation of coconuts, which will be undertaken should it be thought advisable to plant up the available land with this product.

The estates are in a high state of cultivation, and are well equipped with factories, bungalows, coolie lines, and sufficient machinery for all present requirements. The rainfall is ample, and the facilities of transport are excellent as the estates are all connected with the railway by Government or other roads.

The prices to be paid by the Company for the purchase of the estates and properties have been fixed by the several vendors at sums amounting together to £103,000, payable as to £11,000 in preference shares, as to £11,000 in ordinary shares, as to £13,000 in debentures, and as to the remaining £68,000 in cash. Taking the price of the uncultivated land at £10 per acre, and the land under cocoa at £30 per acre, the price of the land under tea, including the factories, buildings, and machinery, is under £55 per acre. The vendors will discharge all outgoings and liabilities belonging to seasons 1896-7, in respect of the estates up to the 1st July 1897, from which date the Company will be entitled to the profits ; but the Company will repay the vendors all advances made by them before that date, on account of the present season, and will take over all outstanding coast advances, and all stores purchased by the vendors for future use and in hand on the 1st July 1897, at cost price.

The present issue will leave an ample surplus for working capital, while the unissued capital and debentures will provide funds for opening out more land and purchasing additional properties as required.

MR. CHRISTISON ON CEYLON TEA ESTATES.

We call special attention to the cautious but valuable deliverance of our visitor, Mr. Christison—experienced Darjeeling planter as he is—as the result of his observations during the present trip in our tea districts. His remarks deserve careful attention. On the whole we consider they will tell in favour of Ceylon plantations; for the “possible dangers” have often been thought about locally, and the far more plentiful planting of tree belts and boundaries has had reference to blight as much as to fuel supplies. But more still should be done in this way.

Then as regards “want of rest” to the tea tree in Ceylon, we go on our oldest fields and the annual favourable report still from Loole Condura estate after 28 years’ experience. The same may be said of Mariawatte with its specially heavy cropping and yet which Mr. Christison no doubt found as flourishing in 1897 as in 1883.

Mr. Christison is quite right about tea at high elevations in Ceylon. So far back as 1864, we were taken by a Haputale planter—long since dead—who had had six months in Assam before coming to Ceylon, to see the forest-clad valleys behind Baker’s Farm, as, in his opinion specially fit for the opening of Tea Gardens! But no one would authorise tea-planting in Ceylon for many years after that and even in 1878, first-class tea seed was unsalable in Colombo and was talked of by a bigotted coffee planter as “troublesome stuff” to be put in anywhere! Mr. Christison must know how much more deeply rooted tea is than its surface-feeding predecessor, coffee.

MR. CHRISTISON OF DARJEELING IN CEYLON.

THE ADVANTAGES AND DISADVANTAGES OF CEYLON AS A TEA-GROWING COUNTRY.

Mr. Christison, late of Darjeeling, has returned from his visit upcountry to the tea districts, his excursions having been to the following estates and districts:—Colombo to Kandy, visiting Hantana, New Peradeniya, Udagama, Galaha, Haragama, and many other places; thence to Gampola (which he visited in 1883); and on to Adam’s Peak Hotel. He saw Wanarajah, Kintyre, Laxapane, Avoca, Bogawantalawa, Talawakelle, Diyagama, Agradatana, Great Western, Abbot’sford, Nuwara Eliya, Naseby, Scrubs, Udupusellawa; and, on his return to Colombo, one or two lowcountry estates near Alutgama. Besides travelling by train he posted 196 miles, and in addition walked considerable distances. Our representative interviewed Mr. Christison a few days ago at the Grand Oriental Hotel, and the following is that gentleman’s own account of the trip, though it is only fair to say that he would have preferred waiting before he gave his views so that he might have given fuller consideration to some of the points he advanced:—

GENERAL IMPRESSIONS.

I am (said Mr. Christison) very sorry my tour in Ceylon has been such a hurried one, and I should very much like to have had three times the time at my disposal. I have, however, seen a great deal in the time and I think have arrived at fair conclusions if allowance is made for the shortness of my visits. Before I started I was told by Mr. John Ferguson I could see a great deal of

tea from the train. I have tried to see it by railway from Alutgama to Nannoya and back and in going twice over these journeys have looked well around me. I have posted 196 miles, and in many cases I have retraced my steps by other routes and gained other opportunities for observation. I have in addition walked on the gardens themselves, but not so much as I would have done had I been a younger man, and further I have walked from time to time considerably amongst the tea along the side of the roads. I have been connected with land all my life and with tea and tropical and more especially hill cultivation for thirty-five years. I am still diffident in expressing my views, but I must say I felt immensely gratified by the hospitality shown me on all occasions, and the unflinching readiness to impart information on the part of all whom I have met wherever I have been.

FULFILMENT OF A FORECAST.

The longer I live and the more experience I gain the more cautious do I become in expressing dogmatic opinion on many points connected with tea. Instead, therefore, of stating my present impressions, gathered from my rapid tour, I would much prefer merely to recall attention to two prophecies I ventured 14½ years ago.

In 1883 when in Ceylon I expressed a decided opinion to the late Mr. A. M. Ferguson—I was standing at the time at a high elevation. I then said that my experience in Darjeeling in 1863 led me to consider from 3,000 to 4,000ft. the best elevation for tea. In 1883 I thought the best elevation in Darjeeling was 4,000ft. to 5,000ft. I then said to Mr. Ferguson that I was confidently of opinion there would be no fault to find with tea at 6,000ft. or over in Ceylon, considering the difference in latitude when compared with Darjeeling. “If,” I then said, “you have the soil there, I believe it would be found a most advantageous elevation for tea, and that it will be the best for flavour and in other respects.” That was commented on at the time, in May, 1883, I have no hesitation in repeating that. I remember in October or November of that year I was at a meeting of the Lebong Company: there was then considerable attention directed to Ceylon which was then beginning to attract notice as a tea-growing country, and my shareholders expressed considerable anxiety as to Ceylon becoming a formidable opponent to Darjeeling to its disadvantage. They asked my opinion and on the spur of the moment I gave it and the reply was

ADVERSELY CRITICISED IN CEYLON.

I then replied that from the impression I had gathered the soil was not sufficiently good and I had seen some instances of large estates between Nuwara Eliya and Kandy, changed from coffee to tea, which would not, I thought, be remarkably successful. Considering everything, I added Darjeeling had not much to fear from Ceylon although they had been getting fancy prices (30s a pound) for their tea, and though their average was higher than ours. Still, I then said, when Ceylon got into full bearing and full crops their teas would not be found equal to the best Darjeeling. Tea I tasted in Ceylon (though not a tea-taster) was not in flavour equal to teas I had seen from Darjeeling, and that I believed Ceylon teas would ultimately find their level nearer that of Cachar.

THE PRESENT DAY.

Those two prophecies (said Mr. Christison) I have no hesitation in now repeating. I have however been through many estates and I have a much

higher opinion of your soil than I had then. I believe there are more than one or two districts I have seen which possess great natural advantages in every way, and are capable of doing anything that is attainable in tea. I have seen a great deal of the island and I must say I have seen nothing I consider poor except some small scraps going up to Kandy. I have seen no "poor tea," but a great deal I consider very fine.

A HEALTHY PLANT.

I have been impressed with the healthiness and robustness of the plant. I may say I have seen surprising little signs of sickness or distress in any part, and hardly what I consider a trace of blight. I have also seen some very fine factories, probably the largest in existence at the present day, admirably arranged and most efficiently equipped. I hardly saw a weed within the whole area of cultivation. I was very much struck with that, for it is such a contrast with our hill district of Darjeeling. I saw none,—not even in the channels, or the banks of the streams, or in fact in any direction. Another thing that struck me was that I never saw throughout the whole of my excursions any attempt at terracing.

FURTHER TEA INVESTIGATION.

I propose to visit ten more tea districts in India and elsewhere. It is twenty-one years since I was in Assam: it is seventeen since I visited Cachar and Sylhet; and nineteen have elapsed since I was in Dehra Dun. It is four years-and-a-half since I was in Darjeeling, but I have been in constant communication with them there, so that is the only country of which I have up-to-date information, and comparing Ceylon with that I consider you have the following

ADVANTAGES.

- 1.—Climate.
- 2.—The slopes are more gentle, lending themselves better to terracing, manuring and surface draining.
- 3.—The estates are less costly in the preparation of the land for planting and in after cultivation.
- 4.—In regard to transit you have splendid roads with easy gradients. Even in the gardens themselves you have the advantage over us for everything is carried on men's backs in Darjeeling.
- 5.—In regard to water-power you are most advantageously situated, the water being more easily brought to the side of your factories than is the case with us.
- 6.—The soil is even (though I consider nothing I have seen any where in Ceylon equals our best Darjeeling soil) and the land less broken up. There are fewer uncultivable portions. The gardens are much more compact.
- 7.—Looking at the physique and health of Europeans of long residence, I am convinced that even with the fine climate of Darjeeling you have an advantage.
- 8.—Through all the hill districts, so far as I have seen, the rivers are gentle in their flow; to some extent they are navigable with slight artificial aid. They are such a contrast to the mountain torrents of Darjeeling.

POSSIBLE DANGERS.

Nature (continued Mr. Christison) has been so lavish and so liberal to you that I am afraid you do not realise the importance of some sources of danger. May I diffidently suggest the following:—

- 1.—I have spoken as to the healthiness of the plant I have seen; but I believe in no instances in any former experience in any crop

where there has been such a surface covered, has there been exemption from blight. This ought to be thought about. I sincerely hope you will escape, but you will be exceptionally fortunate if you do. Wherever there is a large area of cultivation, no matter what plant, in any country and in any climate, there comes in time blight.

- 2.—The want of rest for the plant is another source of danger. You are always plucking or pruning. Pruning is not a rest, but a surgical operation more trying than plucking. I look upon it as a more severe process for the plant than plucking.

- 3.—I have seen some indications of waste of soil by wash and this requires to be seriously thought about—the effects of wash year by year, the carrying away of the constituent properties of the soil by rain. Yours is a light friable soil and in spite of your admirable and complete system of drainage this requires grave attention.

- 4.—We do not know the life of the tea plant yet. When tea is reduced to a science, the deterioration of the plant will be understood and must be reckoned with. Wherever the plant comes into full bearing, you ought to write off a sum for annual deterioration of the plant in the same way that you write off for deterioration of buildings, and other property.

- 5.—In many districts the want of firewood fuel will become very pressing, and, though I give you credit for mch planting along roadsides and also separate plantations, further steps in this direction might be carried out with advantage in the shape of separate forest plantations.

For thirty years (said Mr. Christison in conclusion) I have been fighting against nature in a climate where we had practically five months without rain and I am consequently alive to some of these points I have mentioned. One thing I should like to do—to go back to the beginning of coffee and see what your land was like then. It is not what it was, but it is capable of very much now with the climate you have got. Too much attention cannot be paid to preserving and fertilising the soil, but especially to prevent any more of it being carried down your rivers. I have expressed myself hurriedly, and with many imperfections, but what I have said I have put forward with the most kindly feelings towards all associated with the tea industry in Ceylon.

FIBRES GALORE.

A PRACTICAL agriculturist writes to us from an outstation regarding Rami or Rhea:—

"As regards the Rhea fibre industry, which has recently been the subject of discussion in the local press and is now causing anxiety in the minds of some planters, one can easily understand there can be such a thing as having an 'eye to No. 1.' Mr. MacDonald's figures for yield of crop were evidently based on a character of soil not very general in Ceylon. And yet Mr. MacDonald himself does not appear to have granted this, for, when talking as to soil for the Rhea plant, he strongly advocated planting thickly amongst coconut trees, 'the closer the plants and the more complete the shade from the coconut trees, the better the canes for fibre.' This should prove something worth knowing to owners of large coconut plantations."

We cannot believe that crops of ramie would not interfere with the crops on coconut palms; for, the roots of the latter spread out a great deal from the parent tree.

Regarding *Calotropis Gigantea* or Wara, a planter writes from the Gampola district:—

"I am very much interested in all about Fibres, and, on reading in *Observer* yesterday about the 'Calotropis Gigantea, the Wara,' I sent out and got some of it, and send you by same post a packet containing the leaf and flower, also a small sample of the fibre. The latter seems to be very fine, and, if it doesn't set the ships on fire, like the New Zealand flax did, we should be able to ship it in large quantities, if machinery to clean it properly, and labor for growing and harvesting it, can be got. If it could be cultivated on road-sides and all vacancies in the tea supplied with it, I fancy the coolies would be glad to cut and bark it for the sake of the sticks on lowcountry estates, where fuel is so scarce. It would be a valuable requisite for Ramsamy as well as an additional revenue for the estates. You might kindly show it to some of your friends, and I will be glad to know if I have hit on the right plant. It seems to answer to Dr. Trimen's description of it."

We have not the slightest doubt that our friend is right; we recognise the flower, and an intelligent Sinhalese in our office pronounces it to be the "Wara." We must now await Mr. Macdonald's report on the allied fibre at Bombay; but meantime our friend cannot do wrong in going on with its cultivation, and as he says, on lowcountry estates, it ought to be very useful.

THE AMSTERDAM CINCHONA-AUCTIONS.

The cinchona-auctions to be held at Amsterdam on November 4th will consist of 5,691 bales and 437 cases. The stock in first hand, including the above quantity, now consists of 2,049 packages Government and 5,778 private bark. The market is very firm.—*Chemist and Druggist*, Oct. 16.

THE ADULTERATION OF COCOA.

At the Isle of Wight Petty Sessions last week, Edward Henry Guess, grocer, of Shanklin, was summoned for violating the Food and Drugs Act. Divisional-Sergeant King, said that on August 24, he visited defendant's premises at High-street, Shanklin, and purchased three-quarters of a pound of loose cocoa, he was served by a lad in the shop. The analyst's certificate showed that it contained 16 per cent. only of cocoa, with 24 per cent of sugar, and 42 per cent. of arrowroot. Mr. Drew for the defendant submitted that he had no case to answer as the buyer was not prejudiced, being served with loose cocoa, and was told by defendant that it was not pure.—The Chairman: There is 84 per cent. of adulteration, there is a case to go on with.—Mr. Drew said that it was known that pure cocoa could only be had at 3s. 6d. per pound. What was sold as loose cocoa was a wholesome mixture of cocoa, arrowroot, and sugar.—The Chairman said it was a bad case of adulteration, and fined the defendant £4 and 19s. 6d. costs, or in default a month's imprisonment.

Arthur Nobbs, grocer's assistant to Messrs. Perry and Co., of Ventnor, was similarly summoned.—The analyst's certificate in this case showed that there was 8 per cent. of cocoa 68 per cent. of sugar, and 24 per cent. of arrowroot.—Mr. Drew who defended, repeated his defence in the case previously mentioned, and urged that the mixture was not sold as pure cocoa. He asked that a nominal fine should be inflicted.—The Chairman said that this case was rather

worse than the last, as the purchase contained only 8 per cent. of cocoa. Defendant would be fined £4 and 19s. 6d. costs. The Court thought that the defendant's employer should pay the fine, as the master was really the responsible person.—Mr. Drew said the master was away from home at the time.—*Grocers' Journal*, Oct. 9.

THE NEW COFFEE CROP, B.C. AFRICA.

The present crop is estimated at 450 tons, which we believe is a low estimate. The quality, so far as we can gather, is on the whole excellent, so that in spite of the heavy Brazil crops good prices should be obtained. As was to be expected, the transport difficulty is again acute and many are the signs for the much talked of railway. Even on the river the A.L.C. has as much as it can do to keep its stores clear. In such circumstances we think they would consult the interests of the planters if they were to pass on some of the crop to the other companies, as it is essential to get the coffee out of the country as soon as possible. Mr. Morkel's carts are being kept busy and no doubt he sees that he could add to their number with advantage. Now that our roads are being so vastly improved, there is no reason why the present transport congestion should not be greatly relieved by ox waggons. Judging by the fast rate of progress of the railway scheme since its inception, we will have to depend on human carriage and ox-waggons for some years to come. The transport difficulty is, however, a healthy sign from one point of view, as it shows we have something to export. Let it press heavier and heavier every year and the railway is sure to come. It is too soon to prophesy as to next year's crop until the blossom showers have fallen, but so far as we have heard a healthy spike is showing up. Unfortunately at Mlanje some apprehension is felt on account of the locusts which have congregated in great numbers and it is feared may destroy the blossom as soon as it opens.—*Central African Planter*.

PLANTING NOTES.

RAMIE CULTIVATION.—The last words of Mr. J. M. Macdonald, before he leaves Ceylon this time, appear in our columns in the form of a letter written in reply to the communication from Mr. Rosling. We shall follow with interest the further experiments that are now about to be made.

THE PRESENT PROSPECT OF TEA PLANTING IN FIJI.—This is the title of an article from the *Fiji Times* which we quote on page 379. It gives an account of the two principal estates in the islands, one being "Alpha" which was under the management of Mr. A. J. Stephen who is now in Ceylon, and the other, Wainunu. The labour supply seems to be one of the great difficulties there as well as here and liberal concessions by Government are stated to be urgently necessary if the industry is to be carried on.

CAMPHOR IN AUSTRALIA.—The camphor flora, it is well-known, grows very freely in these colonies. The increasing demand for camphor for use in explosives and in the manufacture of celluloid gives greater importance than ever to this commodity. The Japanese commenced to prepare it by distilling the leaves and branches of the trees instead of destroying only full-grown trees for the purpose. It seems to be worth while to ascertain if the shrub growing in the warmer climates will bear cutting sufficiently well to yield an adequate return of camphor when distilled.—*Chemist and Druggist*.

LOCUST PESTS.

The advantage of having an "honorary Entomologist," and one so well qualified for the post as Mr. E. E. Green, is well illustrated in the official correspondence, which we republish from the *Gazette*. The visitation of locusts referred to must have been identical with that in the Hapitigam Korale of the Western Province, to which we drew attention at the time. It is evident from what Mr. Green reminds us of Mr. Nietner's experience that different districts of Ceylon are liable to sudden visitations of locusts from time to time; but on so limited a scale that so far no extensive mischief has ever been done by them according to existing records. Nevertheless, to be forewarned is to be forearmed; and we trust Government will very urgently impress on all headmen the importance of collecting and destroying the locusts' eggs as described by Mr. Green. It is satisfactory to learn from him that, as regards coconut palms, the same precaution—tarring a circle round the trees—which prevents attacks from rats, will probably go far to prevent the locusts getting up the palms.

RAMIE CULTIVATION.

INTERVIEW WITH MR. J. M. MACDONALD OF THE STRAITS SETTLEMENTS.

Mr. J. M. MacDonald (of the firm of MacDonald, Boyle & Co. of London)—to whom prominent reference was made in a previous article on Ramie cultivation has been recently on a visit to Ceylon. He arrived here from Singapore and continued his journey *via* Bombay to London, leaving Colombo by the outgoing P. & O. steamer. He read our article, from many of the statements of which he at once intimated his dissent, and subsequently granted a representative of ours an interview at the Galle Face Hotel.

"You have," said Mr. MacDonald, "called me a sanguine man with regard to my figures, but as a matter of fact these figures are considerably understated. I do not say that they apply in the slightest degree to Ceylon. I know nothing of Ceylon or of its soil or capabilities. I was simply asked by Mr. Wickwar, of the Hill Club, to call here on my way home and see some of the planters, and give them my views with regard to Ramie, and explain what my machinery and process can do. I have, therefore, brought my machinery to demonstrate the whole process from beginning to end, and to show that from the moment of cutting the stem to the time of producing the white filasse only two hours and a half are occupied. Your article is not sufficiently specific to let me know the other points on which I am thought to be too sanguine, but if it is on the point of production it would be as well to give the following absolutely authentic information:—

PRODUCTION.

"In planting Ramie the cuttings should not be placed more than eighteen inches apart. I advocate only twelve inches. The closer (in reason) that cuttings are placed the better for two reasons: (1) that no weeding would be necessary after the plants are 3ft. high: (2) the stems grow perfectly straight without lateral branches which are very deleterious to the

fibre. The first cutting can be taken in three months, but to be on the safe side we will say six. Many experts have said that the first cutting from a plantation is useless, but here you see (showing a stick of Ramie) a three months' stick which has been produced from the estate of Mr. Thomas Gibson, the Secretary of the United Planters' Association at Klang (Selangor). You see that the stem is 5ft. high: it is at least half an inch in diameter, and with perfectly good and strong fibre, which you can find by taking hold of the fibre and pulling it. This stem is one of those produced from a cutting about six inches long, planted only three months before the stem was taken. The stool contained altogether fifty stems in vigorous growth, which no doubt in six weeks' time would have produced about a fifth of that number of mature stems. This plant is one of a number which Mr. Gibson had dug up and showed at a meeting of the United Planters' Association of the Federated Malay estates.

RAPIDITY OF PRODUCTION.

"With regard to the rapid production in the Straits Settlements, we have the evidence of Mr. Gibson's plantation, where, as I have already stated, in three months' time there is a crop of stems ready to cut and plentiful supply coming forward, a fifth of which in six weeks will be ready for harvesting. Now, instead of taking three months as the earliest cutting, we will assume that it will take six months to produce three stems and not six. It becomes necessary to consider how many stems can be produced to the acre and what the weight of those stems would be. During the course of the experiments at Kuala Lumpur in Selangor, carried on before a meeting of the United Planters' Association, a trial was made of a given number of stems taken haphazard from a heap lying there. It was found that the mean of fifteen stems, small and large shoots, weighed 4.8 ounces each, but for the purpose of our calculation we will say four ounces. Taking, therefore, cuttings as having been put in at 18 inches apart this would give eight to the square yard or 38,720 to the acre. Assuming that each plant only produces three stems each in three months and calculating these at 4 oz. each it is found that you can obtain thirteen tons per acre, and inasmuch as the stems renew themselves every six weeks this will give an aggregate of 78 tons of stems per acre per annum. Bear in mind that this calculation only assumes a production of half the quantity actually produced from Mr. Gibson's estate."

Mr. MacDonald here handed to our representative a printed report of the proceedings of the United Planters' Association, which fully bore out his statement.

HOW RAMIE IS DEALT WITH!

"We will notice now the reports of the 'experts,' when they speak of obtaining so many cuttings per annum, varying from two to four. The practice has hitherto been to mow down the whole plantation, hand over the stems to natives, when they are stripped by hand, and then the ribbons are dried and packed into bales and sent away. A native has to produce a certain quantity of ribbons per day. It is perfectly immaterial to him whether he strips mature or immature stems, and the result is that in one bale of ribbons we obtain in some cases as many as twelve classes of fibre. I need not point to you that this cropping system is a very objectionable one inasmuch as stems from six inches to two ft. high, which would be the large majority of the stems, are utterly de-

stroyed and wasted. I therefore advocate the daily cutting system whereby only the mature stems are cut and so arranging your planting that this may be effected daily so that the coolie can go gradually through his two acres and on his return to the starting point he will find the immature stems be left have ripened and are ready for harvesting. By this means it is obvious, you more than treble the amount of your crop. I consider that each acre of land should produce three cwts. of stems per day. A coolie, therefore, from two acres of land, will have to cut six cwts. Taking the day at ten hours this means that he will have to cut about three stems a minute, and bale and deliver them every hour to the tram lines, when they would be picked up and delivered to the decorticators. Of course this is only possible in countries where the climate is equable throughout the year. The great advantage of this system ensures the quality of the fibre and is a guarantee to the manufacturer that the quality will always remain the same."

DOES RAMIE EXHAUST THE SOIL ?

"A great deal has been said with regard to Ramie as an exhauster of the soil. It has been thought, because it is possible to obtain more than eighty tons to the acre on good land under favourable conditions, that an enormous quantity of material must be taken away from the land, but it is entirely lost sight of that Ramie contains eighty per cent of water, so that after all there is not so much taken out of the soil as would be imagined, and if the system be adopted of returning leaves and the refuse from the decorticators, in the shape of ashes to the land, it follows that the fibre itself, (only from two and a half to three per cent of the crop) is actually taken from the soil."

THE AMERICAN EXPERIMENTS.

"Experiments were carried out by the American Board of Agriculture in California to test the exhausting nature of Ramie and an acre was placed under cultivation and the crops taken during four years. Nothing whatever in the shape of manure was applied to the land, not even the refuse from the stems, and it was found that the fourth year's crop was larger than the first. Of course this may be in consequence of the richness of the land, but at all events the fact remains."

RAMIE AT PERADENIYA.

"The only Ramie I have seen growing in Ceylon (added Mr. MacDonald) was in the Peradeniya gardens, where through the courtesy of Mr. Macmillan I had the opportunity of making a thorough inspection of the plants, which were growing most luxuriantly although they did not appear to have had very much care given to them. There were some very fine stems there, in fact I have never seen better, but none of them were ripe enough."

"Now," put in our reporter, "can you explain the divergence of opinion between you and the other experts, who have signed the official reports we have quoted?"

MESSRS. WRAY AND MATHIEU.

"I would rather not have made any remarks as to these gentlemen, if I could have avoided it (said Mr. MacDonald), but if you had printed the reports *in extenso* your readers would have gauged their value. I have the official printed reports before me now, and what do they amount to? Simply the admission on their part that they personally know nothing of the

subject on which they report, but have filled eight pages of closely printed matter with quotations from books showing the results obtained in countries differing in every respect from Perak, they then proceed to draw their deductions therefrom. Can anything be more misleading? Mr. Mathieu says of Mr. Wray's figures:—"Mr. Wray puts forward several figures which do not afford any basis of conclusion, owing to the fact that they are obtained from stages and conditions of growth not stated;" so much for Mr. Wray's report. Then Mr. Mathieu in his report says:—"The figures which I shall give hereunder are also from widely different countries, because, unfortunately, Ramie having been so far neglected no data can be drawn from Malaya." Surely this disposes of the whole question as to the value of these gentlemen's report. They are asked to report as to 'the prospects of Ramie cultivation in Perak,' and they say they know nothing about it, but they will consult their books and see what has been done elsewhere, entirely ignoring the fact of the different conditions under which the plant is grown. Had they been asked how many tons of Swedes can you grow to the acre in Perak? would they have reported, 'You can get 40 to 50 tons to the acre in England,'—because that is really what their report amounts to.

"If these gentlemen would burn their books and study the question from a practical point of view, and cultivate the plant on a sufficiently large scale to enable them to obtain data and then visit all the likely countries where Ramie can be grown as I have during the last 4 years, they would become entitled to call themselves experts, but until then it would be better to give up writing reports upon a subject on which they have only second-hand information and to bear in mind (to quote a favourite expression of Mr. Mathieu which I have recently seen in one of his letters 'that a little knowledge is a dangerous thing,' a quotation I advise him to think over and lay to heart."

FUTURE SCHEMES.

"One word more and I have finished. I am sufficiently satisfied with the prospects of Ramie in Malaya to embark with my friends a considerable sum in starting the cultivation of Ramie to the extent of 1,200 acres the Muar district of Johore, a district which your expert, Mr. Mathieu has reported to be not suitable for the cultivation of Ramie, but in which I have proved his information to be incorrect, so that although my figures and ideas are magnificent according to Mr. Ferguson, he will at least give me credit for the pluck to carry them out, and I hope as soon as sufficient accommodation is available to see him, and any Ceylon Planter interested in the subject, when they may be assured of a hearty welcome and all the information which has resulted from the 'magnificent' undertaking, an undertaking in which I have secured the moral and financial support of His Highness the Sultan of Johore, who has taken the warmest interest in the future of Ramie."

The interview here ended. Mr. Macdonald added as our representative left that there is no fear of a market for the present, as one firm alone in Dundee had offered to enter into a contract to take 100 tons a month at £42 a ton, and inasmuch as the stuff can be grown, treated, baled, and imported into England with freights and all charges paid, including brokerage, at 1½d per lb. this would leave a very handsome margin of profit to the grower.

RAMIE CULTIVATION.

We are indebted to Mr. Rosling for the letter and information we publish on another page, and still more to Mr. MacDonald for the long and interesting interview granted to our representative. He is a little hard on Mr. Wray, who made no personal pretensions to experience, but performed the duty of compiler, as called on by his official superiors, conscientiously. As for Mr. Matthieu, his information was specially based on actual experiments made at Buitenzorg, Java. However, these are merely side issues. We shall be delighted to hear of the success of experiments made in the Straits, and still more, of course, to learn that a trial on a likely spot is to be made in Ceylon. Mr. MacDonald finds fault with the use of so wide a margin in crop as from 500 to 1,120 lb. per acre. But he is, we suppose, aware that this is a very common experience in the tropics; our coffee crops in Ceylon in old days used to run from 3 cwt. to 8, to 10 and even 15 cwt. per acre. Then there is our tea industry, very much to the point, because tea leaves, like ramie fibre, contain a large percentage of water; well, Mr. MacDonald will find that our tea crops vary from 300 lb. of made tea per acre to the maximum of 1,000 or 1,100 lb.—or putting the weight in leaf from 1,200 lb. of leaf to 4,400 lb. and that this dries down to one-fourth. Tea leaf losing three-fourths weight in moisture while drying, makes it somewhat analogous to Ramie; and yet the richest soil in Ceylon constantly manured cannot supply more than *two tons* of tea-leaf per acre per annum, the plucking going on for nine months out of the twelve.

We do not for a moment say that Ramie planted so closely as Mr. MacDonald mentions, is not going to give a great deal more in weight of crop than the leaves of the tea bush; though we take leave still to doubt whether 20, 13 or even 10 tons of yield of fibre per acre per annum will ever be gathered continuously for any number of years, over an appreciable area in Ceylon.

For a suitable spot for trial it is no use looking to our Northern, North-Central or Eastern regions with their long periods of drought. It is evident that the South-west portion of the island is best, and we would advise the Southern Province, an alluvial section by the side of one of the rivers where perhaps sugar cultivation was tried long ago, provided the land has been left fallow since—or we have no doubt there is virgin soil available in the vicinity. We are extremely sorry that there is no crop of Ramie available at this moment to give a full trial to the Decorticating Machine which Mr. MacDonald has so considerably made available. Better luck next time; and he may depend on our watching very closely all that is done at the Straits.

VANILLA IN SEYCHELLES.

Things here are very quite. The Vanilla crop this year is now being shipped home, the ss. "Bancoora" taking about £20,000 worth *via* Colombo. The prospects for 1898 in Vanilla are still very uncertain. We fear that the flowering will not be so heavy as last year. Prices still keep up, whole crops have changed hands at R16 per $\frac{1}{2}$ kilo and selected parcels of long beans have fetched up to R18. The high prices and good crop of last year have had the effect of greatly stimulating imports. The Customs receipts are about R10,000 higher than last year, other taxes have also yielded more.—*Zanzibar Gazette*, Sept. 29.

THE AMSTERDAM CINCHONA AUCTIONS.

Telegraphing at five on Thursday afternoon, our Amsterdam correspondent states: The most critical cinchona auction of the year is over, and has resulted in an advance of fully 45 per cent upon its immediate predecessor. The total quantity of bark offered was 4,287 packages, of which 3,905 were sold; the quantity of sulphate of quinine represented by the bark offered was 21,781 kilos, of which 19,571 kilos found buyers. The average unit realised today by manufacturers' bark was 6.27c per half kilo, equal to about 11-8th d. per lb., against 4.32c, equal to about 11-16th d. paid at the August auctions. The following figures represent the quantities of quinine sulphate secured by the principal buyers: American and English manufacturers 3,439 kilos; Anerbach 3,701 kilos; Brunswick 2,752 kilos; Mannheim and Amsterdam 5,391 kilos; Frankfurt-a-maine and Stuttgart 1,633 kilos; various other buyers 2,835 kilos. The tone throughout the sales was exceedingly animated. Manufacturing barks realised from 18c to 58c, equal to 3 $\frac{1}{4}$ d to 10 $\frac{1}{4}$ d per lb., and druggist's from 16 $\frac{3}{4}$ c to 60c, equal to 1 $\frac{1}{4}$ d to 10 $\frac{1}{4}$ d per lb.—*Chemist and Druggist*, Oct. 2.

COFFEE PLANTING IN BRITISH CENTRAL AFRICA.

It is cheering to have practical and responsible planters reporting favourably of coffee prospects in Nyassaland after the many adverse reports recently current. The fact is, it requires one who can look back to what "pioneering" meant in Ceylon thirty to forty years ago, to do justice to the present stage in British Central Africa. Young planters trained in the "railway" and "district road" era in Ceylon—the era of district doctors, hospitals, padrès, bakers, butchers, general stores, almost of district hotels and all the conveniences of civilisation—are quite unfitted to judge of *pioneering*. Let them try living on rice "roties" for a number of months—as we found old Thomas Wood and his Assistants on Spring Valley doing in 1865, because there was no baker nearer than Kandy; let them become Assistants even now in Monragala district, or to the South-east of Gongalla, or in the heart of Bambarabotwa; and then they can speak of a little bit of pioneering experience and may exclaim by-and-bye,—

"If you had seen these roads before they were made,

You would have held up your hands and blessed General Wade!"

In the interesting letter which Mr. Israel, the responsible manager of a large group of coffee estates in British Central Africa, sends us—see our Correspondence column—he speaks of the transport of coffee to the coast costing £3 per ton. We can recall Uva coffee costing £6 per ton to bring it 170 miles to Colombo, or more than it cost for freight over 15,000 miles via the Cape to London; while the labour difficulties of the Uva pioneers and planters for many years were infinitely greater than any so far realized, judging by the experience of Mr. Israel and Mr. Henry Brown, in British Central Africa. Under these circumstances, we hail with pleasure the cheery optimistic utterances of our correspondent, and we hope his labours as also those of the Ceylon Nyassaland Coffee Company Manager and Assistants will be crowned with all the success they, or their proprietors and shareholders, can desire.

We also call attention to an article on Coffee Planting from the *British Central African News*, on page 390, in which a first list of the

coffee properties in British Central Africa is given. The total acreage planted, it will be observed, is very considerable, albeit most of the clearings are young. Some local authorities think shade will be needful for coffee in Nyassaland as it is in Mysore and Coorg.

COFFEE IN BRITISH CENTRAL AFRICA.

It has often been discussed within this Protectorate as to whether a coffee bush will continue to bear crops for a long period. It is worthy of notice that a patch of the oldest coffee in the country, on Messrs. Buchanan Brothers' Zomba plantation, which was planted 12 years ago, this year gave a crop of between three and four hundredweight to the acre of good coffee.—*B. C. Africa Gazette*, Aug. 1.

The following notes on coffee plantations in B. C. A. have been recently collected by us. As our readers will see, they are by no means exhaustive, but are meant to give outsiders in other planting countries, such as Ceylon, India, &c., some rough idea as to what is being done in coffee in B. C. A.

We have been freely supplied with information and statistics by all the planters we have applied to (except one). Should we have omitted to mention any plantation now in existence, it is through inadvertence.—*Ed. B. C. A. Gazette*.

NAMASI DISTRICT.—The agent of Mrs. A. L. Bruce at Namasi has now about 200 acres of coffee planted, and a clearing of 70 acres ready to plant out. From what is seen of this plantation from the main road, it appears to be in a thriving condition. Plants of two years' growth look particularly healthy. Mr. Owen Stroud has been in charge of this estate since Mr. Livingstone's departure on leave of absence, and the neat appearance of the estate shows what care is bestowed on it. There is a line of blue gum and Pride of India trees along the road, and another line of Mlanje cedars planted a little further back. With a good brick house, which is being erected this year, the plantation will be completed.

Mr. J. Boyd-Wallace has already planted 116 acres, and has about 100 acres cleared ready for planting next season. Mr. Wallace has laid out his estate with taste, and the roads passing through are lined with Pride of India trees. All the plants are only of one year's growth so that two years must elapse before a return is obtained.

Mr. Gordon Mitchell's estate is being managed by Mr. J. R. Greenshields. He has about 70 acres under coffee: 100 acres of this is only first year, 70 acres second year, and 25 acres third year. This latter portion of 25 acres was originally planted with second nursery plants, and though this is but the second year since planting, the crop, being really third year plants is coming on, and looks promising. Mr. Greenshields, has also planted blue gums and Pride of India trees along the avenues on this estate, and along the main road. These are sufficiently well grown to afford shade. There is one rather noticeable feature in his estate in regard to shade: some of his young coffee plants were planted in the shade of a large *figus*, near the Namiwawa river, and though the rest of the estate looks in a flourishing condition, the plants under the shade of the fig tree are sickly and delicate.

The following are the other Namasi planters with the approximate area under coffee:—Messrs. Robertson and Wren, 140 acres cleared and about 150 acres planted; Mr. K. Keiller, 100 acres planted; Mr. J. Cameron, about 30 acres planted, and Mr. P. Morkel, about 40 acres planted.

Another flourishing plantation along the Zomba Blantyre road is that of Mr. S. Israel. He has about 60 acres third year, 70 acres second year, and 80 acres first year: about 210 in all. He does not intend to plant any more this year, but this does not tell against the rate at which he intends to extend his estate, because he has decided to transplant from his first year nurseries into a second year nursery,

and this, while being much cheaper than actually putting in the seedlings where they are to remain in the fields, does not retard their growth; and next year, when these plants are finally set in the plantations, they are expected to be much stronger for the second transplanting, and a smaller proportion of blanks are obtained. The following is an extract from Mr. Israel's notes on coffee:—

"The first step, of course, is to choose the site of your estate. I selected mine on account of the healthy appearance of the forest trees and rich growth of grass. When the forest is cleared, pegs are put in where the pits are to be dug. This is called "pegging." After pegging comes the pitting, then draining. In my case, I prefer to drain immediately after pegging, because the drains can be made better then. Thorough drainage is necessary, as the open drains prevent wash, and admit air into the soil. Then the ashes of the burnt trees and grass are carefully mixed with earth and put in the pits where the coffee plants are to be set. It is not advisable to leave the ashes exposed as the rain may wash them away, or the winds blow them about. Putting in the plants is a simple matter, if well looked after. Pruning should be constantly kept up, and is even advisable in the second nursery. I have between 30 and 40 men continually pruning. After the plants are three years old, before bearing, I make pits between the rows, one pit between every four trees, and into these pits I throw all the weeds, rotten leaves, and decaying vegetable matter, as a substitute for manure. Then I cover up these pits, and when the substances decompose, a valuable manure is obtained. I also "thatch" my plantations in bearing, that is, cover the ground between the coffee trees with grass. After picking my crop I propose to manure the trees of one part of my plantation in the following way: dig a hole about 12 inches deep and about one foot distant round the stem in a half circle, fill this with cow dung, coffee-pulp and ashes, well mixed with soil. Another part of my plantation I intend manuring with sulphate of ammonia and phosphates, of which, for an experiment, I have purchased six ton.

I have now commenced to plant shade trees, and have big nurseries of different kinds of Australian trees for this purpose, I shall not be able to tell of two or three years what effect the shade trees will have. Coffee estates might be advantageously laid out in gardens of from 5 to 10 acres each. When these are numbered and recorded, it is easy to make reference to certain plots, and to know what has been spent on them, when weeded, what is produced and the working by task work is easier. In this manner my estate is laid out and worked. The following improvements will become necessary for a systematically worked plantation. Large cattle stalls (built near the coffee gardens so as to save carriage of manure), brick houses, for collecting ashes and manure, and good brick houses for the native labourers (to keep them in good health), good stores for drying coffee, for grain, and for general merchandise. Well laid out vats add to the value of a plantation. I have never a scarcity of labour. Labourers are constantly applying for work, and even in the wet season I am always well off. The fact of giving them good houses, giving them the option of food or merchandise to buy food with, weekly supplies of salt, and medicine when anyone is ailing, adds to a certain repute amongst natives. I notice that every tribe has its peculiarities and special fitness for certain kinds of work:—The Ajawa for skilled labour, such as sawing, pruning, brick-laying, carpentering; the Machinga, a section of Ajawa, are a strong set of men, and well suited for building, cutting trees and similar work, where strong muscles are required. The Angoni cannot be beaten for pit-making or careful weeding, and the Atonga, a strong and active race, can be made useful for all-round work. The Anguru are not well suited for garden work, but are excellent for tenga-tenga work—carrying loads up to 75 pounds.

If, however, you happen to pity one of these men and pay him something extra for carrying a heavy load, he is never satisfied, whereas, if you take no notice, he makes no complaint whatever."

Mr. Israel has now been in the country three years and says he has had practically no illness. He believes "a really active life" and moderate living to be the secret of health in British Central Africa.

Mr. Israel's crop just picked is close on twenty (20) tons of parchment (from 50 acres).

Around Blantyre, Mr. T. M. Hastings has an approximate area of 300 acres under coffee; Buchanan Brothers at Chiradzulu, 80; the late Mr. Horace Waller at Nagafui, 50 acres; Buchanan Brothers at Lunzu, 200; Mr. Killer, Matope, 60 acres; Kuntaja, 75; Blantyre Mission, 10; Sharrer & Co., a small plot at Blantyre of say, 20 acres; Malotta, 20; Pettitt Brothers, on their various plantations, more than 500 acres; Lloyd, 30; Lamagna, 200; Hunter, 100; McLagan, 100; Jonathan Duncan, 100; J. Lindsay, 100; African Lakes Co., Mandala, 10 acres; Bismarck, 10; and David Livingstone, 10.—*British Central Africa Gazette*, Aug. 15.

BRAZIL COFFEE NOTES.

There have recently been fires, supposed to have been caused by incendiaries, on several coffee plantations in the vicinity of S. Carlos do Pinhal, Ribeirao Bonito and Araraquara. The losses reported are as follows:—Bento de Abreu Vidal \$20,000; Borneza de Dourados, \$30,000; Capt. Aurelio Civatti, \$200,000. In the fire on Capt. Civatti's plantation 5,500 arrobas of coffee were destroyed. The merchants who have been discussing the depression in the coffee market held their seventh and final meeting on Saturday. Before adjourning they adopted resolutions in which among the means recommended are the following:—Co operative banking societies; reduction in the export duties; reduction in freight rates; responsibility of railway companies for losses caused by them or their employes; more stringent and efficient measures for punishing and repressing the theft of agricultural labor laws; measures for inducing immigrants to come to Brazil and to remain in the country; agricultural instruction of the necessary measures for the execution of the Torrens law; measures for promoting the increased consumption of coffee in foreign countries; negotiations for obtaining a reduction in the import duties collected in certain countries on coffee; cultivation of food products on a larger scale.—*Rio News*, Sept. 7.

On the Albertina plantation near Ribeirao Preto the buildings, machinery and 50,000 arrobas of coffee were recently destroyed by fire.—*Ibid*, September 14.

CEYLON TEA IN NEW ZEALAND.

We have a letter from the representative of one of the first houses in New Zealand—"the Hondai-Lanka Tea Co."—to go in for Ceylon teas, complaining of the frauds which are now practised in reference to the packet trade in our teas and calling on the Planters' Association to deal with the matter. Our correspondent tells us he has sent to his agents in Colombo a sample packet of tea bearing the words "packed in Ceylon and C. B. Hall, Printer, Colombo." We know of no such printer here and it is quite evident as our correspondent declares that such packets and many more besides, sold in New Zealand, as "packed in Ceylon," are really made up locally in Dunedin and other towns with blended teas. In most cases, as our correspondent indicates, nothing can be done to stop this practice; but the packet he sends over with an unknown (false) printer's name, gives an opening for steps to be taken, since the firm or firms selling such packets can be exposed and even prosecuted if our Planters' Association choose to move in the matter. The tea in the

packet we hope to have tested and reported on when it reaches the Colombo Agents: it has not yet come to hand. But meantime our correspondent adds:—"The best thing your Planters' Association (or Committee of Thirty) can do is to send over an agent to prosecute the houses in New Zealand selling spurious or blended, as pure Ceylon teas. New Zealand is now one of the best markets for your teas; but unless this system is checked, the trade will speedily fall off; for blenders are rapidly importing Fiji tea and calling it Ceylon." We commend the above suggestion to the "Committee of Thirty." A single prosecution in New Zealand could not fail to have a good effect all over the Australasian Colonies as well.

DEVELOPMENT OF NORTH BORNEO.

Amongst the passengers who arrived in Colombo by the s.s. "Friedrich de Grosse" were Mr. and Mrs. Fryer, who are returning to North Borneo. Mr. Pryer has lived there for twenty years and is the oldest European official in the island. He is the representative of the North Borneo Development Co., of which Lord Waterpark is chairman, and which owns 100,000 acres of land, of which, however, only some 1,500 are brought under cultivation at present. He is also associated with the Borneo Trade and Planting Company, the chairman of which is Mr. H. A. Scrutton. Mr. Pryer's errand at home has been to arrange for the further development of the large estates of the two companies and to engage European assistants, several of whom will join him en route or meet him on the island shortly after his arrival.

The large area of land, which the two companies have secured, is mainly situated on or near to the seaboard near Sandakan. This, Mr. Pryer claims, is one of the finest harbours in the world, almost landlocked, with an even depth of water and situate so as to be safe from violent winds. Vessels call on their way to and from Hongkong and Australia, but at present the trade is not sufficiently developed to enable them to call regularly at frequent intervals. The land that has been put under cultivation has been mainly devoted to coconuts and has been profitably employed, but experiments have been made in

COTTON CULTIVATION.

And it is intended, in view of cotton mills, started or to be started in China and Japan—the supplies for which are mainly derived from India—to make a commencement on an extensive scale. The cotton plant is indigenous to Borneo and the cotton that grows is much the same as Egyptian in staple, while it will realise in the home market a penny per lb. more than the ordinary American. That was the verdict at any rate of experts in Liverpool, who had the samples recently submitted to them. In Borneo, American cotton cannot be grown because the rain that falls, spoils the produce, but this does not prove to be so with the cotton indigenous to the island, which resembles Egyptian. Another development is to take place in the cultivation of

MANILLA HEMP

which is so largely exported from the Phillippine islands, where the export duties are so heavy and the restrictions on trade so vexatious. There are also other exactions there grievous to be borne, but at Borneo, under the British flag, all is free and everything that can be done to promote trade is done by the representatives of the

Government. Hitherto there has been a difficulty in securing suitable labour for this crop, but there is now a rebellion in the Philippines and it is believed that one of the results of the troubles there will be that there will be in Borneo a large influx of rebels, who, under a free and settled government, with the certainty of fair wages, will soon settle down to regular work. It is hoped that in five years Borneo will be exporting Manilla hemp to the value of £1,000,000 sterling, and that in ten years the island will have virtually secured the trade now enjoyed by the Spanish colony. Another advance will be made in

RUBBER CULTIVATION.

In regard to the demand for which, there have been of late such rapid developments. Rubber is indigenous to North Borneo, the kind most commonly grown being Willoughbeia. There is already some exported and Mr. Pryer has secured twenty thousand seeds so that as soon as he lands steps will be taken to place an increased acreage under cultivation. Such are some of the anticipations Mr. Pryer has formed and our readers will join us in wishing him success in his enterprises. Mrs. Pryer was met at Colombo by Mrs. S. H. Dyer, of Kotagala, who is her cousin.

FACTS ABOUT TEA SEED.

[Contributed.]

To those who have billets on seed gardens, as also to those whose gardens are purchasers, there is little mystery in the manipulation of the annual crop. But as I myself have been often asked how it is done, and others having, I presume, been in the same predicament, there are many to whom the "history of the mystery" may possess some little interest. On the seed gardens the time and season comes round and passes away without causing any undue bustle. We look upon it as a matter of course and get ready for the crop as others at the beginning of a tea season put their machinery and leaf houses in order. The matter is simplicity itself.

About the middle of September the seed begins to fall, and previously to this we have cleared all the jungle from the foot of the bushes, so that picking it up may involve as little trouble as may be. As soon then as the first signs appear the children and some of the women are put on to grope for what they can get. At first this is little, but the seed ripening the night breeze of falling seed shakes down more and more until there is sufficient to justify the cleaning preparations in view of the first chillan; so we spread the seed out in the sun and down beside it plant such of the garden labour force whose physical incapacity for arduous labour best fits them for the matter in hand. These strip off the outer skins and throw the cleaned seed into basket. Next day the cleaned seed is put little by little into a tub of water. Such as floats is thrown aside and that from the bottom and floating in mid water is gathered up and spread on *chalnies* to dry. Some make a second quality of the mid-water seed, and keep it separate. Dried the seed is buried in layers in beds of clean dry sand heaped up on a leaf house floor, ready for packing. The seed ripening still further artificial assistance is necessary to cause it to fall, so some able-bodied men are put on to give the trees a good shaking. This brings

down a lot, and soon we are in the thick of our season, cleaning, sorting and packing as fast as we can.

The packing requires a little care in its supervision. We here use tea chests cut in half, as we find, filled with half a maund of seed packed in charcoal, lidded, nailed down and bound with iron, the finished chest turns out just a maund. This is as much as the despatch service allows.

The mistri first cuts the boxes in half. The bottom half is then taken, and the bottom and all four sides lined with stout paper. Then a layer of charcoal is dropped in thick enough to bed a seed in. Ideas vary as to the best transporting medium. Some use charcoal, others charcoal mixed with sand or earth, others, again, light dry earth only. On the first layer of any of these seed is scattered as close together as may be but not lying double. This is covered with the packing mixture and another sheet of paper laid down. Then the operation is repeated until the chest is full up, and a final sheet of paper is put down under the lid.

The seed and charcoal or otherwise are weighed out for each box, and one or two seed taken out from each as a test to determine the percentage. Now in this testing much difference of opinion is shown, and until a uniform method is agreed on it is as well in agreeing to a minimum per cent good, to know now this will be arrived at. This is the usual method. Take one hundred seed, and breaking the shells, split them open into the two natural halves. Then all absolutely bad is counted out in one row, so many as are "spotted" in the second, and the good seed is in the third. The bad is at once counted out. In the spotted two out of three are counted good, and these, plus the third good row, give the percentage. This is a very fair method, and is usually accepted. The difference of opinion lies in the spotted seed. Some men testing will count out the absolutely bad as before and into this count all seed spotted near the germ. Those spotted away from the germ, on the other hand, being reckoned all good, there is not very much room on the surface of an opened seed, and the meaning of the word "near" may be read differently as one is seller or buyer. It is a delicate matter. Others again—these being buyers—will split a seed into four lest any imperfections should remain hidden after a single cut.

The boxes are hooped, marked and sent off by the quickest route. The price runs from sixty to two hundred rupees a maund, and a further charge of rupees three per chest is made for packing. The expenses of collecting it on the garden are small, so the profit is—fair. First, however, catch your seed.—*The Planter*, Oct. 9th.

SIERRA LEONE COFFEE AND COTTON.—One of the most interesting of the economic plants of Sierra Leone is the highland or native Coffee (*Coffea stenophylla*) which though discovered about a century ago by Afzelius, was not described until 1834, and was not introduced into this country until sixty years afterwards (1894). It was figured in the *Botanical Magazine* (t. 7475), and described more recently in the *Kew Bulletin* (1896, pp. 189-191). This coffee has been widely distributed from Kew. It has lately flowered in the West Indies, and is there regarded as likely to prove useful for cultivation in lowlands where the Arabian coffee will not grow. Another promising economic plant in Sierra Leone is the native cotton, probably *Gossypium herbaceum*, L. In order to supplement this an effort was made some years ago to introduce the cultivation of the Egyptian cotton in the colony.

TEA COMPANIES AND DIVIDENDS.

THE NEW DIMBULA COMPANY.

We call attention to the Directors' Report of this Company for last year. It indicates continued prosperity notwithstanding adverse exchange and a lower average price for tea. The "New Dimbula" is one of the strongest Companies connected with Ceylon, and much credit is due to Mr. Dick-Lauder and his staff for the admirable management of the Company's extensive property, which now includes over 2,300 acres of tea. The Company has three classes of shareholders A. B. and C. and it will be observed that the first two have dividends at the rate of 16 per cent per annum divided amongst them; and the third 14 per cent; while after deductions for planting extension, some £3,000 are carried to the reserve fund. Among the home Directors we always think of Sir Arthur Birch, and Mr. W. Herbert Anderson (the Managing Director) in connection with this Company and its good management. It is in every way a credit to the Colony.

Few Companies give so much information about its operations as "The Consolidated Estates Coy., Ltd.," whose Report also finds a place in this issue. The interests of this Company are spread over a good many districts—Dimbula, Kotmalie, Hewaheta, Nilambe, Matale and Kalutara—and it has now 2,711 acres of tea in full bearing, 129 partial with 334 acres recently planted, besides some cardamoms and cacao. The crops of the past year have been excellent (and the prospects are good), but a lower average price for tea with adverse exchange has led to a reduction in dividend from eight per cent. in 1895-6, to six per cent. in 1896-7. The strictest economy is to be exercised during the current year, in order, if possible, to counterbalance exchange. We need scarcely say that with Messrs. Geo. Steuart & Co., as agents in Ceylon, and Messrs. Arbuthnot, Latham & Co. in London, the interests of "The Consolidated" are in good hands.

One has never heard much of "The Korala Tea Estates Coy.," and indeed it only dates from May 1895, when Riverside, Glenloch, Karagastalava, Wewesse and Debedde estates were taken up and the Company formed. The Report now published is not pleasant reading; but we trust there are better times in store for this Company as indeed for all Ceylon Companies.

PLANTING NOTES.

ROYAL GARDENS "KEW BULLETIN," of Miscellaneous Information. Contents for October is as follows:—Botanic Station, Sierra Leone; Improvement of the Sugar-beet and Sugar-cane; Forest Products of Sierra Leone; Butter and Tallow Tree of Sierra Leone; Coffee Cultivation at the Gold Coast; Botanical Enterprise in West Africa; Miscellaneous.

WHAT THE COFFEE PLANTER HAS TO PUT UP WITH.—Professor A. W. Stokes, the public analyst for the borough of Hampstead, says in his annual report to the vestry of Hampstead, which has just been printed: "Coffee showed an adulteration of 8½ per cent of its samples, by means of from 50 to 60 per cent of chicory. It is usually said that the buyer prefers a mixture of chicory and coffee. This may be true; but when the buyer asks for 'coffee' he ought not to get the mixture. But so long as coffee costs twenty pence and chicory only four pence per pound the temptation to some vendors to think the buyer means a mixture when he says 'coffee' will be irresistible."—*H. and C. Mail*, Oct. 22.

FROM TEA TO COCONUT PLANTING.—Mr. T. Patterson, employed on Holmwood estate, Agrapatnas, purchased on the 13th October last a block of land containing about 97 acres between Negombo and Mirigama. He intends to leave Holmwood, after fourteen years as conductor and assistant superintendent to take charge of the new block and plant coconuts and Liberian Coffee.

WEIGHT OF COCONUT CROP PER ACRE.—Our correspondent "D" writes:—"You were asking about the weight of a crop of coconuts. Taking 4 lb. as the average weight of a fresh coconut, and calculating 3,000 per acre per annum, for an average crop, the weight of the produce will be something over 5 tons." We are much obliged to our correspondent: now for "cinnamon" sticks and all?

SCIENTIFIC RESEARCH.—We understand that Mr. D. Hooper, formerly so well-known as a clever Chemical Analyst at Ootacamund, has established a research laboratory in the Indian Museum in connection with economic products. He will be allowed by the Trustees to undertake on a small scale private analyses of cinchona bark and other organic produce. It is a pity that the Madras Government could not see its way to retain his services in this Presidency, but, though further off, Madras planters will, we fancy, be only too glad to re-avail themselves of his invaluable services.—*Planting Opinion*.

GUANO IN THE SEYCHELLES.—By a recent mail we had a letter from Mr. John Hughes in which, *inter alia*, he mentioned:—

"I have this week completed the analysis of a Phosphatic guano forwarded me from the office of the Crown Colonies in Downing Street. The sample was forwarded from the Seychelles Islands. I don't know whether the results will be made public or not, so I had better say no more, but it may be interesting to know that a phosphatic guano exists in these islands, to what extent I do not know.

"I am very busy with agricultural analysis as the rise in the price of wheat has given quite an impetus to the manufacture and sale of manures."

COFFEE AND CACAO CULTIVATION AT THE GOLD COAST.—A good deal of general work has been done in the Government Botanical Station during the year and considerable attention has been paid to the plantations of coffee and cacao, in the cultivation of both of which, but more especially the former, the natives appear to have become interested. Along the road leading from the Botanical Station through the country of Akwapim to the interior are large numbers of small clearings in which coffee plants, chiefly obtained by purchase from the Botanic Station, are to be seen in a most flourishing condition. The Liberian coffee plant appears to thrive best, but there are large quantities also of the Arabian coffee plant, the berry of which, however, is small and apparently deteriorated. It will probably be necessary for the Government at no distant date, if the coffee industry is to be fostered into a trade, to instruct these native cultivators in the proper way of preparing the berry for export. At present the most primitive method is employed. The berries are scraped by hand with a round stone worked in the hollow of a larger stone, and after this process they are washed and dried in the sun. It is obvious that a large crop could not be so dealt with, and that the employment of machinery in the near future is imperative. During the last two years the Government has introduced machinery for pulping and curing coffee, and consignments of both coffee and cacao have been forwarded through the Crown Agents for sale in the London market. This plan afforded the best means for testing the commercial value of the produce, and it is gratifying to find that the result shows that coffee and cacao can be grown in West Africa capable of realising good prices in European markets. Much still remains to be done to induce the natives to cultivate and cure their produce in a satisfactory manner.—*Kew Bulletin*.

THE COCONUT INDUSTRY.

In view of the references which have lately appeared, from time to time, in our columns on the disappointing prices which rule for coconuts, and in continuation of our article on page 381, it may be of interest to note the change which has come over the oil industry on which the price of nuts most largely depends. Although the Desiccating Mills consume what a few years ago would be considered an immense number of nuts, yet, we saw in our review of last year's exports that the Mills accounted for only about 30,000,000 nuts, while the Oil exports represented 171,000,000 nuts—a figure much below the requirements in previous years. The new Desiccating industry has undoubtedly helped to keep up prices; but it has chiefly benefited estates in the neighbourhood of the Mills, as these save the cost of transport while they realise the same price for their nuts as estates situated at a distance. Oil, therefore, has practically ruled the price of nuts; and even proprietors who have found it advantageous to sell to neighbouring Desiccating Mills complain of the serious fall in price. From one of these we learn, that the difference between this year's and last year's prices averages between R4 to R7 per thousand for separate crops; while the difference is as much as R6 to R10 and even R12, compared with the prices of 1895. Does the difference in the value of oil then and now explain this immense fall in the price of nuts? Not wholly, we think; because the gold price of oil has remained about the same, and the difference is mainly connected with the rise in exchange which cannot account entirely for the lower prices which rule for nuts.

Let us look now at the Oil exports up to 26th October, the latest figures available, we find that the quantity sent away from the island, (300,857 cwt.) is greatly in excess of the quantity exported during the corresponding period of last year, which was 262,818, and little less than in 1895 which showed 310,168 cwt. The figures for the corresponding period of 1894 are 385,616 cwt.; but the shipments that year were exceptionally large and were exceeded we believe only once, that is, in 1892. The present year has thus been one of high average exports for oil; and there is nothing in the quantity exported to explain the price of nuts. The ruling prices for oil have, however, evidently stimulated the demand; and it is on this fact, perhaps, that the hopes of the Coconut Planter must primarily rest. When we turn to the table of distribution, we find that our oldest, and till recently largest customer, the United Kingdom, took from us only 58,770 cwt. as against 68,285 last year; while America, our next best customer for many years took about the same quantity, 52,124 cwt. against 51,570; but India has more than doubled her demand with 135,723 cwt. against 64,961 last year. Singapore too, has made a stride from 32,921 cwt. to 37,566. These two neighbours of ours have thus absorbed more than one-half of our exports, evidently under the stimulus of low prices which are traceable to cheap and abundant tallow in Europe and America. When once the substitutes for coconut oil in the European and American markets rise in price, the demand for our oil, we suppose, will in-

prove; and with that the competition between our new customers and old should lead to better prices.

There are two hopeful circumstances connected with the trade with India and Singapore—that the oil is chiefly required for culinary purposes, this fact pointing to a regular demand; and, secondly that they have found our oil cheaper than Cochin oil; while, for Calcutta and Singapore, it is somewhat nearer at hand. On this point, it may be well to quote from the communication of a Coconut proprietor who had, curiously enough, written what follows before he had seen our last article. He says:—
 “It has always been a puzzle to me why Cochin oil should be so much dearer than ours. The explanation offered, that the Cochin Oil is richer in stearine, affords no information as to why it should be so; and whether, by improved cultivation or improved manufacture, Ceylon may not secure for her oil, too, the pre-eminence she enjoys with almost all her products.
 “Our oil might certainly be whiter; but the natives have an inveterate habit of resorting to methods which give them the least trouble; and, in the drying of copra, the easiest method is to split the nuts and put them on a low platform with fire under.
 “This blackens the copra, and the resulting oil is of a darkish yellow colour. Careful drying, even over a fire, may yield clean white copra; but it is seldom the necessary care is observed, and some of the blackened stuff which is offered for sale, and readily purchased, is a disgrace to the producer. I do not say that all our copra can be sun-dried, because on a showery or cloudy day, the nuts in process of drying must be dried on a platform or they would turn mouldy and be discoloured; but what the mills might do is to offer higher prices for sun-dried copra, and to make oil separately, of the clean white copra and of the black. As it is, though higher prices are paid for clean copra, without reference to its being sun-dried, good and bad are mixed; and hence the oil is not white. May not a different system, save our reputation, and place at least some of our oil on a par with Cochin; for, in the Northern ports, at least, of the Island, sun-drying might be made the rule, if higher prices are paid for sun-dried copra, and white oil is manufactured separately? Then, can smoke drying have any effect on the stearine? Is it not the fact that Cochin oil prices are due partly to operations in the market, though it is decidedly superior to ours?”

These are interesting questions, and we are taking steps to get answers on several points involved—the first of which, indeed, we append. For the present, it is the shifting in the distribution of our Oil to which we wish to draw particular attention, both as a curious fact, having regard to our proximity to India and intimate commercial relations with her, and also as one which gives promise of competition with our older and larger customers for oil. In Desiccated Coconuts our exports are steadily growing and so in Coir. We have no reason to complain of the quantities of Coconuts removed in the shell, which are almost, if not quite, the highest on record; while in Copra we are far ahead of previous years. There is thus an abundant demand for the growing supplies, from the Island of the varied products of the Coconut palm; but what has to be done now is to introduce the Cochin mode of sundrying Ceylon Copra, wherever and whenever possible.

COFFEE PLANTING EXPERIENCE IN
B.C. AFRICA.

As, occasionally, misleading accounts of British Central Africa, and its prospects as a Coffee producing country appear in newspapers in various parts of the world, written in many instances by visitors who have merely passed through the Shire Highlands, and gathered their opinions from more or less reliable sources; we have for sometime past desired to obtain the actual experience of some leading coffee planter in the country, accompanied by accounts of expenditure and results which could be thoroughly relied on.

We recently asked Mr. S. Israel of the Chipande Estate, (now also manager of the various estates of the firm of Buchanan Bros.) if he would be willing to supply us with such notes and accounts; which he kindly consented to do; and these we publish below.

These are the actual experiences of a B. C. A. Coffee planter.

Mr. S. Israel arrived in British Central Africa in June 1894. In July 1897 he had 180 acres planted, the first 60 of which brought him this year 20 tons of coffee. He thus obtained a substantial return, three years and a month after first reaching B. C. Africa. In Mr. Israel's case a very large proportion of his expenditure has been incurred in erecting substantial brick buildings, stores, sheds etc. all of which could have been, dispensed with by a planter anxious to expend as little as possible until his returns came in.

The amount of expenditure in cultivation up to date is also, we think, considerably heavier than would be incurred by most B. C. A. planters on a plantation of similar size.

In the face of statements we have recently seen, made by a correspondent of the *Ceylon Observer*, to the effect that B. C. Africa is no coffee country, poor soil, no successes, and so on, we are glad to be able to publish an authentic statement of a practical planter's experience in this country. The following is what Mr. Israel says:—

"Being led by your wish, and also being requested by friends at home to give a statement of my progress in B. C. A I have no hesitation in doing so.—The enclosed Balance Sheet and Estimates will speak for themselves; but I add the following explanatory notes.

"(1) The extent of my Estate is rather more than 500 acres, but this area is all required for opening such a coffee Estate as my own. I purchased the land at less than 7/- an acre, but this being at least the present value of good coffee land so near to Blantyre I think I am justified in taking that figure as a basis.—

"(2) To open up a Coffee Plantation, permanent buildings are not required, until success may be reasonably expected. No valuation has been made by me for any temporary improvements nor has any labour or profit been taken into consideration chargeable or due to outside transactions.

"(3) The expense of transport of coffee to the river port is included in wages for garden labour, and the valuation of £70 per ton for well-cured coffee will not be above the value, probably less.

"(4) The valuation of coffee land opened up may be considered by some too much, by some too little, but to bring the returns into account, I consider it fair. In valuing the younger planted coffee at £3 per acre less I was guided by my intention to spend this sum per year on that portion of the land.

"(5) The sum of £510 expenditure per year, put down by me allows for all labour, and for the purchase of manure.

"(6) The expenses provide for thorough cultivation of the soil; and the returns exclude first maiden-crops which always have been stripped off the trees by me.

"(7) The estimate on returns of such coffee as has borne a first crop, I only put down for second bearing at one-eighth of the first year's returns while in the third year, when the manure will act better, secondaries on the trees being properly established, I anticipate a heavier return.

"Although I have made a valuation of my own plantation I would remark that such a value is placed on it by me for the purposes of this estimate only, and that I would decline an offer made at my own valuation.

"Being one of the younger settlers of B. C. Africa I must take this opportunity to apologize to older pioneers, should they consider that I wish to lay down the law, as to how to make coffee planting a success.

"I only give my own opinion founded on my own experience, and I am confident that, by planting shade, and light manuring, this country will become one of the best, though possibly not one of the largest coffee producing countries of the world."—S. ISRAEL.

BALANCE SHEET.

CHIPANDE ESTATE, SHIRE HIGHLANDS. B. C. A.

From May 1st 1893 to July 31st 1897-3 years

and 3 months.

<i>Expenditure.</i>		£	s	d
To 500 Acres Land	.. ..	175	0	0
„ Wages for Garden Labour &c., to produce returns	.. ..	996	17	6
„ Tools	.. ..	75	0	0
„ Palper and Pumps	.. ..	70	0	0
„ Nursery Plants bought 1st year, and Seed	.. ..	85	0	0
„ 80 head of Cattle	.. ..	150	0	0
„ Dwelling House	.. ..	90	0	0
„ Baskets and Mats	.. ..	5	0	0
„ Permanent Buildings built of Bricks:—				
Grain Store, Coffee Store, Cattle				
Biar for 100 head, 7 labourer's Cottages, Compost Pit, &c., &c. Ash		650	0	0
House				
Brick Well and Vats	.. ..	125	0	0
„ Own Living Expenses	.. ..	200	0	0
		<hr/>		
		£2,621	17	6

Receipts.

	£	s	d
By Sale of Plants	.. ..	25	0
„ „ Timber	.. ..	35	0
„ 28 tons Coffee (in Parchment) 1st Crop of 60 acres delivered at River Port, value	.. ..	1,400	0
Balance	.. ..	1,161	17
		<hr/>	
		£2,621	17
		6	

VALUATION OF CHIPANDE ESTATE.

August 1st 1897.

	£	s	d
To 60 acres planted with Coffee 4 years old 20/-	.. ..	1,200	0
„ 60 acres planted with Coffee 3 years old 17/-	.. ..	1,020	0
„ 60 acres planted with Coffee 2 years old 14/-	.. ..	820	0
„ 320 acres uncultivated land 7/-	.. ..	112	0
„ Cattle	.. ..	250	0
„ Buildings	.. ..	1,000	0
„ Palper and Sundries	.. ..	95	0
		<hr/>	
Total		£4,500	0
		0	0

ESTIMATE OF EXPENDITURE AND RETURNS.

(to July 31st 1899)

August 1st.	£	s	d	August 1st.	£	s	d
				1897 By returns	1,460	0	0
				1898 By returns			
1897 To Expenditure	2,621	17	6	60 acres coming into bearing	1,400	0	0
1898 To Expenditure for 1 year	540	0	0	From 60 acres old Coffee	700	0	0
1899 To Expenditure for 1 year	540	0	0	1899 By returns			
				new Coffee	1,400	0	0
				60 acres 1st year	900	0	0
				60 acres 2nd year	700	0	0
Balance	£2,858	2	6				
					£6,560	0	0

£6,560 0 0 By Balance* £2,858 2 6

* Hereto to be added value of Plantation and Improvements.

(Sd.) S. ISRAEL.

Blantyre, August 16th. 1897.

—B. C. Africa Gazette, Sept. 7.

COFFEE IN BRITISH CENTRAL AFRICA.

BLANTYRE AND CHOLO DISTRICTS.—Mr. Jonathan Duncan, the pioneer coffee planter of British Central Africa, states that the coffee crop for 1897 is good, and that the amount exported from B.C.A. is sure to increase year by year, as a large quantity of fresh land is being opened up all over the country. He states that coffee is a somewhat precarious crop, and that one thing to be avoided is that the young trees should be allowed to bear too heavily. If this is done, he states, the result will be no crop for two or three years following the first heavy one, as it takes that length of time for the plants to recover themselves. Mr. Duncan is an advocate for shade.

From Messrs. Lamagna we hear that the Mapemba and Ntonda Hill Estates, gave a crop of 40 tons in 1896. The same trees are giving a better crop this year, and are looking healthy and strong.

About 120 acres more were opened up on the two estates, 80 at Mpemba and 40 at Ntonda Hill. Close to these two estates the firm has the Portenope Estate opened in 1896, on which 120 acres are planted.

On the slopes of Michiru Mountain facing the Upper Shire, they have the Tumbulumbo Estate, which in 1896 gave a crop of 9 tons from 60 acres. The same trees this year are giving about the same crop, perhaps a little more. Mwalanduzi Estate in Cholo (belonging to the same firm) gave 6 tons last year and 10 or 12 tons are expected this year.

On their estate at Nkawa (Cholo) they opened last year about 100 acres and were expecting this year only a maiden crop of some 4 tons from 40,000 plants which were planted in 1895.

Messrs. Lamagna tell us that the export of coffee will show a steady increase from year to year, and they also state that:—

"Although nobody is yet able to lay down a single rule, we mean a hard and fast rule, much less any fixed laws about coffee planting in this country, for the simple reason that the industry is too young yet, and we are without sufficient data extending over a number of years to go on, still from the experience of these last 3 years, we may safely say that coffee planting in B.C.A. is or can be made to be a perfectly safe, steady, and paying enterprise, a thing that cannot honestly be said of many colonial undertakings.

"One main advantage of course is the abundance and comparative cheapness of the labour supply and the soil is at any rate moderately fertile and as yet unexhausted, so that for a few years to come it will, unaided, yield fairly satisfactory crops—but naturally we must look ahead of us, and ensure a continuation of these crops; which can be

done by manure and shade,—those two most necessary helps to nature, which are being tried on various estates. Several kinds of shade trees are being given a trial; and in the course of the next two or three years we shall be able to determine what are the best shade trees for this country, and also what effect manures have on the growth and yield of our coffee bushes, and what sorts it is advisable to use in preference to others. Conscientiously we think this is all that can be said at present on the matter of the coffee growing industry, which however, should be highly satisfactory to any who intend starting plantations here or so investing their money.

"Although it might be said that the export of coffee in B. C. A. is increasing yearly simply because every year new estates come into their first bearing, still at the same time the same estates have proved to be able to bear crops for a succession of years. We think that with careful management and hard work an estate can be made to pay from 12 to 20 per cent. on the capital invested.

"Now, as far as regards ourselves, the following is a statement of our estates with their acreage (of course all at various stages of growth) and their estimated crops;—"

Mpenha Estate (I. Lamagna & Co., and others) acres planted, 400; crop expected in 1897, 30 tons.

Ntonda Estate (I. Lamagna & Co., and others) acres planted 300; crop expected in 1897, 25 tons.

Partenope Estate (I. Lamagna & Co.), 120 acres newly planted.

Mwalanduzi Estate (Lamagna and McKinnon) acres planted, 200; crop expected in 1897, 10 tons.

Nkawa Estate (I. Lamagna & Co.) acres planted, 200; crop expected in 1897, 4 tons, (from 40,000 plants).

Tumbulumbo Estate (I. Lamagna & Co.) acres planted, 200; crop expected in 1897, 10 tons.

Makungwa Estate (Messrs. Josselin de Yong & Visser) acres planted, 170; crop expected in 1897, 17 tons.

Mr. J. Lindsay, the manager for Mr. E. Ch. A. Sharrer, and also a planter himself, states that the prospects of crop are somewhat injured by the fact that when the blossoms were setting last year they had prolonged drought, and also locusts did considerable harm by settling on the primaries and destroying both flower and bud.

The extensions planted out in the early part of this year amounted to 300 acres, bringing the total amount of land under coffee cultivation by this firm to 1,800 acres. It must be understood that about half of this has not yet reached the bearing stage, and that 200 acres have only reached their maiden crop.

Mr. R. S. Hunter, the late manager of the firm of Buchanan Brothers, and also the owner of plantations in the Blantyre and Cholo districts, estimates the 1897 crop at 450 tons or a little less. He states that about 10 new plantations have been opened up, though very few new planters have come into the country during the last year. Thus he considers must be due to the deaths of the two Buchanan Brothers, whose names were so widely known that the fact of their deaths—both in the same year—has given a worse impression as to the unhealthiness of the climate of B. C. A. than it actually deserves.

Mr. Hunter states that about 2,000 acres have been opened up in the past year, a large portion of which has been done in the Cholo District. He thinks that the 1897 crop would have been much heavier had it not been for the unprecedentedly hot and dry weather during the last blossoming season. Mr. Hunter informs us that planters generally in B. C. A. seem to have come to believe shade to be a necessity, and in certain districts which have a short rainfall he thinks it most essential.

Shade has been largely planted in the various districts of the country, the *Grevillea Robusta*, and varieties of the *Ficus* apparently being the most popular, although the *Albizia* has also been largely planted.

Mr. Hunter informs us that the labour supply during the present year is a most gratifying feature to coffee planters, also the improvement in navigation on the Lower Shire river which has taken place in 1896-97, now makes it possible to ship coffee home expeditiously and safely.

THE ZAMBEZI INDUSTRIAL MISSION.—Mr. Alexander Hamilton of the Z. I. M. has furnished us with the following notes regarding the large coffee plantations belonging to this Mission.

"In the 'Notes' I do not see much said about Trenching. I think this is one of the most necessary, because one of the most beneficial works, that can be carried on in connection with coffee culture, especially in this Land of Drought where the sky is unclouded for so many months in the year.

"Every plantation ought to have a systematic course of trenching every year. It should be gone over at intervals, say four or five times in the course of the year, during the dry season, as well as the wet. Those who have seen the good effect this has on the plants, will know the efficacy of it.

As some information as to the planting industry of the Zambezi Industrial Mission was requested I will try to give it briefly.

"On the Michiru Estate we have four planting centres, viz:—

- (1) Mitsidi (Headstation) with 220 acres planted.
- (2) Ailsa Craig, with 125 acres.
- (3) Maliya, with 45 acres.
- (4) Chilingani, with 15 acres.

In South Angoniland we have four stations growing coffee:—

(1) Lisungwe. We do not count the acreage on this station, as it has not had a fair chance yet, to know whether it will do or not.

(2) Ntonda, with 128½ acres.

(3) Chirole, with 96 acres.

(4) Dumbole, with 66½ acres.

"The total for the Z. I. M. is thus 696 acres. These are our returns for the year ending 31st March, 1897. We expect at end of next planting season, to have fully one million plants growing in our combined plantations.

"As to the prospects of coffee being successfully grown in South Angoniland, I have very few doubts. I think Chirole Plantation, for instance, will compare favourably with any its own age in other parts of B. C. A.

"The first coffee planted by the Z. I. M. in South Angoniland was during the wet season of 1894-5 and amounted to 15 or 16 acres. This is now in full bearing and is giving a heavy crop. So that this year, another part of B. C. A. enters the market as a coffee producing district. The first sample which has been pulped shows a very good bean."—*B. C. Africa Gazette*, Sept. 7.

PLANTING, LABOUR, &C. IN THE FEDERATED MALAY STATES, STRAITS.

In forwarding the Report of the Resident-General (Mr. Swettenham), Sir Charles Mitchell, as High Commissioner, said:—

This account of the progress of the Federated Malay States, during their first half year, contains, I submit, a record of much good work done, and fully justifies the important step taken on the 1st July of federating these States. So far as I have seen, the chief drawback to the new system is that questions requiring my decision are sometimes a long while in reaching me, but this is inevitable, and will diminish with every advance in developing the means of communication. I cannot speak too highly of the tact and ability shewn by the Resident-General and by all the Residents in overcoming difficulties, diminishing friction, and generally promoting the success of the Federation. The expense has been a good deal greater than I anticipated, but the greater part of it is of the nature of capital expenditure in providing quarters for various Federal Officers. The charge for the

Regiment of Malay States Guides forms, of course, a large part of the Federal Expenditure, but, on the other hand, the cost of the police in the various States has been diminished by the removal of their charges from the States to the Federation.

Mr. F. A. Swettenham, in the course of his annual Report, says:—

Since last June I have travelled close upon 7,000 miles, in and about the Malay States, and I have therefore had opportunities of seeing, and not only the work being done under Government control, but also the operations of private individuals. I have been specially struck by two things; European planting in the Negri Sembilan and European mining in Pahang. Planting, especially the cultivation of Liberian coffee by Europeans, Chinese, Malays and Tamils, has made great strides during the last two years. The evidences of this forward movement will be found in all the States, even in Pahang, but I think the progress is most notable, or it may be only noticeable, in the Negri Sembilan. I am personally very glad that this is so, because I do not myself regard the Negri Sembilan as a State rich in minerals, and it is therefore fortunate that it has attracted planters. It is equally satisfactory to know that one must go to Pahang to find the greatest mining enterprises in the Peninsula. Pahang is the State where we want to see progress, for it is deeply in debt, it is backward in every respect, and fears have been expressed that it was likely to prove a millstone round the necks of its helpful sisters. I do not share those glooms forebodings. One of the best Chinese mining capitalists in the Peninsula has very recently come to terms with the Government of Pahang, and proposes to begin extensive tin mining operations in the Bentong district. If he carries out his present intentions and is successful (the prospects are encouraging) great advantages must result from this undertaking. But it is as a gold country that I think Pahang will presently become favourably known; a country where companies with capital and skilful management will make considerable profit.

With the extension of planting operations, the labour question has become one of such importance that, if the Governments of the Malay States really meant to encourage planters, it was evident that something must be done to help supply them with labour. It is not a new question, and the Malay States have never been backward in their desire to take a fair share of the cost of introducing immigrants into countries which possess no sufficient or reliable labour supply of their own. But unfortunately the matter did not rest with them; it was necessary to secure the sympathy and assistance of the Indian Government, as the source from which the best supply was hoped to be obtained. Whilst the question was discussed, year after year, Government works, especially roads and railways, could not wait, and so far, the Government, either departmentally or through contractors, has taken advantage not only of the free labour that came into the country; but, I fear, to a considerable extent, of the labour introduced by planters in the Colony and Malay States. Now, however, there seems a prospect of better things, and the Federated States have this year undertaken to find a considerable sum of money to introduce Indian immigrants, to strengthen the force of labour available for their own works and the needs of the community. I trust no further difficulties will arise, for the number of large estates now being opened in Malaya increases so rapidly that the scarcity of labour is likely to be increasingly felt, and if, as not uncommonly happens, the price of produce falls, the present high rate of wages cannot be maintained.

NEW INDUSTRIES.—The price of tin has fallen, and the price of Liberian coffee has fallen, and though miners in Malaya can produce tin, and planters can grow coffee, and make a profit at existing prices, it is distinctly advisable that we should increase the number of our productions, and not rely on these alone. As regards mining, there is gold, and that will probably take care of itself; but we have had to encourage agriculture, and it will probably pay us to

continue that policy. The climate and soil of the Malay States are suitable to most tropical products and, when a successful experiment has been made, imitators are never wanting. It is probable that, in the near future, there will be a great demand for rubber, and while many valuable species are indigenous here, amongst them the *figus classica*, which grows like a weed, others have been introduced from South America, and shewn to do well. That is one of the benefits conferred on the country by Sir Hugh Low. Excellent tea has been grown and manufactured in Perak, Arabian coffee of a high class has been produced on the mountains, and, when a cart-road has been carried into the highlands that divide Perak from Pahang it is probable that other paying forms of agriculture will be introduced.

SIROCCO TEA MACHINERY.

We have received from Messrs. Davidson & Co. of the Sirocco Engineering Works, Belfast, an illustrated catalogue of their special tea machinery and also a letter upon the subject. The catalogue is no dry record of the appliances for preparing tea, but an interesting and well printed hand-book, descriptive of the Sirocco works, with portraits of the heads of the various departments. Amongst these are those of Mr. F. G. Maguire, chief visiting engineer of the Colombo branch and Mr. H. M. Harris, formerly of Ceylon, who is now commercial manager of the Calcutta branch. We commend the pamphlet to the attention of anyone interested in tea.

PLANTING AND PRODUCE NOTES.

THE WEST INDIES AND TEA CULTIVATION.—In looking through the report of the West India Royal Commissioner and the subsidiary report by Mr. D. Morris, assistant director of the Royal Gardens, Kew, we find no mention of any suggestion that West India planters should turn their attention to tea cultivation. There are suggestions made as to the development of subsidiary industries other than sugar, but nothing is said about tea. Coffee, tobacco, and fruit cultivation are freely recommended, but, presumably, the Commissioner did not see any prospects for tea cultivation either in the West India Islands or in British Guiana.

THE USE OF THE BANANA.—No doubt its cultivation will be overdone, but at present there is a keen demand for bananas in the United States, where the baked fruit is being extolled in America as the ideal food both for the nervous, the anæmic, and the brain worker. Bananas, it will be remembered, occupied a high place in the diet of the late Sir Isaac Holden, and without going so far as to say they are a panacea for all ills, it is asserted that their great power to sustain mental effort is recognised in India.—*H. and C. Mail*, Oct. 15.

COCHIN Vs. CEYLON COPRA AND COCONUT OIL.

(Answer to Circular.)

One reason for Cochin oil fetching more than Ceylon oil is, that the process of manufacturing it is quite different in the former place from that of the latter. Cochin nuts are smaller than Ceylon nuts and the outturn of oil is roughly speaking about cwt. 2½ per candy for Cochin against cwt. 3 for Ceylon. The Coconut area in Cochin is small as compared with Ceylon, and more care is taken there in the plucking and the drying of the nuts. Only ripe nuts are plucked and the kernel is cut into slices, and carefully dried in the sun. All unripe and bad nuts are removed and only the good clean white copra is manufactured into oil. This is

the white oil of Cochin and it is used in some parts of India as a substitute for ghee. Monsoon-made oil sometimes fetches the same price as white oil, if the quality is fine, but the objection to monsoon-made oil is, that it is, as a rule, off the color in consequence of the damp weather rendering the copra liable to get mouldy, but of course there may be some fine oil made during the monsoon. Greater care in the plucking and drying of the nuts may be bestowed in Ceylon, but the area is too wide, and the climate will not permit of the proper drying of the nuts in the sun. Nuts are plucked anyhow or anyhow here, split into two and thrown to dry in the sun, and if the weather is bad, all the kernels are put on a platform and smoked, which blackens the copra and imparts to it a smoky taste. The copra is then hurried off to the carts or boats to Colombo. Little or no trouble is taken to separate the good copra from the bad nor the white from the black. All come to the mills and it is this produces the Ceylon oil.

White oil, indeed is manufactured in Colombo, but the demand is limited and manufacturers do not keep a stock of it. It fetches about R20 per ton over ordinary good merchantable oil. A good deal of care is taken on some of the estates owned by well-known Ceylon gentlemen, and the copra from these properties always fetches quite R1 per candy over ordinary quality. The best result would be obtained in the Chilaw District. Copra is frequently brought into Colombo from Batticaloa. The climate being dry there the shells get hard soon. It is for this reason that the nut is broken the other way, from top to bottom, for, if the usual custom was followed, the shell would get "splintered" and damage the kernel.

There is but little use, in my opinion, of either sending a Ceylon superintendent to Cochin to learn the method of manufacturing or in bringing over Cochinese to teach the way how to do the work in Ceylon, so long as our climate is what it is. The Cochin men may lead in any thing but he cannot control the clerk of the weather. We have rain almost throughout the year and the coconuts cannot be kept on the trees.* They must be plucked, and rain or no rain, the copra is made and quickly converted into cash! Some years ago a firm of mill-owners manufactured oil from selected copra brought from their own estates. This was superior to ordinary oil and always commanded in London about £1 per ton over the value of ordinary Ceylon, but this firm have now gone largely into the Desiccating line and have given up oilmaking. In this connection it must not be forgotten that copra from the Pacific South Sea Islands, Australia and other places is imported into Liverpool and this competes to a large extent with our oil. In the sixties and seventies during the existence of Armitage Brothers and C. Shand & Co., a very large business was done in Ceylon coconut oil, the contract being sometimes for 1,000's of tons at a time. The former firm who owned Mills at Mattacooly and Mutwal were very large charterers of sailing vessels, and some of the largest ships that ever loaded here were chartered by them. The volume of business then was done direct with London, but now every thing is changed and the news telegraphed out that the stock of coconut oil was 200 tons, the month's landings 200 tons, and the deliveries 200 tons, points to what straits the business in coconut oil with London has come to in 1897 compared with what it was in 1860-70. ©.

THE AUSTRALIAN SALT BUSH.—Professor Hilgard of the California State University says that the Australian Salt Bush can be grown successfully on arid and alkali lands; that it removes from the soil large quantities of Sodium carbonate and Sodium chloride, the two most injurious alkaline salts. In soils, therefore, where the percentage of alkali is near the danger point they may be sensibly relieved by planting salt bush for several seasons. The yield is nearly equal to that of Alfalfa.—*Scientific American Supplement*.

CHILLIES.

A correspondent writes:—During the past few months the prices of all food-stuffs have increased considerably, and notable among them are dry chillies, which some little time ago sold for 12c. a lb., now the market price has risen to 25c. a lb.! It is a matter to be explained why Ceylon with its thousands of acres of available land, should be dependent on the neighbouring Continent for this indispensable commodity. The cultivation of chillies is not new to the Sinhalese villager, almost every garden has a small plot planted with it and in many places where the crop is large a portion of it, in its fresh state, finds its way to our vegetable markets or is hawked about for sale by basket-women, but the process of drying and preserving the fruit, as it is done in India is foreign to the Sinhalese. The cultivation of the plant is not attended with any difficulty and does not require any special care. The requisite fertilizers being cattle-dung and dried keppettiya leaves (*croton laciferum*.) Many years ago the late Sir Richard Morgan tried the experiment by planting some 49 acres of land in Veyangoda—he imported a few skilled labourers from India for the purpose, and if I remember rightly his experiment was a failure owing to his plants being attacked by poochies—perhaps some one who knows more of this undertaking may be able to give other particulars.

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NEW SYSTEM OF WITHERING TEA LEAF.

With a rising exchange and increasing cost of production, planters are not likely to be slow in their appreciation of machinery designed with a view to labour-saving economy, and inventors are very alert just now in regard to all that affects the manufacture of tea. Last week there appeared in our advertisement columns some particulars of an apparatus for withering tea introduced by Mr. Edward Robinson. As it is our province to give details of all tea machinery coming within our knowledge, we give alike for the benefit of the tea planters and other inventors of machinery a description of this apparatus, together with a statement of the claim made on its behalf by the inventor, who mentions that working models of his invention have been on view for some time in the City, and are still to be seen on application to him. He also mentions that a complete installation has been sent out to Ceylon and will be set to work without delay, and that a large number of planters have inspected his working model, and opinions highly favourable to this new departure have been expressed. He points out that an important part of the system has already been thoroughly tested in practice and has proved a remarkable success namely—the arrangements for producing and evenly distributing large volumes of warm wind. Some forty installations of this special apparatus are, it is mentioned, at work, and there are excellent testimonials respecting it. Having thus been able to secure in large buildings the exact conditions necessary for successful tea withering, the inventor has turned his attention to this widely-felt requirement, and has designed and patented an arrangement of swinging trays which he claims is not only very simple, but which introduces a distinctly new idea into the practice of using trays as spreading surfaces for withering. The new method may be briefly described thus: Strong trays, having each an area of thirty to forty square feet, and made with a frame of round iron, covered with wire netting, and all galvanised, are attached on one side by means of staples to a strong angle-iron framework. They are fixed about four inches apart, and will swing about from one side to the other like the leaves of a book.

To the side opposite the hinge-like attachment ropes are fastened, which ropes are connected to a continuous roller or windlass, carried overhead and supported by angle-iron uprights. The windlass is worked by a worm-wheel gearing, so that a boy can easily raise up a whole row of trays at once. On commencing to spread leaf the whole row of trays is made to recline backs upwards. The first of the series is then turned over by hand and the leaf spread, the same with the rest of the trays in succession. The row of trays being thus spread, a few turns of the windlass raises them all up at once to any desired elevation. It is then found that the leaf rests securely on the trays when raised to an angle of 45 deg. or even more. To about this elevation the trays are raised and left until the leaf is withered. Obviously trays standing in this position, with clear spaces of about four inches between each tray, admit of a free up-draught of wind to carry away moisture from both sides of the leaf. The air pipes are so arranged as to disperse a constant gentle current of fresh dry air under each row of trays uniformly; thus each tray gets its own supply of fresh drying wind, such wind having only to pass once between the trays, after which it is driven out through the upper ventilators by the constant incoming wind from below. Thus in bad, wet weather it is only necessary, according to the inventor, to close all doors and windows, and set heater and fan to work, and first-rate withering can be done irrespective of the weather outside. Many planters of large experience, the inventor mentions have told him that this system of withering is well calculated to save a large portion of the losses now unavoidable during heavy flushes of leaf in the rainy seasons. Should this expectation be realised it is scarcely possible to over-estimate the importance of such an improvement.

As to the great saving of labour, that, the inventor contends, is obvious on the face of it, for the spreading of the leaf upon a flat open surface some 2 ft. from the floor is much easier than the stooping down, and climbing up, and reaching between the tats necessitated by the present mode of working, whilst for gathering in the withered leaf a few turns at the winding gear raises a row of some fifty or sixty trays to an upright position, and the leaf at once shakes down upon the sheet spread out under the series of trays. The sheet is then wound in upon a simple roller having a handle and light gear-wheels. The leaf can be dropped through an opening in the floor or picked up as desired. There is nothing in the process that can break or bruise the leaf, which is another very important consideration, having regard to all the vexed questions about small siftings.

At first sight it does not strike us that there would be the saving of factory space which is claimed for this system. It is, however, a matter of simple computation, but the inventor contends that upon a careful comparison of the spreading space obtained by the new arrangement with the actual spreading space available in numbers of factories of the ordinary kind more than twice the area of spreading space is obtained under the new method in the same area of building.

It is further claimed that in the wear and tear of plant a saving of fully 50 per cent will be realised. The wire trays are never moved from their places, and the only handling required is just to swing them over for spreading the leaf. Strong trays so used are calculated to last for some years.

The inventor claims that the most important results are expected to arise from the control the system gives over the necessary conditions of withering in bad weather. When the weather is good and quite favourable for natural withering the windows of the house are opened and no heater or fan used. The arrangement of the trays he regards quite as suitable for natural atmospheric withering as the ordinary tats now in use, plus the saving of labour, space, &c. If the weather is hot, dead, and still, the fan alone can be worked, imparting a nice gentle motion and life to the air and expelling the vapour,

When the outside air is saturated with moisture and will not wither leaf a little steam can be let into the heater, raising the temperature a few degrees; vapour will then be freely carried away, and good withering done. By increasing the inlet of steam the temperature of the house can be raised so as to wither well on the coldest and wettest of days. Thus it is claimed that without in the least interfering with any existing advantages, natural or otherwise, this new system affords the planter the means of effectively withering his leaf, whatever the weather may be. The same thing is being done, says Mr. Robinson, now in numerous factories larger than any withering house on this system would need to be, the conditions obtained being identically the same as the well-known conditions required for withering tea leaf.—*H. and C. Mail*, Oct. 22.

INDIA RUBBER.

LATEST NEWS.

In an article on India Rubber in the *Indian Agriculturist* of the 1st September, we notice an extract from a paper by Mr. J. R. Jackson, which appeared in "Nature," Vol. 55, page 610. Except where this paper may be taken to refer to the few artificial plantations that have been established, it is, we regret to say, far from accurate; for it talks of the *Ficus elastica* forming large forests in India and Ceylon, while, as far as our Indian experience goes, we only find this species very sparingly interspersed in evergreen forests. The *Ficus elastica* is not sufficiently shade-enduring to permit of its germination and growth on the ground. The seed no doubt germinates very freely in the forks of trees where a little mould or debris has accumulated but in order to permit the young plant to establish itself and to become sufficiently strong to form a connection with the soil below, it is absolutely necessary that the tree on which it finds itself placed should be either dead or diseased. If not the young *Ficus* cannot obtain sufficient nourishment, and dies. That this is the case has been clearly established by experiments in the Chardura rubber plantations. Here many hundreds of *Ficus* were planted in the forks of trees. They were supplied with a considerable quantity of soil and grew to be healthy plants; but they lived the life of pot plants, and after more than 10 years not one of those growing on a healthy tree had established its connection with the soil. Now, even in a virgin evergreen forest, the majority of trees are neither dead nor so unhealthy as to yield sufficient nourishment to the *Ficus elastica* till it has become connected with the soil and established itself as an independent tree, and the "veritable forest of trunks" remains a thing to be wished for, but does not exist in nature.

As regards an entirely artificial rubber plantation, Mr. Jackson's description is perfect. In fact over acres of such plantations the roots of the trees, in some instances planted 100 feet apart, have not merely become interlaced but have amalgamated, and acres and acres may be said to live, so to say, on one great root.—*Indian Forester for October*.

PLANTING NOTES.

THE PAPAW JUICE, which is now quoted at 5s. per lb., is easily prepared. The unripe fruit has to be scarred or lined some $\frac{1}{4}$ in. deep, with a sharp knife daily, and the juice caught and dried upon sheets of glass, when it becomes at once a marketable commodity. The active principle, papaw is in much esteem as a medicinal agent. The *Chemist and Druggist* gives the following method of preparing it:—"The juice is pressed out of the fruit, clarified by filtration through a twill bag, and the ferment precipitated by alcohol. It is then dried, but is sometimes purified by treatment with water."—*Planting Opinion*.

THE OLDEST POPLAR IN FRANCE.—The citizens of Dijon, France, recently voted a sum of money for putting a railing round a tree standing within the city limits. The tree bears a label which informs the sight-seer that it is the oldest Poplar in France. The Town Council has a record tracing the history of the tree since the year 722 A.D. It is 122 ft. in height and in circumference.—*Scientific American*.

THE EXPORTS of Coal and Coke from India for the year ended 31st March, 1897—says the *Indian and Eastern Engineer*—amounted to 136,719 tons, the destinations of which were:—

Ceylon	..	..	98,635	tons.
Aden	..	..	16,775	"
Straits	..	..	14,532	"
Mauritius	..	..	7,757	"
Turkey in Asia	..	..	2,550	"
Sumatra	..	..	1,300	"

and trifling quantities to the Persian Gulf and to Zanzibar.

CULTIVATION OF THE SOY BEAN.—Dr. W. G. King, of Calcutta, has requested certain officers in Vizagapatam, Bellary, and Saidapet to report upon the possibility of cultivating the "Soy bean," with a quantity of which he furnished them. The "Soy bean" is, he states, probably the most nutritious form of readily assimilable pulse at present known, and should it prove possible to introduce it widely in Madras, it would prove of great advantage in jail administration and also to the poorer classes generally.—*Pioneer*, Nov. 5.

GERMAN EAST AFRICA is politically and commercially the most important, as well as the largest, of the German possessions, but it is unfortunately also the most unhealthy, says a report in the *London Times*. "Not a foot of East Africa," according to Major von Wissman, "can be regarded as healthy." Of the produce of the plantations in the province of Tanga coffee pays best, but it has been attacked by a disease which is the most serious in that the destructive fungus is considered to be native to East Africa. Tobacco and cotton can be grown, but not, apparently, under remunerative conditions. Special attention is being paid to indiarubber and coconuts. Agricultural experiments are being made in other districts also, but no opinion can be yet expressed as to their success. Gold-bearing quartz has been discovered at Usambara, but of too poor a yield to repay mining. On the other hand, as rich deposit of hard coal has been found close to the water at the north end of Lake Nyasa. The only railway so far is the Usambara line, of which 40 kilometres were completed by January, 1896, but funds failed to extend it, and the company is chiefly occupied in maintaining and improving the existing section, over which one passenger train a week is conveyed. A grant of £15,000 has, however, been made for preliminary surveys of a line from Dar-es-Salam to Lakes Nanganyika and Victoria, the cost of which for the first section alone (258 kilometres out of 1,738) is estimated at £592,500, but its construction cannot be attempted without a financial guarantee, which the Government has not yet ventured to propose to the Imperial Diet. It is worth noting that the total trade of German East Africa in 1896 (R10,338,278) less than a quarter of the imports came from Germany and less than one-sixth of the exports went to Germany.

CRITICISM OF CEYLON COMPANIES.

We felt sure that, sooner or later, the famous *Investors' Review*, edited by A. J. Wilson, was likely to find a text in some one or other of our Ceylon Companies; and sure enough in the October number just to hand we find three pages devoted to "A Weak Tea Company"; while an editorial note discusses the Company identified with its Chairman Mr. James Sinclair in anything but favourable terms. We can do no more in this issue than quote:—

A WEAK TEA COMPANY.

It is not a sign of prosperity, we regret to say, to find a particular industry honoured by a company formed under the fostering care of Messrs. Antony Gibbs & Sons. Whether it be the high and lofty ideals of the bank parlour, or the innate "cussedness" of things in general, that are against the firm, it is a fact that hardly a venture brought out by it of late years has been a success. Yet the firm does not weary in well-doing, and despite the malevolent way in which the nitrate, gun-making, and brewing industries have foiled its efforts in the past, it is now giving the reflected glory of its financial aureole to the tea-growing industry, by standing sponsor to a tea-growing concern. This Company—the Tea Corporation Limited (Ceylon)—was brought out at the end of July with a capital of £181,000 divided into £65,000 of Five per Cent. Debenture Stock, £65,000 of Six per Cent. Preference Shares, and £51,000 of Ordinary Shares. The object of the Company was to buy up a number of tea-growing estates in Ceylon, with a total area of 7,033 acres, of which 3361 acres were under cultivation. The price to be paid for this property, after allowing £5 per acre for uncultivated land, worked out at about £45 per cultivated acre. It does not seem to be a high price, as Ceylon tea companies go, but this is perhaps the best that can be said about the issue, for the prospectus is drawing up on the free-handed system. A list of thirteen estates to be purchased is given, and it is set forth in big type that considerable economy will be effected by working them in one combination. But the prospectus rhetorician does not mention that four of these estates have for years back been worked as one company, that three others had been similarly handled, and that two more were one in all but name. As a fact, the London market knew these nine estates as three, and therefore the economy of combination had already been in force to a great extent. Then although the 3,211 acres under tea to be purchased was mature, except as to 282 acres, no record of past workings is set forth in the prospectus. Now, to have such a mature area implies that the estates must have been worked for a number of years; why, therefore, this mystery of silence?

Most probably the reason for this omission is the fact that no satisfactory statement of past profits could be drawn up. The estates in several cases are poor, four of them having formed the Lauderdale Tea Estates Company, which after having been in existence a good many years, paid, we believe, its first and only dividend of 2 per cent. last year; and two others to the Asiatic Produce Company, which has the still more unenviable record of never having paid any dividend. A number of the estates, including the Lauderdale group, have to our knowledge been offered about the City with a view to inclusion in a company, but no one who had a knowledge of the industry would take them over at the prices asked.

The only piece of information vouchsafed as to the past by the gracious sponsors is that the crop for the year ended 30th June last amounted to 1,060,463 lb. But while no information is afforded, there is a wealth of estimates, and by the dexterous use of this childish device, a visionary dividend of 10 per cent. on the Ordinary Shares is brought out. These estimates, by the bye, are made by Mr. F. Tatham, who is to be managing director in Ceylon, and who, therefore, must be considered not wholly unbiassed in his judgment. He

starts with the amazing surmise that in the current year the crop will be 1,250,000 lb., or just 189,537 lbs. more than in the preceding year. This is an increase 18 per cent., produced by an area that has less than 3 per cent. of tea shrubs only in partial bearing upon it. Why such an increase should be expected we fail to discover, except that it comes in hardy to swell the estimate of coming profit. Then this 1,250,000 lb. of tea is figured out to produce 6d per lb. *nett*, and from the gross revenue of £31,250 thus triumphantly reached, the deductions of working expenses and interest charges are made, so that it is all plain sailing. Now, the majority of the estates are situated in districts of Ceylon that produce a low-priced tea, and yet such a nett price would imply that the Company must dispose of its tea at an average gross price of at least 7d per lb., in order to cover the freight, landing, warehouse, and sale charges that go to make up the difference. In the most recent Minceing Lane sales the produce from six of these estates has been selling at 5½d per lb. gross; of one at 6½d per lb. gross; and of another at 7d per lb. gross, and only the produce of three of the estates has produced more than the indispensable 7d per lb. gross. Finally, the exchange for the purposes of the estimate was taken at 1s 2½d, yet the day the prospectus was issued the Indian exchange stood at 1s 3¾d, a difference of 1½ per rupee, which would probably mean a loss to this Company of £1,800 per annum at least, and since then the quotation has been forced higher still.

Too hopeful an exchange is therefore assumed, the increased production seems to be taken at too high a figure, and the *nett* price to be obtained appears sanguine. What this combination of favourable estimates means can be discovered if we assume more moderate figures. Should the Company produce in the current year 1,100,000 lb., more than last year, a very fair increase on an acreage of this character, and if this crop yield 5½d. per lb. *nett*, which is by no means a low estimate, and if the exchange rules at 1s 3¼d—it is now 1s 4d—the Company would find its *nett* revenue amount only to £5,370 instead of the £12,970 set forth in the prospectus. Were such to be the case, and from the present condition of affairs our estimate seems more likely to be fulfilled than that of Mr. F. Tatham, the Tea Corporation would not be in a position to pay the full interest upon its Preference capital, to say nothing about a dividend on its Ordinary Shares. Of course we do not say that this will be the result of the first year's working, but if estimates can be varied so easily, no one can wonder that we prefer to have hard facts as to past working. The remainder of the prospectus is filled up with windy generalities about the enormous increase in the consumption of tea, and a statement of dividends paid by Ceylon tea companies, which is not entirely correct. We note, however, that the vendors give themselves the option of taking the whole £169,000 of the purchase price in cash, if the public be foolish enough to subscribe the whole of the capital. Therefore, although the Company possesses the benefit of a sou of the Governor of the Bank of England as director, and has a so other high-class banking connections upon its Board we should strongly dissuade the public from touching any part of its capital. It is companies such as these, and there are too many now being formed, that will bring disrepute upon the tea-growing community, which of late years has been rather free from wild-cat creations.

* * * * *

Now we come to the first of "Company Notes" as follows:—

Dimbula Valley (Ceylon) Tea Company.—In our article about Ceylon tea companies, we advised the public not to be sanguine about the future of some of the newer companies. This is one of the newer companies, and in reference to it we might even go a step further and say that we regard its future with extreme apprehension. Established in January 1896, its first report shows that with £150,000 of share

capital and £6250 of mortgages, the Company possessed 1441 acres of land under mature tea, and 444 acres under immature tea, so that the reserve land only amounted to the trifle of 206 acres. The capital cost was therefore over £100 per acre, and how this must handicap the concern can be imagined when it is stated that any company with a capital cost of over £50 per acre is considered highly valued, while most of the good companies have a capitalisation of between £19 and £40 per acre. To show how badly this Company shows up, we compare its figures with those of a few other companies on the same basis, as we did the companies in the article on Ceylon tea companies.

Companies.	Total land held.	Land under mature Tea.	Land under im-mature Tea.	Total Deben-tures and Share Capital.	Reserve and Amount forward	Capit. p. mature a. after deducting Res.	Aver. pr. realised for Tea.	Yield per acre.
	acr.	acr.	acr.	£	£	£	d.	lb.
Dimbula Valley	2091	1441	444	156,250	375	101	9 ¹ / ₂	556
Edarapolla ..	894	471	129	22,000	295	39	6 ¹ / ₂	640
Highland ..	702	545	41	32,000	404	55	9 ¹ / ₂	357
Standard ..	3290	1519	761	60,000	9800	22	11 ¹ / ₂	398

The Company has the benefit of a rather high yield per acre of tea, for which a good price is obtained, but this does not warrant such a high capital value per acre. The Board managed to bring out a trading profit of £14,596, and a nett profit of £13,375, but we should rather doubt their methods in arriving at this result, while nothing can be said about them, as no account of the working of the estates is rendered. By this means a dividend of 10 per cent. on the Ordinary Shares was distributed, but we feel sure that the heavy capital cost is bound to tell its tale in the future.

Two things puzzle us extremely here, namely, how Mr. Wilson makes out the Dimbula Valley tea area to stand so high as £101 an acre, and how the "Standard" can hold their fine properties so low as a cost of £22 capital per mature acre? Perhaps we may have corrections on both points.

PLANTING NOTES.

THE AFRICAN COFFEE COMPANY.—Mlangi Coffee Estates, Limited, was registered on Oct. 16th, with a capital, £50,000, in £1 shares to adopt an agreement with J. Crabb, and to plant, grow, manufacture and deal in coffee, cocoa, tobacco, sugar, maize, tea, etc. The subscribers are:—A. Eldridge, 32, Hamilton Bldgs, Gt. Eastern St. E. C., accountant; H. F. Garrett, 54, Gloucester St. Bloomsbury, W. C., gentlemen, J. B. Somerville, 48, Lincoln's Inn Fields, W. C. solicitor; A. P. Paine, 20, Essex St. Strand, W. C. solicitor; J. Crabb, 26, Wetherell Rd, N. E. gentleman; C. H. Chambers, Belle Vue, Swanley, Kent, clerk; and J. Edwards, Swan Grove, Cricklewood, N. W. gentlemen.

THE "INDIAN FORESTER."—A Monthly Magazine of Forestry, Agriculture, and Travel. Edited by J. W. Oliver, Conservator of Forests, and Director of the Forest School, Dehra Dûn. The following is the contents for No 10—October, 1897:—I.—Original Articles and Translations. India Rubber; Kumri Teak Plantation, by A. L. Lowrie; II.—Correspondence. The After-training of Coopers Hill Men. Letter from "Scrutator"; Gurnand's System. Letters from N. Hearle and "Kritik"; The Formation of Chlorophyll. Letters from J. L. MacCarthy O'Leary and A. W. Lushington; III.—Official Papers and Intelligence. An Enunciation of Forest Policy by the Madras Government; IV.—Reviews. Forestry in Jeypore State; Forest Administration in Bengal during 1895-96; VI.—Extracts, Notes and Queries; VII.—Timber and Produce Trade; VIII.—Extracts from Official Gazettes.

CARDAMOM OIL.—The oils of different species of cardamoms described here have been distilled heretofore by us as well as by others. Their composition, however, has as yet not been ascertained; we therefore insert here a brief resumé of the results of our examination of these oils, abstracted from a report which will soon be published in some chemical periodical.—Schimmel & Co's. Report. [Then follows a learned analysis of oils from different species of cardamoms.—Ed. T.A.]

TEA CULTIVATION AT NEW CALEDONIA.—Efforts are being made to encourage the cultivation of the tea plant in New Caledonia. An exchange to hand by the steamer "Tanais" yesterday states that a quantity of tea seed was received by the Agricultural Union at Nonnea by the mail steamer "Polynésien, and would be distributed among those desirous of attempting the culture of the plant. It is considered that the climate of New Caledonia is admirably suited to the growth of tea, and that if the matter were taken up energetically it would prove a source of wealth to the French colony, by reason of the enormous demand for tea in all parts of the world.—Planters Gazette, Oct. 1.

A NEW ROOF AND WALL COVERING FOR IRON AND WOODEN BUILDINGS IN TROPICAL COUNTRIES —is described in the latest *Indian and Eastern Engineer*. It is a new cement called "Tilestoneite" Cement, which is both heat-resisting, waterproof, and fireproof and consequently for hot countries is an invaluable adjunct to roofs, and outside walls, of iron and wooden buildings. In fact, wherever it is desirable to reduce the temperature as in bungalows, station-verandahs, barracks, stores, factories, laundries, creameries, etc., the use of this cement does away with the necessity for the expensive double roof sometimes put up for that purpose. Further, being completely waterproof, it is specially suitable for wooden structures, the use of which is restricted by the fact of their not being rainproof; and, of course, the cement can be applied to buildings covered with iron or felt? We read further:—

A considerable advantage claimed for this cement is that it will adhere to perpendicular walls, whether constructed of brick, wood, or corrugated iron; and this virtue still further prevents the absorption of heat from the sun's rays, thus reducing the temperature within. "Tilestoneite" Cement is non-inflammable, and completely protects iron buildings from the corroding effects of salt, spray, steam, or vapour; and as it contains no deleterious substance, water coming from it may, with safety, be used for drinking and domestic purposes. The cement is light-grey in colour—the best refractor—and is made of materials which are the best non-conductors of heat, and it gives a stone-like and finished appearance to any structure to which it may be applied. The cement is applied in a dry state, and all that is required to bring it into working condition is the addition of a little water, when it can be applied in layers, with a trowel or plasterer's float, no skilled labour being requisite. The manufacturers reckon that one ton of this cement will cover about 430 square feet of corrugated iron, 1½ inch thick and the cost per square foot, therefore, is very trifling. Compared with slates or tiles the saving is equal to 50 per cent in material, with the additional advantage that no skilled labour is required. For wooden surfaces an inch beington sufficient thickness, a ton will cover 573 square feet, at a cost of 2d per square foot; whereas one ton of slates or tiles will cover only 220 square feet, and will cost 43d per square foot. One of the best testimonials to the merits of this cement is the fact that it is supplied to the British Secretary of State for India, the Crown Agents for the Colonies, and the Agents General for the Cape of Good Hope, and Western Australia, for use on Government buildings.

The sooner the manufacturers get agents in Ceylon to advertise and supply "Tilestoneite," the better!

Correspondence

To the Editor.

COFFEE-PLANTING IN NYASSALAND:
A REPORT BY A RESPONSIBLE
PLANTER.

Chipande Estate, Blantyre, B.C.A.,

Aug. 25, 1897.

DEAR SIR,—A contribution in your June number, headed "Planting Prospects in British Central Africa," by a gentleman, Mr.——, gives most misleading statements; hence permit me to correct his truthless allegations. Although I have lived a number of years in this country, I never heard of this man who tries to pose as one who came to prospect for land suitable for coffee plantations. Making enquiries about this coffee expert, I found out that he walked here from Mashonaland, and was glad to accept a position as barman, which he gave up with the intention of prospecting for gold in the Northern parts, and joining company with a trader, who allowed him to do so. When returning, without success, he tried to obtain a position with the Chartered Company, but being unsuccessful, he disappeared. It is only with a certain amount of reluctance that I write to correct statements of this description, but as a resident in this country I do not like to see injustice done to it by false and untrustworthy reports.

Coffee has not been a failure, and although in the beginning it did not always prove successful, for want of capital and knowledge, it has now established itself as a well-paying industry. It is distinctly untrue that everybody here is trying to form companies.

Transport, considering that we live in the interior of B. C. A. is cheap, costing only £3 per ton for coffee from Katungas to the sea coast. The average cost of land carriage to this part (according to distances) from 10s to 60s per ton. The average rate of wages is only 3s a month, which includes food pay. Labour is inexhaustible, and a number at certain times of the year must return home for want of finding work. If some planters cannot get sufficient labour in the wet season, they are themselves to blame, as they do not provide sufficient food supplies and the men want food to live. My labour, and the same of the majority of planters costs no commission for obtaining, and only in some instances are agents employed.

The soil is not inferior to that of any other country, where coffee is grown. It varies in quality, and large blocks of good uncultivated land can be bought at low prices.

Like in any other tropical country a man must live a moderate life, and by observing this condition, he need not fear to live here.

The Tanjanyiki plateau, to which Mr.—— refers, as being unfit for white settlers, is a beautiful part of Central Africa and will soon be developed, and settle a large white population, in spite of that gentleman's wholesale adverse statements. The heat is not great, we are about 3,000 feet above the sea level, and if heat should inconvenience me I would sooner live here, than in Colombo.

We have plenty of water in this country, but no large river exists in Blantyre, as is stated by Mr.——.

Coffee disease in our country is also a new discovery of his, and this eloquent gentleman, surely knowing this, wasted his time prospecting for coffee land. I have no doubt that any reader will at once see what harm men of this type might do, if such statements are not corrected. Not wishing to encroach on your space any more I conclude with the offer to willingly give my report and information to any enquiries made to me.

Yours truly,

S. ISRAEL,
Planter, Chipande Estate, and Manager of Messrs.
Buchanan Bros.' Estates, Miehira and Zomba.

SIROCCO TEA MACHINERY.

"Sirocco" Engineering Works, Belfast, Oct. 6.

DEAR SIR,—As you have on many occasions been kind enough to make favourable reference to my tea machinery in your columns, and to publish descriptive articles regarding some of the new machines which I have placed upon the market from time to time during the past few years, I take the liberty of forwarding to you by this mail, under separate cover, a copy of my new catalogue of Sirocco Tea Machinery, and should feel very much gratified if you could see your way to notice same in your columns, as I have no doubt such an article would be read with interest by your planter readers.

This catalogue is very much more complete than any I have yet issued, and is the only complete catalogue of tea machinery that has ever been published—in fact no other firm manufactures machinery for more than two or three of the processes through which the leaf passes, whereas, as you will see from the introductory remarks in my catalogue, I can lay claim to be the "first who can now supply tea factories with an entirely complete outfit of mechanical appliances for each and every process in the manufacture of tea, from the time the leaf is brought into the factory up to its being sent off as finished tea in packed chests," and which wide claim is supported by the descriptions and illustrations subsequently given in the catalogue of the various machines that I manufacture. Amongst these are included one or two new machines which have yet to make their reputation in practical employment on the tea estates, though I expect they will do so in course, quite as much as my new roller (which was first brought under public notice in my catalogue of last year) has done already, and so well have the rollers been received by planters, more particularly in Ceylon—where they were first introduced—that many orders have already come in as a consequence of the working of the first machines sent out; and planters seem to appreciate the fact that this machine is an entirely new departure, both in construction and method of applying pressure to the leaf (which you will see for yourself, if you glance through the descriptive part relating to the roller), while at the same time it has the still further advantage in their eyes, of being considerably cheaper in price than other rolling machines of equal capacity.

The view of my works is different from any that has appeared in my previous catalogues, on account of its being taken from the reverse end of the premises to what my previous views were, namely from the end facing the river Lagan. The view of Belfast seen beyond the Works, is absolutely correct, and any planter knowing the town here would recognise the principal local features shown in the illustration. I have put the names of each of the "shops" on the tops of the roofs in these drawings, to indicate them for the benefit of planters who have never seen my works, and don't know anything about their extent.

Then as you will see, I have shown photographs of the heads of my official staff at home and abroad, and I have also shown photos of the foremen of each of the various departments. The insertion of these I thought was desirable, because it has often been told me that many planters abroad, know-

ing that I was myself once a planter like themselves out there, fancy that my place is likely a kind of amateur engineer's place, and not got up on the lines, or to anything like the size of old-established premises, whereas in reality I think they would be larger than the average of engineering concerns over the country, and their equipment is complete and up-to-date in every respect. I thought therefore that if I would let my constituents see that it is not altogether with me personally that they are dealing, but, that I have a large and intelligent-looking staff in charge of the official and management part of the business, as well as an intelligent lot of foremen in the various departments of the works, it would likely produce in their minds a feeling of greater confidence as to the probability of my turning out good machines, than if they thought the whole thing was a kind of amateur place, without much in the way of a staff of foremen and officials, such as, I am glad to say, I am able to show; besides which, Ceylon and Indian planters will be interested in the photos of the men with whom they have to deal in connection with my depots in Colombo and Calcutta respectively.

In the introductory remarks that I make, following the photographs, I have confined myself to a few important and particular statements, which I hope you will find time to look over; and a peculiarity in the wording of the catalogue, to which I would like to call your attention, is that a portion of the matter is printed in heavy type, and if you simply glance down any of the pages, reading only the heavy type, you will find that it reads consecutively, and forms a condensed synopsis of the leading features of the body of the descriptive matter.

The first machine shown in the catalogue, which refers to the "conveying" of leaf, has of course not been worked on any tea estates yet, as it has only been employed in Messrs. Gallaher's enormous factory in Belfast for conveying tobacco leaf, but, as you will see mentioned in the descriptive matter, tobacco leaf being not only very much more delicate but a great deal larger and more difficult to deal, with than tea leaf, when the apparatus has been found very suitable for tobacco, it ought to be still more suitable for tea.

Then as regards the withering machine, which comes next, the difficulty of introducing such a new and "revolutionising" process is so great, that it has involved a large number of experiments, and I am not really pushing for orders for the machine yet, because the experiments have not been carried out so sufficiently far to satisfy me that the best possible results have yet been obtained with the machine, but notwithstanding this, the results show already that I can get quite as good a quality of tea as that made in the ordinary way, but I am still in hopes of being able to produce a *higher class quality* with this machine, and until my experiments are absolutely completed in a practical way—and which are being carried out under the supervision of my own engineers, I am not looking for orders as yet, but think it well to include the machine in the catalogue now, as its being shown will gradually get planters familiarised with the idea of effecting the withering of the leaf by machinery, which at present would be too much in the nature of a revolution, for them to think seriously of adopting, until their prejudice and conservatism is overcome as regards the old routine of manufacture, and they are forced in their own interests to adopt the latest and most up-to-date systems, when such are shown to produce as good, if not a better quality of tea than ordinary manufacture.

The other machinery illustrated and described in the catalogue is already well-known and in general use on the tea estates, but amongst the new improvements which are being applied to my Drying machines, you will see particular reference made to the new Multitubular Air-heater, of same type as applied in the large "Auto-Sirocco", which has proved such a successful machine, not only as regards the amount

of work of which it is capable, but also as regards the quality of the tea which it turns out, the improvement in which is attributable to the system of drying applied in the machine. This new Multitubular Air-heater is applicable, in reduced sizes—large and small Dwindrafts, also to 16 and 20-tray Uprdrafts, and its employment is strongly recommended as it is more economical in fuel, and its air heating capacity is about 30 per cent. greater than that of the corresponding size of the vertical-flue type, which important advantages more than counterbalance the relatively higher price of the Multitubular Heater.

No doubt you will find other features of interest in the new catalogue, to which I needed not specially call your attention, and hoping that you can see your way to give a notice of same in your columns, and thanking you in anticipation.—I am, dear sirs, yours faithfully,

S. C. DAVIDSON.

[The catalogue was noticed in our last issue.—Ed. T.A.]

LOCUST PESTS IN CEYLON.

DEAR SIR,—In your notes on this subject, in your last issue, you remark that, so far as existing records go, no extensive mischief has been done by locusts in Ceylon. With the columns of *Tropical Agriculturist* open to receive any information on planting subjects, this ought not to be the case. As a matter of fact, these insects have at various times developed in considerable numbers, and as they have apparently no known enemy except, perhaps, sudden changes of weather, it is necessary for planters in every district to keep a sharp look-out for them. I remember finding a single specimen in the Kotmale patawas some seventeen years ago, and subsequently on several occasions have come across whole broods of them in the low-country. In one instance they were found in some chena on the borders of a young cacao estate: the vegetation was stripped absolutely bare of foliage. I am not sure whether any *lantana* was attacked, but guava trees were stripped to the buds, and wild plautains had only their mid-ribs left. I killed nearly five hundred locusts: a few escaped. Insects that will devour either of these plants are not likely to have any objection to feeding on tea or cacao leaves whenever there is a scarcity of the food on which their parent brood subsisted.

About two years ago, on an estate not far from the one just referred to, the *dadap* trees over several acres were almost denuded of foliage: the sound caused by the falling chips of leaves and the locusts' droppings on the cacao trees beneath was like a heavy shower of rain. I was told that an adjoining estate was affected in the same way. I have not heard if the subsequent brood was destroyed or not.

So far as I have observed, the insects usually breed in *illuk* grass and the stunted vegetation of abandoned coffee fields. To search for their eggs in such places would be practically impossible, but the destruction of the young locusts in the grass, before their wings develop, is an easy matter. If the grass is dry, one can set fire to it, but if this remedy cannot be applied, the insects can be caught in nets or Hessian bags and crushed on the nearest open space.

As the locusts when full-grown exude, when disturbed, an acrid yellow froth, birds and lizards will not eat them; the crow perhaps might be an exception. The burning off of chena and *illuk* grass along estate boundaries would at first sight appear to be a good preventive measure: on the other hand these are the most convenient places in which to search for the insects when laying their eggs or for the newly hatched broods.

As verbal descriptions of insects would convey little information to the average planter, and as I understand the Director of the Colombo Museum has never sufficient stocks of these or any other insect pests to supply specimens for general distribution, the Government should circulate coloured lithographs of any insect pest which appears to be increasing.—Yours faithfully,

B. E.

[We are obliged to our correspondent for his interesting information: we must await our 'topical index' to be able to say readily what is in the 16 volumes of the T.A. Nietner takes no notice of locusts.—ED. T.A.]

RAMIE CULTIVATION:—FACTS AND FIGURES.

Dessford, 16th Oct.

SIR,—In the *Observer* of the 12th instant, (see page 330) there was a long and interesting article on the prospects of Ramie cultivation in Perak.

I quite agree with the writer that the exaggerated reports issued by Companies and individuals with a patent process or machinery for sale, have done much to retard progress in this product, so far as Ceylon is concerned.

In comparing the three estimates, Mr. Wray shows a loss on cultivating "Ribbons," Mr. E. Mathieu a profit of dollars 102.30 per acre for "China grass," and Mr. MacDonald a profit up to £50 per acre for "Filassee." These estimates are based, apparently, on experimental plots in various parts of the Straits and must be considered far from final; still, surely there is room for encouragement to persevere with the cultivation, if only experimentally.

The late local syndicate gave as their reason for ceasing operations, that the product was so hedged about with patents that they were afraid if they grew it on a large scale, prices would be such as to preclude all chance of profit. A few years ago "China grass" was £22 per ton, whereas now it is about £35 per ton, and the annual consumption has reached over 2,000 tons spread over the Continent, England and America. This hardly looks as if the price was being driven down by holders of patents.

There has been an endeavour to interest planters to grow "Ribbons," but seeing "Ribbons" lose 60 per cent in treatment, whereas "China grass" loses only 30 per cent, it will be seen that in this country of high freights, the former has not much chance, except when the cultivation is in an experimental stage.

It must be remembered that in dealing with a crop of 20 tons of green stems per acre that 80 per cent is water and another 15 or 16 per cent is woody matter and leaves, which can be returned to the soil, leaving only from 4 to 5 per cent or 16 to 20 cwt. per acre taken out of the ground.

Let any planter with suitable land try an acre or two experimentally, and make his crop into "Ribbons" which requires no machinery. He will then be able to see if there is sufficient encouragement to go into the matter on a larger scale and lay down "Plant" for either "China grass" or "Filassee."

Finally, to quote Dr. Morris, of Kew, in 1893, the total value of fibrous material imported into the United Kingdom was £50,002,244, of which £5,357,968 was received from British possessions and £44,644,279 from foreign countries. These figures speak for themselves and surely here is a possible chance of a remunerative low-country cultivation instead of increasing our acreage in tea.—Yours faithfully,

ED. ROSLING.

Colombo, Oct. 19.

SIR,—I have read with much interest Mr. Rosling's letter in your impression of the 18th. It is quite refreshing to read a letter on this subject from one who undoubtedly understands the matter and looks at it from a practical point of view.

Mr. Rosling, I am glad to see, is backing up the advice I have offered to such of the planters as I

have had the pleasure of meeting over here—that is to *experiment*. I have suggested two acres as a suitable area to put under cultivation as this will enable them to check what the *Observer* calls my exaggerated figures. If they find in Ceylon that they cannot get more than 20 tons of stems free from leaves an acre, I should advise them to stick to their tea as 20 tons per acre will not pay. Calculating the filasse at 2½ per cent, it will only produce 11,000 lb. which at 4½d per lb. would fetch about £20. This £20 has to bear the whole of the expense of cultivation, treatment, freight, etc., etc., and would leave the planter a mere pittance. Get 40 tons per acre and Ramie begins to pay well, but nothing under 30 tons will pay.

Another thing for the planters to bear in mind is that the only way to make Ramie pay is to decorticate and degum on the spot and send the resulting filasse to London. When once this is done the days of ribbons and chena grass are numbered. Who will pay £35 per ton for chena grass when it takes three tons to make two of filasse. Hence each ton of filasse costs £42 10s. to which you have to add the cost of steam, English labour, rent, taxes and chemicals. British manufacturers will readily welcome Ramie filasse, and it will soon create such a demand as to increase its price, and for a reasonable crop £42 per ton pays well, but there is no reason why £60 per ton should not be obtained for small parcels of a few tons.

My firm do not sell our patented machines. We either supply them at cost price or supply working drawings, from which planters can have their own plant erected by any local firm. It may, however, pay them to have the machinery through us as our manufacturers have the patterns, and they would, of course, get the benefit of this, added to the fact that we should test any machines before leaving. We look to our profit when the planter makes his and not before. We then take 25 per cent. of the *net* profits, and undertake the sale of the filasse which, of course, it is our interest to see fetch the highest price and keep the market up.

I am writing a handbook to planters, with full instructions for planting and treating the fibre, which I shall be happy to send to your readers if they will apply to the office of my firm, 39, Victoria Street, Westminster, London, S. W.—I am, etc.,

J. M. MACDONALD.

DEAR SIR,—Don't you think, Mr. Editor, you have misapprehended Mr. MacDonald's figures on Ramie somewhat, when you express a doubt "whether 20, 13, or even 10 tons of yield of fibre per acre, per annum will ever be gathered continuously for any number of years over an appreciable area in Ceylon?" The crop which Mr. MacDonald estimates, on the basis of experience at the Straits, is "78 tons of stems per acre per annum." The stems include leaf, stick and fibre—as they do in Cinchona and Cinnamon, the bark, leaf and wood; and he proposes returning to the soil all that can be returned, save the fibre. Now, the fibre he calculates at only "2½ to 3 per cent of the crop." It would, perhaps, be more correct to say that the crop is 2½ to 3 per cent of the cuttings, as what is thrown away, because useless, can scarcely be called crop! Well, 2½ per cent of 80 tons will be only 2 tons; and even that at £42 per ton ought to satisfy the average investor, assuming that the fibre can be laid down in Dundee at 1½d a lb. Of course, I venture no opinion on the figures, or on the investment. I only draw attention to the confusion that has evidently arisen from speaking of the waste products as crop, and to the difference between stem and fibre.—Yours truly,

PLANTER.

[We are under no misapprehension as to Mr. MacDonald's figures; but doubt their realisation.]

Ceylon, as indeed does Mr. MacDonald himself. Can our correspondent tell us as a matter of curiosity what the gross weight of an average cinnamon crop—sticks and all—or of coconuts, is, per acre? We shewed the maximum for moist tea leaf was about 2 tons; while average coffee—in its cherry form—may have given 3 to 4 tons per acre?—Ed. T.A.]

DEAR SIR,—Let me premise at the outset that I am a believer in Ramie as a paying crop, provided, of course, that the necessary machinery for treating the fibre is set up in Ceylon, and that the flasse will fetch £42 per ton. But at the same time I am not a believer in Mr. MacDonald's figures. Not that I mean for a moment to insinuate that they are cooked; but that they are not quite consistent, and are therefore misleading in a manner that Mr. MacDonald himself may not suspect. While he was here he pretty well bewildered ordinary mortals, and at least one editor, with the great mass of figures he thrust upon them. The "Examiner" in its leader of the 25th instant says: "From trials made it has been ascertained that fifteen of these stems will weigh four ounces." The statement is no the face of it absurd, nor could Mr. MacDonald be credited with saying it. What he did say was that the mean of fifteen stems small and large weighed 48 oz.

Now that Mr. Macdonald has left us we can examine his dazzling figures at leisure. The "Examiner" again in its editorial states,—“If therefore the cuttings were put at 18 in. apart they would give, he says, eight to the square yard, or 38,720 to the acre.” Did Mr. MacDonald really say so, or was the "Examiner" misquoting again? On turning to the *Observer's* interview of Oct. 19th, it was found that Mr. MacDonald had actually put it so. Here is a sum in arithmetic: What number of plants will there be (1) in a square yard, and (2), in an acre of land, if the plants were put 18 in. by 8 in.? Work it out for yourselves and do not trust to any one's figures. And what do you get? Four plants per square yard, and 19,360 per acre,—just half Mr. MacDonald's figures, which would represent the number when the plants were put 6 in. by 6 in.

With 19,360 plants per acre, the weight of the crop of stems from an acre (at the rate of three stems per tree) will of course be 39 tons and not 78 tons. Now Mr. MacDonald when he put his crop of sticks per acre per annum at 78 tons, said that 1½ tons of flasse would be a safe estimate; we shall now have to divide this by two, whereupon the weight of flasse is reduced to ¾ ton. This at £42 per ton in England would realize £31 10s.

Now what is the cost of producing a ton of flasse? Mr. MacDonald tells us that it can be grown, treed, baled, imported into England, with freight and all charges paid, including brokerage, at 1½d per lb. At this rate the cost of ¾ ton would be £10 10s; and the profit per acre would be represented by the difference between £31 10s and £10 10s, or £21. "From these profits," Mr. MacDonald candidly allows, "the patentee's royalty of 25 per cent will have to be deducted." And this will bring down the net profit per acre to £15 15s,—rather a come-down from £50 per acre!

But there are some who may point to the elaborate calculation in the *Observer* of the 12th Oct., (see page 332 of November issue) where Mr. MacDonald by giving all the working details makes out the profit of nearly £50 per acre, and may ask how such a calculation can be at fault. Well, it will be found that according to it, the cost of producing one lb. of flasse is as nearly as possible 11-14d only. Now if the price obtainable for 1 lb. (at the rate of £42 per ton) is 4½d, this would leave a profit of 3-3-7d on a lb. or £32 on a ton. But Mr. MacDonald elsewhere tells us that ramie costs 1½d per lb. delivered in England. If we take the latter figure, the profit on a lb. will be reduced to

31 per lb. or £23 per ton, which makes a considerable difference on a thousand or so of tons! Now, which should we take of the two figures given for the cost of 1 lb. of flasse? Clearly 1½d as this represents the cost per lb. laid down in England where the £42 per ton, or 4½d per lb. is to be got for it. So that we must decide to accept a profit of £28 on a ton of flasse. Now, what is the amount of produce as flasse per acre? That is the point to be settled. If we say with Mr. MacDonald 1½ ton, then we must suppose that the crop of sticks from which this must be got was 78 tons and that the land carried 38,720 plants per acre, or eight per square yard. We saw that with eight plants to the square yard the plants must be put down 6 in. by 6 in., but if on the other hand the plants were to be put in 18 in. by 18 in., when there cannot be more than four plants per square yard or 19,360 per acre, and therefore, the weight of flasse would by the same calculation be reduced to ¾ ton per acre. The profits on an acre would thus be three-fourths of the profits on a ton, and that is £21. Taking 25 per cent off, this for patentee's royalty, we again get £15 15s profit per acre, and not £50!

Let me, however, repeat here what I said at the outset of this letter than I am a believer in Ramie, and that what planters must now do is to have experimental plots of an acre or two and satisf, themselves as to the suitability of soil and locality and the probable crops to be expected per acre.—Yours truly,

D.

[But "D." must remember the conditions laid down by Mr. MacDonald for successful growth, in which we quite agree,—namely, equable temperature, good soil, and well-distributed rainfall; and so we have pointed to the South of Colombo, and especially the Galle district, as best for an experiment. The Udagama Company should certainly try one. Particulars given of an experiment by Messrs. Clarke, Young & Co., to a contemporary are as follows:—“Two and three quarter acres of land have been planted up with the new product (obtained from Calcutta), and they can supply 10,000 cuttings at once, and more in a month or two. Four crops a year, he said, may be safely counted on as far as his experience goes. Mr. Young took up the idea some time ago on hearing of the offers made for ramie by Capt. A. Whitley, and he has already sold several lots at good prices. From what he tells us, it is evident there is a good deal more rhea in Ceylon now than most people are aware of. Not only is it growing in Kurunegala and Ratnapura; but the plant is thriving in Colombo at no greater distance than the Cinnamon Gardens; while Mr. Young informs us also that they are going in for it pretty extensively on the Pallagama Grant Association's land.” Ratnapura with its abundance of rain and heat ought to be a good district for ramie.—Ed. T.A.]

Colombo, Nov. 1.

DEAR SIR,—Your editorial comment on my letter, (see above) is to the effect that it would be quite possible to grow ramie successfully in Ceylon, and in that opinion I am at one with you. Indeed, I stated in the letter referred to above, that I was a believer in ramie as a paying crop. But the purport of my communication was to show that the calculation, according to which eight trees planted 18" by 18" are made to occupy a square yard, was wrong; ergo, the results based on such a calculation—viz., that 78 tons in sticks and 50 pounds in money would be got per acre—cannot be accepted. Like the estimable firm named in your quotation from a contemporary, I also grew ramie experimentally in the Cinnamon Gardens from plants imported from Calcutta, and can also supply 10,000 cuttings. But then there are others also growing ramie in Colombo—and a great many doing so outside Colombo. I doubt, however, if any

of us will, in spite of equable temperature, good soil and well-distributed rainfall, succeed in getting 78 tons per acre—which Mr. MacDonald makes out, according to his occult system of arithmetic, is a fair yield.

I see that the old word *rhea* is used in your extract. It is better that we should now drop it and stick to *ramie* as the name of the plant we are talking about. At one time *rhea* and *ramie* were considered to be a distinction without a difference, but that is not so now, and the words should not be confounded.—Yours truly,
D.

Colombo Oct. 30.

DEAR SIR,—In a letter written by the Managing Director (Mr. MacDonald?) of the Boyle Fibre Syndicate to the Secretary to the Queensland Agent-General the following passage occurs: "If a guarantee could be given that 500 acres would be put down under cultivation and the product supplied to the mill, my company would be disposed to put up the mill, and the required machinery, and pay the farmers at the rate of 2d per lb. for every lb. of white degummed filasse produced from the stems supplied by them, or so much per ton for the stems supplied after. We have tested the amount of fibre produced, which would be about 4 per cent of the weight of the green stems."

It is a pity Mr. MacDonald did not volunteer to make similar arrangements in Ceylon, only offering something more than 2d per lb! In the above extract the fibre is said to be about 4 per cent of the weight of the green stems. We have a recollection that Mr. MacDonald put down the percentage as between 2 and 3. Which is it? We want something definite to go upon.—Yours truly,
D.

3rd Nov. 1897.

DEAR SIR,—Your correspondent "D," has very clearly exposed the simple error made by Mr. MacDonald in his estimates. The latter has taken a square yard, on paper, and planted it up at eighteen inches apart, quite forgetting that the plants on its boundaries would require a share of the soil in the adjoining square yards, and in his estimate of plants per acre he has further allowed for 10 vacancies caused by rocks, tree-stumps or drains. But there are other points on which information of a practical nature is desirable.

To begin with, the expert allows for roads and tramways three hundred acres in a twelve hundred acre block. Even if this large area is necessary for the regular and rapid collection and transport of crop, it is doubtful whether sufficient allowance has been made for the maintenance of three hundred acres of roads, especially as regards their weeding and drainage.

as he allows abus in Ceylon six months, instead of three, for the stems to mature after the cuttings are planted: no details, however, are given of the cost of the period which usually elapses before planting can be commenced. And there is apparently some confusion as regards the yield. If, just for the sake of argument, we take Mr. MacDonald's figures, at 78 tons of stems per acre per annum, we have, he tells us, to make each cooly cut and deliver to the tram lines six cwts. of stems (from two acres) for a day's work, at intervals of six weeks. But three cwts. per acre multiplied by eight cuttings per annum gives only 24 cwts. Even in an "equable climate," there would evidently be a serious shortage, and the cooly would have to find more stems than the expert reckoned, and telephone to the mills for more tram cars.

Next as regards the cultivation. We are not told whether Mr. MacDonald has ever grown *Ramie* himself on any large scale: apparently not. As one who has cultivated it, though not on a commercial scale,

so long as ten years ago, I may, perhaps, be allowed to suggest to the expert that such close planting as he proposes, 18 inches, even though it only gives a paltry 19,360 plants per acre, instead of double, that number, would most probably only lead to rapid deterioration. The advantages he claims are, of course, delightful to contemplate: (1) no weeding necessary after the plants are three feet high, let us say after the first two months; (2) the production of stems so extra long and free from knots that the market value could not possibly fall below £42 per ton, though, of course, buyers might gladly pay more. I do not claim to have ever seen even one acre of *Rhea* growing wild, but I very greatly doubt if it is to be found anywhere growing naturally as closely as the expert proposes to grow it. My plants were grown three feet apart: I supposed when planting them they would require air, sunlight and soil. Apparently my impression was correct: they grew very luxuriantly and the roots nearly met after six months. Mr. MacDonald evidently proposes to have no cultivation whatever: the cuttings have merely to be planted and then the climate and the cooly (nature and art) do the rest.

After this captious criticism, it will probably surprise you, Mr. Editor, to learn that, like your correspondent "D," I am also a believer in *Ramie* cultivation. But I should prefer to see *Rhea* grown as a subsidiary crop, or at any rate combined with some other product, and I should certainly prefer to buy decorticating machinery outright rather than pay away twenty-five per cent of my profits to any inventor. I raise no objection to the price quoted, £42 per ton, though, as Mr. MacDonald's figures of crop have had to be reduced by half, the price might fairly be increased. The sample which I sent home in 1887 was, of course, prepared by hand, and was valued at rather less than £40.

I should deprecate planting any closer than three feet. Though this would still further reduce the number of plants to 4,840 per acre, I should be able to obtain a better quality of fibre, not only because the stems would be grown more naturally and would have the advantage of air and sunlight, but because I should have space (which the expert would not) for working the soil between the rows and returning to it all the waste foliage and stems. And I do not think that by this system of cultivation my weeding would be expensive. I make no stipulation for an equable climate: we must forego that in Ceylon. But I venture to suggest that *Rhea* planted at this distance would yield per acre quite as good returns as plants treated on the wild kitchen-garden system which Mr. MacDonald has so strenuously advocated.—Yours faithfully,

B. E.

PLANTING NOTES FROM SOUTHERN INDIA:

RAMIE CULTIVATION, SHADE TREES, AND COFFEE, &C.

Oct. 28.

DEAR SIR,—I have carefully perused your notes and the writings of various Planters on the cultivation of the *Ramie* plant, but failed to discover that any one has reaped a profitable crop. More than 12 years ago I experimented with this plant, growing about $\frac{1}{4}$ acre in a ravine with good soil, but only managed two good cuttings annually and the fibre I used for general use on the estate.

I have it again here in a ravine, but so far have not given it any attention. I have seen its cultivation in Tinnevely district on the Parapet property. If it is to be cultivated to give a return, it must be grown on good flat land, capable of being planted and irrigated and also matured. Padi field land is suitable.

I suppose you receive that weekly Journal, "Planting Opinion" I occasionally have a look at it and observe it makes copious notes from the *Tropical Agriculturist*—it is a miserably con-

ducted paper and the editor appears to have no knowledge of the subjects he writes upon and his "General Notes and Articles" are most inaccurate. The chief subject in his paper for the three months is *Erythrina lithosperma*. In the issue of 16th instant we are told that *E. lithosperma* is good firewood. No one with any experience of timber would ever make such a statement, the wood is utterly worthless for such a purpose, only spongy tissue. In the last number, 23rd instant, it is stated that the manager Ariankan, Shencottah, is the only person that can supply this variety of *Erythrina*: "that is a tall one!" Did he not bring the seed from Ceylon? Seventeen years or more, was the first of this variety introduced into Ceylon from Java, as a shade tree for Cocoa—the old *E. Indica* has been in the island for many years. Tons of cuttings and lb. of seed of *E. lithosperma* can be procured in Ceylon and also in Southern India. It is recommended as a "wind break;" that is not the experience of those who have planted it. It is a surface feeder, branches very brittle and easily blown over. The tree is a good temporary shade and for such a purpose it was planted in Java, Ceylon, Straits Settlements, Southern India and elsewhere. Now Mr. Nelson informs us, that, "old half abandoned coffee" has revived and become full of fruit and vigour under shade of *E. lithosperma*. We all ask where? I have Arabian and Liberian coffee growing with *E. L.* and cannot say that it is any better than the fields with *Grevilleas*, *Albizzi* and other trees. Let cocoa growers look round and say if their trees are superior under its shade. Under thick shade of *E. L.* our Liberian coffee trees bear very sparingly. The best crops of coffee I have seen were grown under shade of *Ficus Glomerata*, *Albizzia lebbek* and *stipulata*, and *Pithecolobium Saman*.

Was there ever any district in Southern India where the Arabian coffee trees produced such stems as was found in Matala, Rangala, Pussellawa, Uda-pussellawa and Badulla. I think not. Coffee is doomed in Southern India and no system of manuring will ever save it. This year it has had a most virulent dose of leaf disease. To satisfy my curiosity as to the condition of the roots of some of the severely attacked trees I had the roots of a few trees exposed and examined and found them to be in a very healthy condition.

Let Mr. Nelson and others who write extensively on scientific manuring, discover an antidote for the cure of leaf disease, and I am sure their brother planters will gladly erect a "statue" to their honour and glory—Mr. Nelson is great on green manuring, as he calls it, how long after application was the humus in a state for plant food? Practical Agriculturists and Horticulturists, those who go in for high cultivation, generally apply manures that will give the best returns in the shortest periods. Most naturalists know that plants are most susceptible of the food their roots consume and few roots will penetrate into a decomposing mass of vegetable matter. Tea can't go on for ever, and will have its time as coffee and all other eastern commercial products have passed their course of existence. We must make the most of it while it is in a vigorous state and reap the reward. Cinchona will yet give handsome returns to those in new countries who can cultivate it at suitable devotions. When we are increasing our products, some should try, "Patchouli, Pojasteman patchouli" it is a most profitable cultivation, being a valuable perfume, leaves and flowers containing an essential oil.

ARBORISTS.

RAMIE CULTIVATION, SHADE TREES, &c.

Nov. 4.

DEAR SIR,—Your correspondent, "Arborist," should be able to give us some useful information as to the yield of ramie fibre. He says he got only two good cuttings of stems from his plants annually: what was the actual yield from his quarter acre? I think your correspondent is wrong in supposing that paddy

fields are suitable for the cultivation: if thoroughly drained, of course they are, like any other flat land, but the rhea plant belongs to a family which is not aquatic.

With regard to "Arborist's" remarks on shade trees and his criticism of the Nilgiri journal, *Planting Opinion*, it is not possible, without perusing the whole of the articles he refers to, to say whether the Editor's views are right or wrong. Your correspondent in an airy way condemns the entire contents of three months' weekly issues, while admitting that he only occasionally has a look at the paper. He says the journal is "miserably conducted," but as the Editor "makes copious notes from the *Tropical Agriculturist*," there is hope for him yet. Personally, I may say that I have heard several Ceylon planters say they prefer the former paper as being lighter reading and less bulky than the "*T.A.*": there is probably room in the East for the circulation of both.

"Arborist" flatly contradicts the Editor's opinion that the dadap tree (*Erythrina lithosperma*) is useful for firewood. I have heard of one cacao estate in Ceylon on which the coolies use no other wood for fuel, and know of many others on which it has been used for years.

Your correspondent is in error as to the tree having been introduced from Java to Ceylon. The first seed was obtained from Assam, in 1887, with the object of supplying what was then thought to be of more importance than firewood, viz., charcoal for use in tea-house *chalas*, and cuttings from the first plants were distributed to the Royal Botanic Gardens and gradually to all the coffee districts, beginning with Pussellawa and Dikoya.

As regards the benefit to be derived from planting dadap in poor coffee, I am able from experience to confirm the opinion expressed by Mr. Nelson in the Nilgiri journal. No one has ever supposed, except perhaps your correspondent, that the dadap, or any other shade tree, was a cure for leaf-disease in coffee; but its shade is distinctly beneficial, and its roots going down to a great depth, open up and improve the soil wonderfully. I quite agree with "Arborist" that *Albizzia*, *Grevillea* and *Ficus glomerata* are also useful. As to *Pithecolobium Saman* it is extremely brittle, and when a few years old is one of the worst surface-feeders known.

The last part of "Arborist" letter seems to indicate that he belongs to that class of planters which, for want of a better term, must be classed as "sweaters." Blindfolded he runs a tilt at green manuring, on the ground that "Practical Agriculturists and Horticulturists, those who go in for high cultivation, generally apply manures that will give the best returns in the shortest periods. Most naturalists (*sic*) know that plants are most susceptible of the food their roots consume, and few roots will penetrate into a decomposing mass of vegetable matter. Tea can't go on for ever. . . . , we must make the most of it while it is in a vigorous state and reap the reward." We may leave the Horticulturist out of the question. The gentlemen who grows cabbages and onions generally knows that they will attain maturity in a few months, and he applies fertilisers accordingly: with staple products such as tea and coffee the case is rather different. There are probably few planters now in Ceylon who will not support the statement that the application of artificial manures to coffee was often extravagantly and recklessly carried on. In really scientific cultivation natural conditions must be considered and science and art must work together. "The best returns in the shortest period" is only a paraphrase of the simple expression "over-bearing."

As regards the activity of roots when in search of food, if your correspondent has the courage, let him try this cheap experiment. Take a few bundles of mana or illook grass, or a dozen old gunny bags, and spread them over the ground in tea, coffee or any other product. Then let him after the lapse of three or four weeks, before the grass or bags even reach the stage of decomposition, fork up the soil and see what growth the roots have made in order to get at the new food.—Yours faithfully,

MUSTARD,

MANUFACTURE OF WHITE COCONUT OIL.

Colombo, Nov. 11.

DEAR SIR,—In connection with the discussion now going on in your paper it may interest you to hear that we have been manufacturing white coconut oil regularly for the last ten years.—Yours faithfully,

FREUDENBERG & Co.

[We are interested to learn that this description of oil has been regularly manufactured at the Hultsdorp Mills during the past decade. The question then is,—how does its value compare with "Cochin Oil," and whether it is sold in Europe under a mark which distinguishes it from Ceylon oil generally.—ED. T. A.]

PLANTING NOTES.

SELANGOR PLANTERS' ASSOCIATION.—As will be seen from the summary of a meeting which we publish in another column this Association has had under consideration the question of having a labour-recruiting agent in India, but it has been allowed to lie in abeyance in the meantime. Steps are also being taken for establishing a central coffee-curing store in the State.

TEA PREPARATION BY ELECTRICITY.—The *Indian and Eastern Engineer* returns to this question as follows:—A correspondent of our contemporary, *The Englishman*, under the *nom-de-plume* of "X. Y. Z." writing on the subject of our article on "Tea Manufacture by Electricity," puts on record the fact that Mr. Lloyd originally introduced the *system* on the Darjeeling estate. Mr. Lloyd did originate electrical plant in this garden, but as an amateur in Electricity; and is entitled to great credit for the ideas on the subject which he partially developed. However as stated by us, Mr. Rickie is the first to *successfully* introduce Tea Manufacture by Electricity. *En passant* we hear that Mr. Rickie has been appointed Chief Engineer to Messrs. Finlay, Muir & Co., for all their gardens, and we look for considerable developments of electrical enterprise in connection with their numerous interests.

CACAO IN THE WEST INDIES.—By the last West Indian mail information arrives that cocoa-growers have of late been doing remarkably well. In three months the price had risen by 13s. per cwt. This, after a long depression, has greatly benefited all the colonies not wholly dependent upon sugar. Of late years many have chosen this delightful occupation. The planter's house is in the middle of a grass clearing surrounded by all trees, which in the earlier part of the year are a mass of pink flower. From the house, paths of about half a mile long radiate. Along these avenues on both sides the cacao tree, which is about the size of our own apple tree, is planted at regular intervals, each being allowed a certain number of square feet. Behind these cacao trees are larger trees, required to shelter them. In these leafy avenues the planter has merely to see that his small staff prune judiciously, thin out the immature pods where they are too thick, and keep the trees from parasites. In the best plantations costly machinery for drying and separating the beans has been introduced. Small beans are kept for home consumption, and large beans fetch better prices in Europe than those produced elsewhere, except perhaps Venezuelan.—*Grocers' Journal*, Oct. 23.

FRESH AIR IN BULK: A TRIP TO THE HORTON PLAINS.

To any one who has been long stagnating in an enervating climate such as is found in many of our lower districts, a change of scene even though a short one, with a cooler atmosphere, offers such temptation as hardly requires to be backed by the authority of medical advice. The pity is that we are sometimes not quick enough to grasp the occasion, and by putting off a holiday indefinitely, only prepare the way for a longer holiday, but one in which the only exercise we get is that of patience, while physical exertion is confined to the prescribed exhibition of pills, powders and mixtures. The weather is often made the excuse for delaying a much-needed trip, but without adequate reason: considering how little satisfied each of us usually is with the weather that falls to his lot, it would be only fair to assume that people even a short distance away have some of finer quality.

There are many ways of getting to the Horton Plains, and

THE LEAST TROUBLESOME WAY

is probably by rail to Ambawela or Ohiya station, the distance being short and the road easy; but for a cross-country trip, with plenty of exercise and varied scenery, a walk from Haldummulla *via* Kalupahani may highly be recommended. The elevation of Haldummulla is 3,380 and the Horton Plains some 7,000 feet. But the cart road goes downhill to Kalupahani, and the distance being nearly four miles, there is probably a drop of nearly 800 feet, so that one has a clear ascent of 4,500 feet to make before reaching the pure air on the summit. At the foot of the hills there is a painfully oppressive feeling in the atmosphere and even light clothing seems a burden, but long before the summit is reached a change of flannels becomes necessary.

The town of

HALDUMMULLA

does not strike the casual visitor as a terrestrial paradise. There are two or three native shops well-stocked with tinned provisions, umbrellas, country salt, &c., but a striking scarcity of fruit and vegetables. Not a single lime was to be had for money, the only circulating medium with the Moorish fraternity, and only about a dozen plantains, more withered than ripe, were visible in the whole place. Possibly bolders of plantains were waiting for a rise in the market, but this seems to be their normal condition, and the population are not likely to take an increased interest in fruit before the Last Day, unless a Light Railway drops supplies at their doors. The few small gardens at the roadsides were being weeded and fenced, but

HORTICULTURAL EFFORTS

appeared to be limited to the growing of cabbages and beans. If the School of Agriculture can turn out a few practical gardeners, there is room for one here. The only fruit trees visible about the place, and those very few and for the most part utterly neglected, are mulberries, tree-tomatoes and papaws. Some of the former were carrying a fine crop, but the fruit is generally neglected by the natives, and the bulbuls were enjoying them. In the villagers' gardens at Kalupahani things seemed a little more hopeful: sweet potatoes, cassava, yams and a few chillies being grown. Jak trees and kital palms are fairly numerous, but coconuts and arecas are represented by some half-dozen sickly specimens. The villagers seemed to be living largely on hope and short rations until their paddy and chena crops ripen three or four months hence, unripe jak fruits and the succulent stems of certain wild plants being much in demand. Plantain trees, even in the most sheltered situations, are very scarce: the large number of wild pigs and porcupines in the neighbourhood are said to account for the cultivation not being taken up.

CATTLE REARING.

The road, after leaving Kalupahani, is a tavalam road running, or more correctly climbing, up through

some miles of patana, here and there, with a sprinkling of trees, mostly wild figs and 'kahaata,' often miscalled the 'patana oak.' The soil, especially on wind-blown ridges, seems poor and gritty, and the periodical firing of the grass probably makes it annually worse. It seems a pity that the natives should be allowed to devastate such an enormous area as they do 'to improve the pasturage.' If they raised cattle in proportion to the acreage burnt off, we should be able to export frozen meat instead of relying on Australia to supply us. Besides the large area fired each year for the benefit of the owners of cattle, a good deal of promiscuous firing is doubtless done with the object of driving game into convenient places for shooting and trapping.

GREVILLEAS AND PARA RUBBER.

Here and there on the patanas one comes across a paddy-field or a kurakkan chena defended from wild beasts and cattle by walls of loose stone, and cannot help wishing that the cultivation was more extensively carried on so as to remove more stones from the road. In the patana hollows too, below the most westerly of the Kalupahani estates, there are extensive nurseries of tea and grevilleas. About a mile or more from Haldummulla, a small plantation of grevilleas had attracted notice. They had apparently been planted in scrub and patana land and were growing very well with scarcely any vacancies? It seems curious that the Forest Department should, for so many years, have neglected its vast opportunities of redeeming the sterile grass lands of Uva by planting them up with grevilleas and other suitable timber trees, instead of trespassing on the right of private owners by starting extensive plantations of para rubber. Many planters were called upon, some ten years ago, by a circular issued in the Central Province, to give information as to the growth in their districts of some three or four dozen kinds of trees for timber and fuel, including some which were useless for either purpose, but rubber cultivation (with a view to the preliminary expenses being all wiped out by the sale of seed) was not then suggested.

The Government Blue-book for 1892 reported over 825,000 acres of

PASTURE LANDS

available in the colony; since then Mr. Vincent's examination of the country has probably added to this a large area, and the total of course does not include all paddy and dry grain fields, which are available for grazing purposes as soon as the crops are reaped. Even if these figures are above the mark, there is surely ample scope for considerable work in the patana hills of Uva alone. With a Government railway clamouring for fuel, to say nothing of estate requirements, why is this work so long delayed. It may be said in answer that experimental planting some years ago in Dimbula was disappointing: trees grew to a great height and then died out, apparently killed by the same boring beetle which has recently devastated our cacao trees. But is the Forest Department expected to squat, like a sedent Buddha, in contemplation? As regards the boring beetle, it has long been known to attack only trees in an unhealthy condition. Specimens of it were sent, with other insect pests, to the Planters' Association some fifteen years ago. The actual cause of the decay of the gums and grevilleas was most likely the prolonged visitation of cockchafer grubs. A great many of the large brown chafers have been flying about on the patanas in the evening lately, so that there would probably be a large number of grub ready to interfere with any experimental planting. But the aeration of the soil by draining and forking would soon put a check to their ravages, while a careful analysis of the patana soil would show in what chemical constituent, if any, it was deficient.

After leaving the patanas,

THE ROAD IMPROVES

considerably and winds up, at a very steep gradient, through some very fine tea fields and then through jungle till it joins the bridge road leading from Haldummulla to the Plains. Here tree ferns and rhododendron trees begin to get numerous, and in the early part of the year, when the latter are in flower and the varied jungle trees put on their new foliage, the scenery must be enchanting. Many of the wild flowers on either side of the road remind one strongly of those at home. On reaching the Plains, the road becomes easy: a mile and a quarter of comparatively level walking, through the grass land gay with crimson orchids, brings one to the resthouse.

It has been said that the finest scenery in the world is improved by

A GOOD HOTEL

in the foreground, but its attractions are distinctly increased when it is found near the vanishing-point. The garden surrounding the resthouse is bright with flowers, periwinkles, gladioli, cannas and hydrangeas, and the delicious air is filled with the perfume of borders of mignonette, but after a climb of four thousand feet æsthetic aspirations, unless very intense, are apt to be overcome for a time by considerations of the practical measures necessary to restore lost energy. The fresh air of the plains is certainly bracing but one cannot drink in much of it at once, and the suggestion of a draught of the liquid which is popularly supposed to be obtained from fermented grain is irresistible.

But the fine weather may not last all day, and if one of the great attractions of the plains, the view of

THE "WORLD'S END,"

is to be seen, it must be done quickly: a farther walk of two miles. Packets of sandwiches, which at starting seemed more than sufficient, disappear in a galloping consumption: the air makes one feel as hollow as a spectre, but breakfast must be postponed. About a mile from the resthouse, at the side of the road, with the jungle growth carefully cleared on all sides, appears a small log hut. The door has no hinges but is raised some two feet from the ground by a rope tied to a pole fixed horizontally above. The interior is uninviting; the uneven earthen floor is littered with brushwood, and at the farther end a small part of the space is fenced off. The guide explains that it is not a summer-house, but a cheetah trap: no one but a cheetah could feel sure of it. One wonders why no provision has been made for the animal's comfort: there is no dry straw to lie on nor any feeding-trough. There are many break-neck places in Ceylon, but the "World's End" is probably the finest known. Leaving the road at a point where it emerges from the jungle and dips into a saddle, one has only a few feet to step down the grassy slope to obtain a splendid view of the panorama spread out beneath. Cautious movements are necessary: there is no railing to support one and the stunted vegetation growing on the brink would be of little use. With a fresh breeze blowing behind one it is advisable to plant one's feet firmly: the slightest movement to save a blown-away hat might land one fifteen hundred feet in the valley below. The sunlight gradually fades and the air gets colder, and though the thermometer in the resthouse porch marks only 62° the ample fire-place in the dining-room is attractive. After breakfast a tour round the garden was very enjoyable. It is seldom that one finds a garden in which the splendours of Western floriculture are to be seen grafted, as it were, on Oriental luxury, many of the flower-beds are raised on banks of empty beer bottles. The effect is striking and probably also beneficial from a practical point of view: few visitors can conscientiously say farewell to the Horton Plains without making an effort to promote the cultivation of flowers in such an artistic way.

GIPSY JOHN.

COCHIN vs. CEYLON COCONUT OIL.

THE following are the questions embodied in our circular :

1. Have you ever considered the reasons for Cochin Oil selling for 30 to 36 per cent more than Ceylon Coconut Oil ?

2. What is your opinion after having read the article in *Ceylon Observer*, 30th October? (See page 381 of this issue.)

3. Do you think it possible in your District to give the same attention to palms and kernels as is given by the Cochinese according to the description under notice?

4. Are objections or difficulties in your district?

5. In what Districts of Ceylon would you think the best results could be obtained?

6. Would you recommend a Ceylon Superintendent being sent to Cochin to note what is done there from beginning to end; the nature of the soil, cultivation of palm, etc.?

7. Or, would you recommend getting two or three Cochin natives accustomed in copra and oil-making to lead on local plantations?

8. Do you know of any Ceylon estate or district whose copra or oil is always superior to ordinary Ceylon oil, and approximates to Cochin?

9. Any other observations?

The following have been received from well-known planting authorities:—

(Answers.)

No. III.

1. Yes; and if you will look up the *T.A.* for 1895 or 1896 you will find that this question was discussed in the *Observer* and opinions elicited.

2. My opinion is that the great difference is almost, if not entirely, due to the large amount of stearine in the Cochin oil.

3. Quite. Although there is not the same long spell of dry weather; yet copra dried over coconut shell fires can be cured quite as white as sun dried.

4. None except the more frequent rains preventing copra being sun dried.

5. In Jaffna, Kalpenty, Batticaloa, and Chilaw, I am sure that copra quite as fine as any Cochin article can be, and is prepared in these districts.

6. Perhaps it would be advisable. There may be something done there of which we are ignorant, though I doubt it!

7. No; by no means.

8. Answered in No. 5.

9. I am afraid that the difference is due to climate and soil and perhaps, to some extent, to keeping the nuts for so many months before converting them into copra. Is there no reliable person in Cochin from whom information might be got? W. J.

No. IV.

Oct. 5.

1. The difference in price of Cochin and Ceylon coconut oil attracted my attention many years ago. The experts in the trade whom I consulted, referred the difference, partly to Cochin oil being richer in stearine, partly to speculation and combination among owners.

2. My opinion, confirmed by the *Observer* article of 30th October, is that a third explanation is to be found in the fact that most of our copra is smoke dried, much of it positively black, yielding oil which cannot be filtered white.

3. Not the same, perhaps, to kernels, because of the greater humidity of the air and the greater rain fall; but more attention than now. To palms the same attention can be paid as in the most favoured countries.

4. The special difficulty in the way of sun drying in this district is the absence of the sun for a good part of the year. Half the number of days in the year is wet or drizzly, and the sun is often obscured by clouds; but smoke drying is resorted to too readily.

5. In Jaffna, Batticaloa, Manaar, Kalpenty, and Puttalam. If the copra from these districts should sell distinctly better, not only because it is better dried through its long journey but because it is

sun dried, other districts would resort to open air drying whenever possible.

6. It would be an advantage, but it is not absolutely necessary. Cultivation is understood here and is being practised with good results—larger crops and thicker kernels.

7. That, too, may be desirable, but is not essential. Copra drying is a simple process and every one knows that well dried copra is more valuable than damp, and clean is preferred to dirty. There should be an incentive to greater resort to the sun than to fire.

8. The copra of Jaffna, Batticaloa, Puttalam and Kalpenty is generally superior to that of other districts because it is cleaner and better dried, and it fetches better prices, because it contains less moisture. The oil of one district cannot be compared with that of another, as there are no district mills and district oils.

9. For the above reasons I do not agree that it is merely a planters' question. If the mill-owner offers more for sundried copra than for smoke-dried, in order to prepare white oil as a speciality, there will be inducement for planters to avoid smoke or steam drying, except as a last resort. F. B.

No. V.

Nov. 4.

I have not had any practical experience in coconut oil manufacture—so cannot reply to questions 1—7. As regards (8) I can only repeat what I heard from Mr. O'Grady of Karativoe estate, who told me he took home some of his (checku-mill oil) and submitted it to some large dealers in London, who after examination assured him that it was far superior to ordinary Ceylon oil, and I think he said equal to Cochin; but that to secure a proper price it should come into the London market under some different designation than "Ceylon" oil.

On another occasion I know Mr. O'Grady made some very superior Copra for a local Chetty, who sent it to Calcutta (to be used he said for sweet-meats), but it took a lot of trouble and additional expense and did not pay.

So these facts show it is in the long dry season which prevails on the Eastern side of the that there island could be prepared a superior class of copra and oil.

Mr. O'Grady would give fuller particulars doubtless if asked.

I may also mention that in the Batticaloa estates, the nuts are left (I think for a month) in the (coir) husk before being split—which is done with an axe without removing the husk.

E. ELLIOTT.

No. VI.

1. For the reason that no endeavour is made in Ceylon to export white oil. I saw a sample of white oil in Colombo some time ago, which if exported, should approximate, if not equal, Cochin oil.

2. Except as regards any superiority due to climate conditions, there is no reason why Ceylon oil should not be as good as Cochin.

3. The attention given to palms on my estate is quite equal to that in the description you notice. In the treatment of kernels too, I do not see any difference between our methods and those adopted in Cochin except as regards the use of mats.

4. I believe there is not so much uniform sunshine here as in Cochin, hence we are obliged to have more recourse to fire. In drying by fire there is now no means of excluding the smoke, which accounts for the bad colour. If the smoke could be excluded by the introduction of some kind of Sirocco, I think much of our difficulties may be overcome.

5. Kalpitiya, Puttalam, Rajakadalawa and Chilaw should do well. I believe Jaffna and Batticaloa would also do, although I have no acquaintance with them.

6. & 7. I do not see any necessity of adopting either of the suggestions. Given good weather and good nuts there is no difficulty in making white copra.

8. No.

9. My experience is that nuts of estates on the seaboard make the best copra. I think this superiority is due to the presence of salt in the soil. If some means could be devised for obtaining salt at cheaper rates for manuring purposes and better methods of manuring are adopted, I think our nuts will not be much inferior to those in Cochin, and if some method can be devised of drying copra by means of a uniform heat without smoke, I think we will be able to manufacture a very superior oil in Ceylon. D. J.

We direct attention to two thoroughly practical communications discussing this matter below. One is from the Manager of a large plantation in the Rajakadalawa district beyond Chilaw, which ought to be specially favourable for sun-drying; and the other bears the initials of an old contributor who will be recognised as almost "the Patriarch" among coconut planters, at any rate in the Western Province of Ceylon. The former supplies a great deal of out-of-the-way information as to the careless, if not fraudulent way in which copra is treated by native owners and middlemen before reaching the mills; and both writers seem to make it evident that the Mill Managers are pretty well helpless in reference to reform—since they must take the copra as offered, and it would not be profitable for them to deal separately with small quantities of cleanly superior or sun-dried copra.

But "W.B.L." shows us very plainly how private estate owners in Ceylon, anxious to do as much justice to their nut-kernels as is done in Cochin, can accomplish their purpose. We infer from what he says that a "Sirocco" (or query "Dessicator")—or even a more primitive contrivance described by our correspondent—would enable copra to be properly dried even in our wetter districts; while in the drier series—which must have as many sunny days as Cochin—the result can be arrived at with a little care more simply and economically. "W.B.L." tells us of a proprietor of 200 acres of coco-palms who regularly prepared his own copra and manufactured superior oil from it on the estate, we suppose at a considerable profit over his neighbours' returns? With this example before them, we do not see why a good many individual planters should not go and do likewise and secure in the London market not £21 to £22 but £29 to £30 for their oil. "W.B.L." says it should pay to erect a Mill (with hydraulic presses) for 50 acres; but to make the venture safer, a Syndicate of proprietors owning not less than 1,000 acres—or why not a Limited Company buying up estates to that extent?—should be tried to establish a Mill to manufacture only superior Ceylon oil. No doubt, a distinctive mark would have to be adopted to secure due attention in the London market. With a margin of from 30 to 36 per cent. to go on, it does not seem to us that encouragement is wanting to deal with an enterprise of this kind.

(No. VII.—Answer to Circular by a
Rajakadalawa Manager.)

I have read the leader in the *Observer* of 30th ultimo with great interest. The superiority of the Cochin coconut oil, as evidenced by the high price it obtains in the London market, is a matter well worthy of our consideration and the remarks made in the leader are quite to the point. The opinions expressed on the subject by the authorities quoted are perfectly correct and that little remains to be added. Considering what

large tracts of land in Ceylon are under coconut cultivation and what vast quantities of copra are prepared, it behoves us to put our best foot forward and see if we cannot successfully compete with our rival, but what is the use of the energy and care of a few when the vast majority of the natives in this island engaged in the coconut industry are notorious for their apathy.

To make good copra, as made in Cochin, three things are of paramount importance:—1st, the choice of nuts; 2nd, mode of manipulation; 3rd, time of drying.

1. With regard to the choice of nuts—these should be thoroughly well matured and dry on the tree before plucking and of a dark-brown colour. Nuts that are so dry that they sever their connection with the parent tree by their own weight and fall of themselves are the best adapted for making copra. The Cochin nuts are so gathered and I suspect this accounts for the larger percentage of stearine in the Cochin oil. By this method two bunches of thoroughly matured nuts may be relied upon from a well-bearing tree and the third or less matured bunch may be left to form the first bunch of the next crop and so on. These nuts should be plucked once in three months instead of two months so as to ensure two perfectly dried bunches. The nuts when plucked should not be left in a heap longer than three weeks or a month by which time the kernel is so far desiccated that it comes away from the shell after a slight exposure to the sun and very often the moment the nut is split. Germinated nuts should be avoided if a first-class copra is to be turned out. The general rule in Ceylon is to pluck once every two months. I think this accounts for the inferiority of our copra, for immature nuts are bound to be mixed with the mature ones even on the best regulated plantations.

2. As regards the manipulation, nuts should be placed in a fierce sun as soon as they are split, care being taken that no sand or earthy matter adheres to the inner surface. Where practicable they should be placed on mats or cadjans till the surface moisture sufficiently evaporates, leaving a dry inner surface to which foreign substances cannot cling. This can be ascertained by passing one's fingers over the inner surface a few hours after the nuts are exposed. When this amount of dryage is ascertained and the kernels are detached from the shells, mats and cadjans are no longer needed, as the kernels may then be placed on the bare sand (the looser and whiter the sand the better) till thoroughly dried, without any fear of taint. Where large quantities of copra are prepared at a time it is not always feasible to effect the preliminary drying on mats and cadjans, but it is trouble well laid out when the ulterior benefit is taken into account.

In Ceylon the natives are very careless as to what becomes of the nuts in the splitting. They are split and chucked about anyhow, rolling over mnddy ground or dirty sandy soil clogged and damp with coconut water or over patches of cattle dung or any dirt that is lying unswept. The nuts are then spread out to dry with a large percentage of earth sticking to them thus indely spoiling their snow white appearance. The earthy matter leaves its stain and quantities of sand are embedded in the body of the kernel. This is regarded by the natives as the proper thing to happen as it increases the weight of the copra. I have seen sand actually thrown on the newly split nuts for this very purpose. How is it possible to obtain a good merchantable copra when men are capable of such nefarious practices? In some instances the coconut water is not all out of the split kernels when exposed to the sun, a small portion at the bottom is allowed to remain and evaporate slowly (as it is too much trouble to throw it out) and in this slow process of evaporation a sticky gummy substance is formed which clings to the bottom of the kernel and readily holds any rubbish that may eventually come into contact with it.

The kernels should be placed closely side by side to dry, but no nuts should be split after 11 a. m. as those split in the morning get the benefit of a full day's sun, whereas those split in the afternoon may, or may not, get a dry inner surface by the evening. This is an important factor in the drying process, for damp on the inner surface all night long is

apt to engender a sticky substance which may induce mildew before the sun rises next day and present a sorry appearance in juxtaposition with the better dried kernels.

The kernels should be placed in long narrow heaps about 8 inches deep and covered with cadjans before nightfall so as to prevent the dew getting on them, as any watery interference with the oleaginous surface is most detrimental to the unique colour of the copra. These heaps should next day be spread out again in the sun, as at first, and so on till perfectly dry.

Kernels dried on sandy soil dry quicker than those on ordinary hard ground, as the heat of the sand at the bottom is intenser than that of common earth, and helps to dry the kernel faster. A white colour is produced by hard bleaching.

When the kernels are well dried (which can be ascertained by a sharp snapping sound they make when doubled and pressed in the fist and by an even leaden hue perceptible in the broken portion where the escaping oil stains the outer surface) they should not be allowed to sweat too long in heaps. The sooner they are despatched to the mill the better for the oil they are expected to yield. Mildew forms thickly and rapidly and is most prejudicial to the making of a colourless oil; but with a nice, even, snow-white inner surface and a thoroughly sundried kernel, I don't see why good colourless oil should not be made in Ceylon equal to that of Cochin, provided no other copra of inferior quality is mixed with the good lot crushed. The heterogeneous mixing of all kinds of copra in the mills is a great evil. If good, bad and indifferent are all crushed together it is impossible to get any other than the amber coloured oil now in vogue, which, when coagulated, gives a palish yellow hue instead of alabaster white. The excess of stearine in Cochin oil, which makes it preferable for candle-making purposes, is, I suspect, due to the excellence of the nut and not to the superiority of the soil—an excellence attained by full maturity and a regular system of manuring the trees—for the soil of the west and north-west coast of Ceylon compares favourably with any soil in the world as a feeding ground for the coconut palm.

3. As regards the time when copra should be made I am convinced that the hottest and driest season of the year before the advent of the south-west monsoon (*i.e.*, between January and June) is the best, because it is the most reliable for heat and rainless days. Copra, to be white, should have no interruption in the process of dryage, save that of the night. It should run no risk—no heat but sun heat being used. If it has to be transferred from the drying-ground to be finished off over the "Attoowa" fire in the event of clouds or rain intervening, then good-bye to the hope of making a pure white copra. The smoke of the coconut shell-fire soon leaves its tell-tale mark on the inner surface and a browned, if not partially blackened, copra is the result. If the heat brought to bear on the kernels is not unique and continuous, a brownish tint is observable on the borders and this tint is bound to tarnish the oil expressed therefrom. Should rain-drops find their way to the copra whilst drying a spotted and motley appearance ensues and these spots of many colours, in the development of mildew, can never be removed, no matter how severely they may be subsequently dried. Undoubtedly the colour of the oil is affected by these accidents. Rain and dew are the enemies of copra and should be carefully guarded against.

In Ceylon copra is made all the year round and plays at hide and seek with all weathers and consequently much damage accrues; but given a good season of the year, a well matured nut, thorough cleanliness of manipulation in a powerful sun and careful handling in the mill, and it would be hard lines indeed if we could not compete with Cochin. Good white copra has been turned out from heating rooms, so well constructed as to be impervious to smoke and maintaining an equable temperature regulated by a thermometer. The heating room, if in good order, makes one independent of the weather, and if it involve no risk, should be resorted to by all proprietors of estates who turn their nuts into copra.

Nov. 6.

(Answer by an Old Coconut Planter No. VIII.)

Nov. 8, 1897.

Few parts, of the coconut districts of Ceylon, enjoy sufficient sunshine at all seasons, to dry copra without more or less damage. These unfavourable climatic conditions, are not the only causes of injury to this product, as it is usual to sell the nuts on the spot, to middlemen, who make a trade of it, and probably, three fourths of the crops of the Island, pass through their hands. It is of course their business to make as much profit as possible on their transactions, and as a large proportion of the original weight is moisture, it is an object to get it to market, with the greater part of the moisture retained. It is therefore put into a rude kin after a few hours in the sun, not to dry, but to be smoked which prevents mould and rot from setting in at once. Thus most of the copra brought to market, is discoloured with smoke, and contains at least 50 per cent of its original moisture. The large buyers, therefore regulate the price according to the average quality, the only distinction being boat and cart copra. This seems rather a curious method of arranging prices, but there is some reason in it; boat copra comes chiefly from the dry climate, to the north of the Mahaoya, where the drying process is less liable to be interrupted by rain, and if only half dry, when put into the boat, the drying goes on during the voyage of ten days or a fortnight, and, it is perfectly dry when it arrives in Colombo. On the other hand, the cart copra is collected from the country round Colombo, within a distance of say thirty miles, and consists of the smoked article of the traders, and the still more carelessly prepared produce of the villagers. I do not know whether any change has taken place, since I was familiar with the working of the oil mills, but then all copra that came in, was thrown in one heap, and taken to the stores as it came to hand. This produced a dark-coloured article which is still—I believe—the character of all Ceylon oil, and so it must continue, so long as the bulk of the copra comes through the trader and the villager.

Perfectly ripe nuts, cleanly and thoroughly dried, consists of 66 per cent oil, and of pounce 34 per cent. The chechu cannot extract more than 60 to 63 per cent of oil, but the grinding stones and hydraulic press can do more with the same material; but with the common quality of the copra delivered at the mills the yield must be much less. Perfectly clean and dry copra yields an oil, that in a glass, beside another of spring water, the eye cannot distinguish a difference. Whether Cochin oil is intrinsically superior to the produce of Ceylon, is a question for the chemist to decide; but there can be no doubt that clean colourless oil, would command a higher price in the markets of Europe and America, than the smoke-stained article now supplied. There is not however the least hope, that the trader and the villager, will spontaneously improve their methods, and the mill owners probably make more profit on the existing system than they would do by a superior article.

The only hope of raising the quality of Ceylon oil, lies with the Europeans who are going in for coconut cultivation, which they may do, by rendering themselves independent of the nut dealer, and the mill owner. It has been done before, and can be done again on the same or improved lines. A coconut estate planted in 1840 about 200 acres, owned by a non-resident European, manufactured all its copra on the spot, for over twenty years, with very satisfactory results. This was done by chechus; but a property of 500 acres, could afford to have its own mill, or several neighbouring properties might join in it convenient; at all events in a coconut district, nuts to keep the mill going could always be purchased, at current rates. Every coconut estate should have an apparatus, for artificial drying. Without that, no one can prevent copra all the year round, from getting mouldy and spotted. A sirocco would do first-rate; but there are cheaper means of attaining the end in view; anything will do that carries the heat without the smoke, say a sheet iron platform, with a fire of dry coconut husk, five feet lower giving out heat without flame, and raising the temperature of the chamber

above to 150 deg., which if kept up for 48 hours, will thoroughly dry the copra, and so clean and bright, that the oil made from it will be perfectly colourless.

Once on a time, the Engineer of one of the Colombo oil mills, showed me a phial of clean bright oil, which I duly admired, and asked by what process he had got it. He replied, that was his secret. Do you propose to take out a patent? I'll consider of it, he said. Well I think you had best not go to that expense, for I could show you tons, as pure as that, and any one is free to inspect the process; it merely amounts to this:—'clean copra makes clean oil.'

Ceylon may not be able to compete with Cochin in quality; but it is in her power, to make the best of the material she has to deal with, and thereby gain both credit and profit. W.B.L.

We append some half-a-dozen additional answers to our circular-questions on this subject, so closing the discussion for the present. We trust, some practical good will come out of it. We may say that the whole of the correspondence and remarks will be embodied in our forthcoming Coconut Planter's Manual. There can be little doubt, we think, that as regards both copra and oil from our dryer districts—Jaffna, Batticaloa, Kalpitiya and Chilaw—only, as Mr. S. C. Munro hints, "a bad name"—a confounding of the superior with the general character of "Ceylon" copra and oil—can account for the value being placed lower than for Cochin. If that be the case, it rests with proprietors themselves we think to get matters put on a proper footing. Let them obtain standard samples of Cochin oil and copra from their Agents, and then challenge comparison when they feel, in the dryer districts especially, that they have attained to the same standard. At the same time, experiments in the directions pointed out by "J.D.V." and other correspondents could not fail to yield interesting and perhaps, profitable, results. "W's" idea of using a "Clerihew" for drying copra in the wet season is a very good one, and we hope to hear of success.

Answers to Circular: No. IX.

AN OFFER OF WHITE COPRA TO COLOMBO,

Nov. 7.

1. Yes. The reasons given in your issue of the 30th ultimo, are to the point. We of Pallai turn out much better copra than estates in the South, but nearly all our copra used to be shipped to Cochin! At present there are no purchasers here for the Indian market. In consequence price of copra has fallen, and we have to sell to the oilmongers.

2. I think it quite possible to make good clean copra rivalling that of Cochin, and indeed our copra is perfectly clean and white. I don't think there is much room for improvement over the Cochin treatment either of soil or kernel, though we don't use mats on which to spread the copra.

3. Matting would be excellent, but expensive. We heap the copra on the approach of rain and cover with *kudals* made of palmyrah olas and jungle sticks.

4. The only disadvantage is, this copra, if not sufficiently dry, is apt to get soiled and discoloured by heaping. Perhaps tarpaulin would be better to cover with, without heaping the copra.

5. Best results can only be obtained in the districts where the rainfall is lowest like Pallai: 40 in. average per annum. In the South when the copra is fired, it is sure to be discoloured, and the oil expressed from it to be anything but limpid.

6. I am not quite sure if a Ceylon man could profit much by going to Cochin? I think it had better be left to individual effort.

7. However I won't speak dogmatically on the subject. But I certainly should prefer the course suggested in (6) rather than get Cochin run over.

8. I think it is quite clear from what I have already stated that Pallai copra is just as good as the Cochin copra. The oil here is perfectly clear.

9. I was about to write to you when this paper came to hand, *in re* the quality of the nuts.

There cannot be any material difference between these and the nuts of the Western or Southern Provinces, or even those of the Cochin Coast—at least so far as they contribute towards the clearness of the oil. The so-called "superiority" of the copra is simply the *whiteness* of the copra which is entirely due to careful preparation, and fine weather. We have from 8 to 10 months of dry weather, which people in the South don't have. Hence our copra is whiter and better in every respect. We spread out the nuts when split open on fine white hot sand, and the copra is thereby subjected to heat both on *top* and *underneath*. Thus the kernel comes out quite crisp and dry and perfectly white from the shell. It is only when we are disturbed by rain unexpectedly that the copra suffers and is apt to get discoloured and mouldy. It also gets soiled by being thrown about during heaping and then spreading out when the sun shines. The one problem that has been simmering in my head for the last 11 years since I settled here, is, *how* best to cover the copra *without* heaping it on the approach of rain. Tarpaulin might answer, but I have never tried it: and I am not sure if it is without disadvantages. My second question is what do we gain here in the North by our copra being whiter, seeing that we do not get a higher price for it than people in the South. Supposing we take more than ordinary care with our copra and make it extra white and clean, what are the chances of getting higher prices, and what should be done to secure that end? There being no demand for copra in Cochin, local merchants do not buy copra now. Our price is regulated entirely by the prices ruling in the Colombo market! It is as a rule 4 less per candy at Jaffna than the Colombo price, with its inferior copra. If, indeed, the Colombo Oil Manufacturers offer us sufficient inducement, I, for my part, can guarantee to supply good, clean, white copra, quite equal to the Cochin copra in all respects.

One disadvantage of spreading out the broken nuts on mats instead of on hot sand is that it does not get the benefit of the hot sand, and I venture to think that spreading on mats is not a very great advantage any way. I don't think the copra would be any cleaner by the precaution.

I dare say that in Kalpitiya and Puttalam they should be able to turn out just as good copra as here. Good well-matured nuts, (especially dropped nuts) *sun-dried*, without being exposed to rain, will make excellent copra. I don't think you have the climatic conditions necessary for the preparation of copra of superior quality, either in the Western or in the Southern Province.

JOHN F. PHILIPS.

No. X.

In answer to your circular on the above subject, the disparity between the prices for Ceylon and Cochin oil attracted my attention long ago, and I discussed the subject in the pages of a contemporary about a dozen years ago. It was then said that the reason was in the Cochin oil being richer in stearine than Ceylon oil. Coconuts in Cochin were said to be stored on covered *messas* or platforms, under which small fires were lighted, till the nuts were quite dry and had absorbed all the water or milk in them. They were then converted into copra. Of course this method of dealing with coconuts can be practised only by small peasant proprietors and is not possible on large estates which have to deal with hundreds of thousands of nuts at each picking, and when two crops are on the ground at the same time.

I think the proprietors of the large oil mills in Colombo will be able to inform you whether Cochin oil is richer in stearine than Ceylon, and how the white oil they turn out compares with Cochin as regards prices.

The communication of the retired Colombo merchant is very interesting and instructive. What he says about the application of ashes to the coconut tree only supports Mr. Cochran's recent analysis, that Potash is the leading mineral constituent of the coconut palm. Potash manures ought to be the principal manure for coconut trees, especially in sandy soils which are poor in potash, but not I think the only manure. It is gratifying to know that I am practising the style of cultivation which he says is practised successfully in Cochin, i.e., turning up the soil round the trees and leaving it in little clods. The advantages of thus aerating the soil are too apparent to need explanation. I always dig in manure round the trees, and do not apply it in circular trenches, and I leave the clods of earth as they are. Further, to prevent them from being battered down by the rain and caked by the sun, I use a mulch of coconut leaves and weeds. The loosened soil is then kept free and open for a considerable period. This is especially important in heavy soils which cake as hard as cement in dry weather. A friend, who followed my advice on a heavy soil, was full of the increased freeness and porosity of the soil which resulted from this treatment.

What your merchant friend says of the color of copra from germinated nuts is true. Desiccating mills will not use these as the stuff turned out is quite yellow. Copra likewise from these is quite discolored and if dried over fires turns out black. Of course it is not possible for large estates to dry nuts on mats, but barbacues are possible and should, I think, be made on every estate making copra. The disadvantages of keeping nuts to be cured till dry weather sets in, are that left out as they of necessity are in the open, the bottom layer of nuts go bad or germinate even when the nuts are well spread out.

2. There is the delay in realizing their value. I think that with a little attention means could be devised to dry coconuts white over fires. That this has not been done yet is, I think, a reproach to all coconut planters. I know of experiments that have been made but have been unsuccessful owing to sufficient thought not having been bestowed on them. Fire or smoke should not be allowed to come into contact with the nuts, especially in the earlier stages when they are not quite dry as they then get readily discolored. I think a simple plan would be to have sheet iron immediately under the platform of "waratchies" on which the nuts are placed.

Unfortunately everything on a coconut estate is done on the "cheap Jack" system. On coffee and tea estates expensive stores were and are built, and much money spent on up-to-date machinery. Not so on coconut estates. Everything is of the most primitive kind, and "cheap and nasty" is the rule.

3 and 4. Quite possible to give the same attention in this district and elsewhere to copra curing and cultivation as in Cochin, but since I came here we have had very little continuously dry weather. If after coconuts are split they have not two days at least of fine dry weather the copra gets mildewed. But after this, fire drying does not discolor the stuff.

5. Puttalam, Calpenty, Jaffna, Batticaloa and last Chilaw.

6 and 7. Hardly necessary. Copra curing is well-known here and we can dry white given the weather and failing that proper appliances, i.e., a well-fitted hot room.

8. Calpenty copra always ranks first in the Colombo market and Marawila second. I do not know whether Jaffna and Batticaloa copra fills a large place in the Colombo market, but if it does there is no reason why it should not be classed with Calpenty.

9. Answered fully in the beginning of this paper.

I do not think it advisable for the copra to be in direct contact with the fire-heated iron sheets. If a "messa" of "waratchies" will not live over the heated iron, wont perforated iron do?

B.

No. XI.

1. Yes, but could not fathom it, as some years ago, and (I believe even now), all copra from Jaffna was shipped to Cochin and the oil extracted there.

2. My opinion is, that it is not so much the copra that is to blame, but the mode of extracting the oil.

3. Yes.

4. No. Considering it to be the driest district in the island more or less.

5. Jaffna and Batticaloa.

6. Certainly. A good idea.

7. Certainly I should also recommend getting some Cochin natives.

8. No.

9. I do not think the tint observed in the oil has anything to do with delay in collecting and making into copra, and nuts should always be allowed to lie in husks for at least a fortnight or three weeks.

T.

No. XII.

November 11th. 1897.

1. Yes, and in my opinion

2. The vast difference between the price of Cochin oil and Ceylon is due principally to the better quality of copra the Cochin country is turning out.

3. I do not see why in dry districts the palm should not enjoy the same attention as it does in Cochin, and so with the kernels, if not all the year through at least most part of it.

4. My district is one of the wettest and in such localities unless expensive factories are provided, with rooms heated by steam and free of smoke, the quality of the copra must be inferior to that of the dry district. It is unquestionable, though, that with care and cleanliness our present means should be sufficient to secure a quality of copra nearly as good as that now produced by our dry districts, and these in their turn go much nearer to Cochin. The colour of copra does not depend solely on the means of heat (sun or fire), but a great deal on the handling while curing. In wet districts it is in fact a matter of repeated handling and shifting from the drying ground to the drying tray, layer upon layer, and from this again to the ground. It is during this handling that the fibre dust of the shells, and other dirt sticking to the gummy kernel spoil the appearance of the copra. This could only be avoided by having commodious hot rooms with plenty of trays where only one layer of kernels should be spread, but as long as our copra must be heaped up on a single drying tray eight to ten layers, one over the other it will never turn out clean.

5. This is not the case in dry districts, where the split nuts once spread out on a mat to dry, and simply covered at nights, can be left there until ready. Those districts certainly should be able to give better copra than what they give at present.

6 and 7. Systematical, clean sun drying, or improved accommodation for artificial drying, and well matured nuts are, in my opinion, all that is wanted; hence not much to learn in Cochin, by a superintendent from Ceylon nor from a Cochin man here.

8. No, but I know of one estate in a wet district (with 128 inches up to 31st October) obtaining for its copra as good a price as Maravilla.

A NEW HAND.

No. XIII.

1. I have.

2. The principal cause is a bad name as regards the oil of this district, Batticaloa.

3. It is always done.

4. None.

Batticaloa, Jaffna and Kalpitiya

6. I would not.
7. No.
8. Batticaloa, Jaffna.
9. In Buenos Ayres foreign wool growers can never obtain Australian prices from the bad name due only to the filthy condition of native wool.

S. C. MUNRO.

No. XIV.

1 and 2. Dr. Watt in his Dictionary of the Economic Products of India, says that to produce fibre of the purest hue the green or unripe coconuts, *i.e.*, about ten months old, are used in South India,* and it may be that in this fact we have the explanation of the superiority of so-called "Cochin oil," with reference to which, too, Dr. Watt says that "he is almost forced to the opinion that by 'Cochin oil, as with 'Cochin coir,' may be meant the superior qualities of the oil derived from the Madras Presidency." Several gentlemen connected with the coconut industry of South India have told me that nuts are not allowed there to thoroughly mature before they are plucked, as the fibre of the immature nut is so much superior to that of the mature, and the oil, though less in quantity, is superior in quality. Another difference from Ceylon practice pointed out to me was that the nuts are not allowed to wither as with us for two to four weeks (and sometimes even as many months waiting for better markets) before they are husked, but are husked within a day or two of their being plucked for the sake of the fibre from the green husk and presumably the kernels are dried at the same time as well. Ceylon experience in the preparation of cooking oil and hair oil also shows that a superior white oil is obtained from the immature or rather partly mature nut. Our cooks, too, prefer such nuts in the preparation of curries. A careful series of analyses of samples of best and monsoon Cochin and of Ceylon oils extracted from nuts at various degrees of maturity and withering is very desirable.

3 and 4. The Ceylon growers and dealers would be only too glad to pluck their nuts earlier and dry them sooner, if it be the fact that less maturing on the trees and withering in the heap, would pay them better. But as for more careful preparation of copra than is the practice now, I do not think that is likely.

5. In the drier districts, that is where the air is least humid, Jaffna, Kalpiya, Puttalam, portions of the Kurunegala district and Batticaloa.

6. Yes. Will W. J. oblige? His long experience, open mind and clear judgment would be invaluable in such an investigation.

7. We have a large number of Cochine working our chekkus and at our oil mills, and I suppose they are also to be found in our larger gardens.

8. Answered in 5.

9. I shall test on a few acres the value of "pruning" off the stalks that have borne fruit. Does the sap continue to nourish these stalks? If so, the advice to prune, seems sound; but would the bleeding of the sap not attract the red beetle?

J. D. V.-d-S.

No. XV.

1. Ceylon can produce as good oil as Cochin. The fault is that the men do not pick the nuts when mature. Natives as a rule send small quantities to the market, and the market people make copra from all sorts of nuts which are discoloured by their method of drying and smoking them. I am of opinion that we should dry our copra in a Cleihew's patent, similar to that used for coffee and the husk and shell could be used as fuel. Mr. Levy of Levy Bros. & Co. told me that they kept the coconuts on a shelf above a fire-place for two months and this caused the oil to be clear and good. I have seen some oil extracted from desiccated coconuts which was as clear as water. I mean by and by to have a Cleihew's patent and to dry my copra by hot air.

* Nuts mature with us when about 12 months old.

2. We must dry our coconuts in the sun or by steam.

3. Certainly. I for one will do it.

4. No. Where there is a will there is a way.

5. If we dry our coconuts by hot air and carefully pluck, I believe all the districts in the island will produce good results. In Jaffna, Batticaloa, and these places the copra is better simply because it receives more attention than in the other places.

6. I do not believe there is anything to be learned.

7. No.

8. No.

9. I am fully convinced that if our coconuts are dried by sun the oil will be every bit as good as that of Cochin.

W.

SOME TEA FACTORY DEVELOPMENTS
IN CEYLON.

Much has been recently written about the over-production of tea in Ceylon by the opening up of new land, and the fear of a lowering of prices by the increased output. While the discussion has not particularly affected (if at all) the arrangements to open up more land for tea, it has neither prevented an extensive additional expenditure of money in connection with further accommodation and improvements for an increased output of tea in the principal tea districts of Ceylon. This does not apparently indicate that there is much deep conviction that tea production is being overdone, and that the industry has come to a precarious position in view of increased output, low prices, and high exchange. It rather indicates a commendable determination on the part of many proprietors of estate property that not only shall their properties be maintained at the highest attainable productiveness, but also that the cry of deterioration in the manufacture of the tea shall cease to be true, if at all true, in the case of their estates. It is an undoubted fact that want of proper factory accommodation for tea manufacture is not only (to use an Irishism) an expensive economy in regard to output, but that this want of accommodation results in the production of an inferior quality of tea. This has been proved over and over again. We are glad to see these and other indications of wideawakeness in consolidating the industry, and hope the efforts to maintain and improve estate factories as indicated below, will prove, not only commercial successes to the engineering firm concerned—an important local industry in itself—but will stimulate other tea proprietors to similar efforts for the general improvement of the quality of our staple industry. It was with these reflections that the activity in regard to Factory accommodation was brought to our notice recently, and now we are pleased to give some particulars as follows:—

Among the engineering firms of Ceylon, Messrs. Brown & Co. of Colombo, Hatton, Norwood, Maskeliya and Nawalapitiya have recently shown great energy and push in regard to business extension. While the Hatton branch is generally full up with heavy work, the branches at Norwood, Maskeliya and Nawalapitiya are also busily pushing on with the lighter, though not less important operations, incidental to factory additions and buildings in extensive and important planting districts. Their principal branch at Hatton is under the efficient management of Mr. J. Grieve, who has also a general control over the branches; Mr. R. B. Stewart is engineer in charge at Norwood, Mr. Geo. Brown is engineer in charge at Nawalapitiya. The Hatton branch (in the charge of Mr. Grieve) of Messrs. Brown & Co.'s engineering business is the largest. They have over one hundred and fifty hands constantly at work there. In spite of ex-

tension to Norwood and Nawalapitiya, there is little decrease in the work turned out. Here all the heavy iron castings are done, besides other heavy iron work, and it forms an important centre from which the other branches can be worked.

Among the engineering work at present in hand is a complete factory for the estate of Ferham in the Dimbula district. The factory will have an output capacity of 150,000 lb. made tea. It is to be 40 feet by 84 feet in size. The motive power is to be a 14 horse-power oil engine, and a full complement of tea machinery is to be erected.

Wanarajah factory is having an extension of 60 feet by 40 feet made to the main wing.

An entire remodelling of Tunisgalla factory, Rangalla, is in hand, with an addition of 100 feet by 40 feet. There is to be laid down for this factory a 20 horse-power Pelton wheel.

At present the Norwood branch is exceptionally busy with a large number of orders from estates in the surrounding districts, and Mr. Stewart has his hands full for some time to come. Among the orders in hand are the following:—

A new factory for Gangawatte estate, in Maskeliya. The factory is to be 87 ft. by 40 ft., and like almost all new factories is to be built principally of iron with the roof the full 40 feet span. The motive power is to be a Pelton wheel of 20 horse-power, working under a 240 feet fall. There will be two rollers, one a 32-inch "Rapid" and the other perhaps a smaller one, two driers, one a down-draft No. 3 desiccator, Brown & Co.'s sifter and roll breaker (invented sometime ago by Mr. Stewart himself). It is expected that the capability of this factory will be a 200,000 lb. output.

Another order in hand is for Forbes estate in the same district where they are partly converting an old coffee store into an extension of the tea factory. Additional motive power is also to be introduced in a 15 horse-power Pelton, driven under a 630 feet fall. This is supplementary to a 10 nominal horse-power steam engine, put in some time ago. Last year a full complement of machinery was put into this factory which included, two 32-inch "Rapid" rollers, two No. 3 desiccators, sifter and roll breakers. In connection with the introduction of the water power, 1,900 feet of 5-inch diameter top-welded steel piping will be used, besides 500 feet open spouting to bring the water along the edge of a precipice to the piping.

In the Agras, Iona estate is having erected a very big factory 60 feet by 30 feet for which Norwood branch has secured the iron work contract. The girders are to be carried across the whole building without support in the centre. There is to be installed an 18 horse-power turbine and other machinery to turn out a total of 170,000 lb. of tea.

Another factory in the Agras for "Caledonia" estate has just been finished. It is almost similar to the Gangawatte estate factory already referred to, and has a 20 horse-power turbine, with a 16.3 feet head of water.

A 20 horse-power turbine is being laid down for Kotagalla estate, Bogawantalawa. At present this factory has a 30 feet water wheel and this turbine is therefore supplementary.

The iron work of a factory extension of 60 feet by 48 feet on Bogawana estate, Bogawantalawa, is another order in hand. There is also to be a 25 horse-power turbine and some new machinery laid down, which will entail an entire rearrangement of the present factory machinery.

An extension to the factory of St. John Del Rey estate, all iron, and 40 feet by 40 feet, has just been finished.

It is only ten months since Messrs. Brown & Co. extended their business: since then Nawalapitiya has become quite an engineering centre under the able management of Mr. G. L. Brown. An extensive workshop with engineering plant has been erected, and a pile of work is being turned out there. Since Mr. Brown went to Nawalapitiya, Little Valley and Ardross have been supplied with Pelton wheels.

A complete factory with a steam engine and 24 horse-power boiler is being completed on Rattewatte estate.

Donside, Gampola, is having a new factory built, for which Messrs. Brown & Co are preparing the ironwork.

A new and extensive withering-house is being built on Sanquhar estate, Gampola. The size will be 76 feet by 35 feet.

Mount Temple estate, Gampola, is having an important addition to its machinery.

A Pelton wheel of 15 horse-power, under a 490 feet fall, with its connecting water course and piping is to be laid down on Raxawa estate.

Tellisagalla estate factory, Kotmalie, is to have an extension of some dimensions.

A Pelton wheel is to be installed at the factory of Dangkande, Rangalla.

The erection of new machinery cannot go on for ever; Messrs. Brown & Co. by having machinery at every branch have laid the plaut down, so that they are able to cope with machinery repairs of any description on the shortest notice. One of our representatives was shown round the Hatton and Norwood establishments the other day, and was surprised at the various and large quantities of stores kept in stock. Mr. Grieve informed our representative that they had been slightly inconvenienced in the engineering department by the slip, but that, owing to their large stocks and the goodness of the Railway Company, they had not suffered much inconvenience in the store department.

In connection with their large store at Hatton, the firm has a most efficient aerated water manufactory, fitted up with some of the latest appliances for rapid work. Owing to the slip they have recently been working at high pressure to keep up with the demand for their aerated waters.

The Colombo headquarters are mostly used for forwarding and commercial purposes. The other places have not only engineering works, but the firm have attached to each a general store of large dimensions from which they do a large and increasing business. Mr. Pearson stationed in Colombo, controls the store business and acts in the capacity of Commercial Manager.

PLANTING NOTES.

CHOLERA AND PLANTERS.—The Indian Tea Association has, we understand, recently engaged the services of a Dr. Mulheim in introducing his cholera specific in the coolie depots. The Doctor has accepted the moderate remuneration offered him *i.e.*, £150 a month and all his travelling expenses for three months, and proceeds to Gauhati.—*Planting Opinion.*

SALE OF A COCONUT ESTATE.—Mr. Bastian Fernando, plumbago merchant of Kollupitiya, has completed the purchase of a coconut estate about 300 acres in extent at Haldanduwana, in the Chilaw district, from certain villagers, about 30 in number, who held the land in common. The estate is fully planted, part of it being in bearing, and is situated opposite to the Ceylon Tea Plantations Company's property in the same district. The price paid was £60,000, and the negotiations were carried to a successful termination by Mr. Ekaayake Mudaliyar, the well-known broker and commission agent.

COFFEE: MARAGOGIPE HYBRIDS.—A Nilgiri planter draws attention to the good effects of hybridisation. He writes: "I was much struck with the good return of last season's coffee from one of my places, and pleased with the large proportion of A. A. size. I attribute it to my having some years ago filled up the vacancies with Hybrid Maragogipe plants. The neighbouring plants seem to have been 'inoculated,' so to speak. I have a field of 5 acres of them just coming on. They are remarkably healthy and free from disease. There is no doubt about it; we have gone on too long planting Arabica, and the introduction of a fresh strain is desirable."—*Planting Opinion.*

TROPICAL PRODUCTS.

Mr. Raoul, chemist, who had been commissioned by the French Government to go to the Malay States in order to discover the plants which might be of utility for supplying raw materials to industry and commerce, has just returned. The mission of which he was the head was able to penetrate into unexplored forests, and to bring back some valuable plants destined for cultivation in French possessions. These consist of new textiles, india-rubber, some species of gutta-percha, some of the latter quite unknown as yet, some trees producing vegetable butters and greases, oils, resins, varnishes, and tannins. The immense island of Sumatra, which was visited, is almost unknown in the interior. There the mission found veritable riches, amongst which gold, which they were not seeking, and have located the presence of petroleum and discovered immense forests of trees, producing resin, india-rubber, and gutta-percha. All that wealth remains unutilised for want of workers, because the natives are apathetic, ignorant, and cannot be employed as labourers.—*London & China Express*.

PRODUCE AND PLANTING.

RUSSIAN CENTRAL ASIA AND ITS TEA TRADE.—In the last report from the British Consulate-General at Meshed some space is devoted to the tea trade of Russian Central Asia. Tea and indigo are the two main exports to these regions from India. Russia has now begun to cultivate tea in the Batum district with some success, but, although it is said that tea enough to satisfy the requirements of the Central Asian market will be produced here in time, it is evident that the Russian planter will not be able to compete with the Anglo-Indian for a long time to come. The bulk of the tea from India and China into Central Asia now goes by the Batum route in place of by Bandar Abbas and across Persia. At the end of last year it was stated in Bokhara that the Russians were trying to deprive Bombay of the trade in Chinese green tea by creating a direct demand between the Bokharan dealers and Russian agents in China, and also by inducing the Peshawar merchants trading in Bokhara to purchase in China and import by Batum. As the latter were representatives of Indian firms, they did not alter their commercial routine; but it seems clear that there is now direct communication between Russian houses in Bokhara and in China and direct purchases and sales between them, mainly of green tea, consignments being shipped direct to Batum. This involves loss to India, where great profit was made by importing green tea from China and then exporting it to Central Asia. But India has not lost the trade yet by any means. Indian traders in Bokhara continue to make their purchases in Bombay, and have them sent by Batum in place of Bandar Abbas. Thirty-six to fifty days is the time taken from Bombay to Bokhara by Batum. This is much shorter than the Persian route and the cost of carriage cheaper; but the Batum route is said to be unpopular with the Indian trader, for he has to pay the customs duty in cash at Askahad or Bokhara immediately on the arrival of the goods there, whereas by the Persian route the Persian forwarding agents paid all duties and charges and recovered them afterwards from the consignees without requiring any advances. Hence Indian traders are making inquiries about the new route from Quetta through Seistan into Khorasan, as they think it might suit them better than the Batum route. The Indian traders residing in Bokhara are natives of Peshawar, Rawal Pindi, and other Punjab districts, and prefer buying near their homes in India. Hence it is suggested that the tea planters in Kangra, Dehra, and other places

in India should endeavour to recover a trade which was wholly in their hands twenty years ago. They can beat the Chinese green tea imported by Russian traders, for their tea is of better flavour and cheaper, especially now that the Indian tea will have no heavy Afghan duties to pay by the new Seistan route. But it will not do to wait for the traders to come to the Indian gardens as they used to do; the purchasers must be sought out in Quetta, Karachi and other places in Upper India. In this way the Indian planter might be able not only to secure the green tea trade of Central Asia, but also a trade in black tea in the Seistan and Khorasan markets, and perhaps elsewhere in Persia. "Were a European Persian-speaking commercial agent deputed by the Indian tea companies collectively to travel in the country to study Persian tastes and ascertain the quality of the tea that may be in demand, and then to advise them to produce suitable tea especially for the Persian market, and make arrangements for its direct export and sale through a central depot in charge of a European or trustworthy Indian agent, the Indian tea trade with Khorasan might be expanded to a large extent even now."

A TRAVELLER'S TALE.—The opponents of tea drinking, who are always on the look-out for an object-lesson wherewith to point a moral, can find one if they turn to the columns of the *Boston Traveller*. As that journal may not come within their range of vision, we supply an extract from it referring to the case of Peter Schultz, an old man who has just died in a New York work-house. Peter, according to the *Traveller*, was a great tea drinker, and visitors to the almshouse encouraged his fancy by sending him many packages of his favourite leaf. Schultz was a hard drinker before he went to the almshouse, but it was of something stronger but apparently not more potent than tea. His reform and his affection for tea pleased the missionaries and good folks generally who visited him, and hence the many gifts of Oolong and Japan. But they did not know the truth. Schultz used to boil a great quantity of tea down to such a degree that the result was a potion that would have eaten away the stomach of an ordinary man. He increased the frequency and strength of his dose and soon became a tea drunkard. His nerves began to trouble and he "saw things." He was believed to have nephritis and was treated for it. One night Schultz partook of tea more liberally than usual, lit his pipe, and fell dead. At the autopsy it was discovered that his heart was fractured. It had been stimulated too much with tea and had broken under the strain. That is the plain English of it, the medical terms being left to those who deal in them. Otherwise than this fracture Schultz's body was that of a man in fine physical condition. He was a victim to his over thirst for tea. Heavy drinkers of the beverage whose nerves trouble them should learn a lesson from the experience of old Schultz. Perhaps Oolong and Japan kill more effectively than Indian and Ceylon teas; but even the latter, when boiled as Peter is supposed to have manipulated them, are not good for the constitution.

THE POSITION OF COCOA.—Cocoa is advancing in popularity, and in the import market it stands well. The *Grocer* points out that its appreciation is not confined to a single set or class of consumers of one special or isolated nationality, but extends far and near, and, after winning favours from the British population of both high and low degree, it is fast making a conquest of the palates and likings of foreign drinkers of the beverage in Eastern Europe. Especially is this so with the Germans, who have become eager patrons and increasing quantities every month. No separate official returns are given of the countries abroad to which cocoa is shipped from the Port of London, so that we cannot trace from official figures its destination, or form an opinion as to which part of the Continent is the best customer for cocoa after it leaves the United Kingdom. But, in the

absence of such authoritative particulars, it may be interesting to state that statistics are prepared from private documents as to landings and deliveries of cocoa in London, and they afford some criterion of what is the extent and nature of these movements, as compared with the entries in the previous year. First, then, we may state that the total exports of cocoa from London this year up to date have amounted to 76,700 bags, in contrast with 59,700 bags in 1896, showing an increase of 17,000 bags. In addition to shipments on an extended scale, there have been clearances for home consumption also at an advanced rate, bringing the aggregate at the present time up to about 118,000 bags, against 106,000 bags in the forty-one weeks last year, which exhibits another gain in the delivery of 12,000 bags, making, with the 17,000 bags above mentioned, an augmentation of 29,000 bags in the joint deliveries of cocoa at this port during 1897. The latest official accounts, carried up to the end of September, furnish similar comparisons, stating the duty payments in the United Kingdom to be on 20,667,905 lb. in lieu of 18,443,463 lb. last year, and returning the quantity exported as 11,020,787 lb. instead of only 8,752,442 lb. in the first nine months of 1896.

KEW GARDENS AND TROPICAL PLANTS.—The “excursions of the Right Hon. Joseph Chamberlain, Secretary of State for the Colonies,” are credited by the *Kew Bulletin* with being chiefly instrumental in securing for the Royal Gardens at Kew a very important extension. Kew is well supplied with accommodation for plants requiring the temperature of the stove and cool green-house, but has long wanted an “intermediate house” of larger dimensions than the conservatory. This, thanks to Mr. Chamberlain’s kindly interest, has now been supplied by the erection of the new south wing of the Temperate House. It is intended to devote this wing mainly to large specimens of economic plants, such as the mango, guava, cinchona, sisal hemp, and so on. It will have largely a Mexican character, and will house a great many interesting flowering shrubs previously excluded. A new north wing about to be erected will be devoted chiefly to Himalayan plants. —*H. and C. Mail*, Oct. 29.

THE PUTUPAULA TEA ESTATES COMPANY, LIMITED.

The Annual Ordinary General Meeting of the Shareholders of this Company was held on the Nov. 10th. at the Office of Messrs. Aitken, Spence & Company, when the following report was submitted:—

DIRECTORS.—Edward Aitken, Esq., Gordon Spence Esq., W. B. Kingsbury, Esq.
SUPERINTENDENT.—H. A. Tippie, Esq.

ACREAGE.			
Tea in bearing	..	391	Acres.
“ „ partial bearing	..	30	“
“ „ under two years	..	33	“
Liberian Coffee	..	10	“
Forest—			
Grass &c.	} ..	235	“
Waste land	} ..		

Grand Total .. 699 Acres.

The Directors beg to submit to the Shareholders the accounts for the year ended June 30th last.

The crop amounted to 155,593 lb. tea (against an estimate of 165,000 lb.) and 8 bushels Liberian Coffee. The net average price realised for the tea was nearly 39 cts. per lb. The Coffee sold for R67.69.

The estate suffered during the year from unavoidable change of management, Mr. Tippie having been invalidated home from July to end of April; the crop was short of estimate as above; and, added to this, there was the depressed state of the tea market, aggravated by high exchange, all combining to show poor results.

R3,312.00 were spent during the year in manure which has been charged to expenditure.

R3,000.000 were spent on the 36 acres young tea clearing and have been charged to capital account.

The net profit for the year amounts to R2,960.00, and, with the balance brought forward from last year, the balance at credit of Profit and Loss Account is R7,786.94.

The Directors recommend that as no working capital was provided for at the formation of the company, and as the charge for interest during the past year was, owing to dear money, very heavy, no dividend be paid; but that the balance at disposal R7,786.94 be carried forward.

The estimate of crop for the current year is 170,000 lb. on an estimated outlay on working account of R37,280.

In terms of the Articles of Association Mr. Spence retires from the Board of Directors and offers himself for re-election.

The appointment of an Auditor for the current year will rest with the meeting.—by order of the Directors, AITKEN, SPENCE & Co., Agents and Secretaries.

OVERLAND TEA.

One by one our cherished illusions are being dispelled, our idols shattered, our preconceived notions destroyed. When the reign was young we learned as an irrevocable fact that tea coming overseas gets spoiled, and that the Russians, recognising this, refused to use the dried leaves of the aromatic and pungent shrub if they had crossed the stormy waters. There was justification for this belief, so far that the overland system has continued to this day, and caravans are now on their way from China to Russia which will travel many months and over many leagues ere the buyers get acquainted with their load. But a change has occurred in these later days—the charm has been broken, and, as might be expected, it is English enterprise which has done it. Messrs. R. M. Moir and Co. could not see any reason why China tea should not reach Russia via England and penetrate to Siberia keeping yet its original fragrance. They organised an expedition to the Obi and the Yenesei to prove their contention, and in the last week of July a little fleet left London on its reforming mission. After seven weeks’ voyage, the Kara Sea was passed, and Tieman reached, and those in charge of the venture were very anxious as to how the brick tea from Hankow which had been put on board in London would show up before the *connoisseurs* gathered together to test its merits. Singular to relate, not only did the tea commend itself to the judgment of those qualified to judge, but they were even forced to admit that the condition in which it had arrived was superior to that they were accustomed to in the consignments by the all-land route. It was an eye-opener to them, as we can well imagine, to get tea in four months from Hankow which has hitherto taken six times that period to reach its destination. Moreover, this new route is incomparably cheaper. Those who go down to the sea in ships have gained another victory. The fleet has returned from its voyage laden with golden grain and jubilant at its success, and no doubt is entertained that the future Siberian demand will be met in the new way. Thus the overland tea, the pride of Russia, the erstwhile envy of the *connoisseurs*, is to become a thing of the past, and the British flag is to float over the tea imported into the dominions of the Czar of all the Russias. Moreover, the same ships which convey these “bricks” can carry the products of British Indian tea gardens, and the slow process of conversion which Russian taste is undergoing in respect of its tea be quickened, to the benefit of the colossal trade the last decade has seen built up by British capital and British industry.—*Grocers’ Journal*, Oct. 23.

EXCHANGE AND PLANTING MATTERS. THE VIEWS OF A SOUTH INDIAN PLANTER.

Mr. G. L. Acworth, late chairman of the United Planters’ Association of South India was last month in Ceylon having booked his passage from Colombo to Europe by the P. & O. ss.

“China which left on the 18th. Nov. He had been subjected to the interviewing process, in the course of which he expressed the opinion that his successor was mistaken in his view that the Government of India should impose an export duty of 5 per cent., being convinced that if exchange dropped to a shilling the export duty would have to be considerably higher than 5 per cent—probably 10 or 15 per cent. The difference between the actual and artificial value of the rupee meant that the planter was then really paying an export duty of 52 or 53 per cent. The Government must resume their council drawings to meet their obligations and exchange must then fall. He did not think there was the slightest possibility of the mints in India being reopened without agitation, but the West coast traders were against agitation as they were remitters and desired a high exchange, and they shipped a class of goods for which there was always a steady market which did not come into competition with other silver-using countries.

Referring to tea cultivation he said it was extending very rapidly in Travancore and the Wynaad and he hoped it would continue as he was interested in the sale of tea seed. One of the advantages of buying tea from Travancore instead of Calcutta was that they could get it at all times of the year and perfectly fresh. He had already sent to Ceylon through Mr. Cole, formerly of Ceylon, and now in Permaad, a number of leaves, and had brought a great many himself picked at random. They measured from 10 to 12½ inches in length. The parent trees from which he got his seed were about 35 years old and there was not a hybrid plaut within 20 miles of where they were planted. They were raised from wild seed from Assam. In the Wynaad he expected there would be a boom in tea in two or three years. As to labour supply he believed the cry there was one of “wolf.” What however handicapped them in Southern India was the drought. As to Coorg they were beginning there this year. He added:—In Travancore my district, you must remember, is different from that Messrs. Finlay, Muir & Co. are working in. Our district was opened 40 years ago, and we are favourably off as regards roads and general conveniences, our produce being sent to Cochin, which is an excellent port where we can get direct freight home once a month, and freight *via* Bombay home twice a month. Messrs. Finlay, Muir & Co.’s district is a new one. The land was originally entered by one or two men after it had been attempted by the North Travancore Land and Plantation Company, but these few men had not means enough, and were not numerous enough to combine, and thoroughly open the district, so that Messrs. Finlay, Muir & Co. had practically a new district to develop. But they are going ahead fast, and their coming has been the greatest possible boon to the district. The place is now practically all Finlay, Muir, as they bought out the private properties, with the exception of those in the lower part of the district—particularly Mr. Knight and Baron Rosenberg, who are largely interested in cinchona, though Mr. Knight is going to open everything.

Referring to the labour question he said:—“Well our great trouble now is in recovering lost advances. There are a large number of fraudulent contractors, and the matter became so serious that we sent a special deputation to the Viceroy in 1895 and he granted a Commission

of Inquiry consisting of two Civilians and one planter to inquire into our grievance, and they wrote a very strong report in our favour, which was considered this year by our Planters’ Association, and had our very cordial approval, and it was sent to the Madras Government, and has been passed on to the Government of India, and we hope if Plague and Famine do not stop the way, the Government of India will legislate in this present session. What we principally hope for is to have registration of kanganies. A man would have to hold a certificate as a properly authorised kangany to collect labour, and the name of this employer would be endorsed on his certificate, and we hope and have asked that the rule may be made applicable to anyone. Registration of kanganies is the chief thing we have asked for, but there are other matters such as increased punishments for thefts of prædial products and some minor changes.

“Lastly,” said Mr. Acworth, “I should like to say a word about the healthiness of Travancore. There is a very mistaken idea that Travancore is unhealthy. It has unfortunately arisen through superintendents having gone from Ceylon to the south and got into an unhealthy tract of country. I believe in the Venture group they had many Ceylon Superintendents, and that gave Travancore a bad name, for Venture is unhealthy, and I don’t think will ever improve. I know the country well. It is one of the richest pieces of land I know, and it is all magnificent tea, but it never can be otherwise than unhealthy. It is 800 ft. high—one of those steamy hot climates where fever is always renitent. Mr. Cole was very agreeably surprised at finding how healthy Permaad was, and we have two or three Ceylon men in the hills—Mr. Bisset and young Knight and Mr. Wood, who keep their health splendidly while I have been there for 20 years, and I don’t think I am a bad specimen.”

INDIAN TEA ASSOCIATION.

INTERESTING PROCEEDINGS.

We make a few extracts of special interest to Ceylon planters from the proceedings of the Meeting held in Calcutta, Oct 12th:—

The Chairman announced that the contribution promised to the American Market Fund up to date amounted to R97,431.

Recorded telegrams from branches in Assam, Cachar, Sylhet, Dooars, Terai and Darjeeling, with crop prospects at the end of September.

The Secretary was instructed to telegraph to London, stating “prospects show little or no improvement.”

Recorded letter of 27th August, from the Secretary American Market Fund, enclosing copies of letters from Mr. Blechynden, dated 16th and 17th idem, with copies of his accounts for June and July, and pointing out that the injurious method of testing the purity or impurity of tea imported into America by means of a No. 16 sieve still prevails, and that Mr. Blechynden fears that in consequence English houses selling packet teas will be bound to do their packing in the States. Mr. Blechynden was taking active steps to have the new regulation altered, as a great injury was being done, as it was blocking the finer grades of what was known as needle leaf.

In his letter of 3rd September, Mr. Blechynden stated that he had just learned that the Japan people had made final arrangements in regard to the work they were going to do in America and he understood that they had entered into a contract to spend at the rate of \$60,000 each year in magazine and newspaper advertisements for seven years, and they had reserved \$10,000 for other purposes. He also understood that they had some hope of being able to secure a further grant from their Government after January next for additional work.

IMPORTANT FACTS CONCERNING CATTLE MANURE.

The November number of the *Agricultural Magazine* contains an article, entitled "Denitrification—Some important discoveries," dealing with the latest investigations of the German Agricultural Society, into the action of cattle manure, the results of which, it must be admitted, are of a startling character. Experiments carefully conducted by the leading German scientists have gone to prove that cattle manure, when used with artificial fertilizers, tends to "depress" the action of the latter. We note that the power of denitrification, or of causing a loss of nitrogen, is possessed to a great extent by the straw or litter in the manure, while the depressing action is exerted, not only upon the artificials used along with dung but even upon the nitrogen naturally present in the soil. Superphosphate of lime and kainit were found to intensify and prolong the denitrifying action, but this objectionable property tended to decrease with the age of the manure and with long contact with the soil, while such substances as sulphuric acid and copper sulphate have the effect of minimizing denitrification.

All these results, it must be confessed, open out new questions with regard to the use of manures, the forms they should take and their method of application.

The first idea that strikes us with reference to this question is that to defeat the denitrifying power we should apply cattle manure and artificials separately and at different periods, due time being given for the dung to lose the power of bringing about a dissipation of the nitrogen of artificial fertilizers. But the subject is altogether too complex to be disposed of by any offhand suggestion, and there is little doubt, considering the far-reaching results of the German investigations referred to—not only to the agriculturist but to the manure merchant—that English scientists will thoroughly thrash out the subject before long. It would be interesting to enquire whether the denitrifying power of dung also extends to or is exerted upon such organic fertilizers as castor cake, blood meal and fish manure, while we should be glad to know whether any of our tropical agriculturists have been struck by what is termed the "depressing action" of cattle manure when used in combination with the more concentrated fertilizers commonly in use in the tropics. We would draw attention to the article in question in the *Agricultural Magazine*, which we may mention is given as a Supplement to the *Tropical Agriculturist*.

COFFEE IN THE STRAITS.

Mr. W. W. Bailey writes some pungent comments in the *Straits Times* upon the careless way coffee is pulped in the Native States. As the matter is of great importance to our own coffee growers, we quote a portion of his remarks:—On the cherry loft, I saw a lot of cherry which had been picked several days without having been pulped, though, in the old coffee days in Ceylon, one would have been in a great state of mind if any had to be left over even to the next day. 10 per cent. of the cherry was immature and the beans of such cherry are bound to shrivel in drying, and not turn out a good glossy sample (and I imagine it is more likely to go bad in transport). I remarked at the time that it was a very good sample of cherry. From the cherry loft, I went to the pulper, which was sending some 40 per cent. of pulp into the receiving cistern, we have not yet got a pulper which can do anything approaching good work in separating the cherry from the bean, no matter how well set it is; however, I think one will soon appear which I have seen do really good work.

From the pulper I went on to the receiving and fermenting cistern, and there I got a shovel and turned up some of the parchment which was being fermented. The stench was something horrible from enormous

percentage of pulp being fermented with the parchment; when I was looking at it, I said to myself, "No wonder our coffee is getting a bad name in the market." This treatment does not much interfere with the appearance of the coffee when it has been pulped, polished, and made ready for market; but I am absolutely certain that it must give the coffee a bad sour taste. I consider this fermenting of the parchment with the pulp the worst of all the evils I have mentioned, and the simple and cheap remedy for it is as follows:—

Pulp into the washing cistern, in which have two men washing and separating the pulp from the parchment, and this can be done to the large extent of 90 per cent: throw the pulp (which still contains a little parchment) alongside the cistern to be washed again the next day to get the rest of the parchment out, and the parchment into the fermenting cistern (it will then be minus 90 per cent. of the pulp it first had). If any one should say that this is expensive, I am prepared to prove that the curing per picul of clean coffee on the estate on which it is done is about the cheapest curing done in the Peninsula.

On looking over the sides of the fermenting cisterns, I saw flakes of nasty, sour, half-dry saccharine matter, and at the bottom in a pool at one end was some white looking stuff, which smelled very much like bad bread harm that had a dead rat in it for some days, and this horrible stuff, I know, is left there until the next lot of coffee is put in to be fermented and get its flavour; whereas with the water turned on for 5 minutes one man with a brush would make it as sweet as a nut.

I would not write the above if I did not realize that the planters have to do something to produce a better sample of Liberian coffee than they now produce, and I know they can produce one very much better at a cost of less than 60 cents per picul of clean coffee.

I am a strong supporter of doing something; but I do not think that the planters should look for any direct profit out of it, and I think that a travelling agent in America would be more likely to advertise our coffee than a place of business in London: but, before we had advertise our coffee better see and turn out a better sample than the present one.—*British North Borneo Herald*.

CURING VANILLA BY THE CALCIUM CHLORIDE PROCESS.

The cultivation of vanilla is the largest secondary industry in the French colony of Reunion, near our own possession of Mauritius. Indeed, the profits yielded by it have more than once helped the farmers in the island to tide over a bad sugar season, although on an average the value of the vanilla production is only one-third of the 500,000*l.* which represents the sugar output. A great deal of the Reunion (or Bourbon, as it is often called) vanilla is consigned to London, and passes through our drug-auctions. About two seasons ago attention was called in the sales to some packages of Reunion vanilla which had just been received as having been "dried by a new process," but no information was given wherein that new process differed from the old. We were afterwards enabled (see *C. and D.*, September 12th, 1896) to give a short outline of the process, which consists, in the main, in the substitution of calcium-chloride as a drying-agent for the free air or hot-air stove formerly relied upon.

Consul C. W. Bennett, in a recent report, gives further particulars of the calcium chloride process, which appears to have thoroughly established itself in the island by this time. The preliminary treatment of the fruit is the same as that of the older method. The pods should be picked as soon as their lower portion begins to turn yellow. If picked too green their aroma does not fully develop; if too ripe they will split in the drying, which lowers

their commercial value. Within twenty-four hours after gathering the pods should be dried in tins not too large to prevent all the vanilla from being heated evenly; old petrolcans do very well. The tin is lined all through with wool, a quantity of vanilla-pods placed vertically at the bottom, and a horizontal layer laid on the top of the first one. A number of tins are then put in a halved wine-barrel, and hot water poured into the barrel up to the lid of the box; but no water must penetrate it. The harrel is covered with a piece of sacking and left overnight. The pods are then taken out, dried for a while in the air, and then indirectly exposed to sunlight, covered with a woollen cloth, and spread on shallow wooden boxes placed upon trestles. This first drying generally takes two or three days, and is completed when the pods have acquired uniformity of colour.

At this point the calcium-chloride process comes into operation. This is carried on in a galvanised-iron box, 40 inches long and broad, provided with a hinged door with indiarubber edging—airtightness being a necessary condition for the success of the process.

The apparatus, as will be seen, is the same in construction as an ordinary hot-air chamber. The sliding hurdle frames rest on side brackets, a calcium-chloride tray being placed in the centre, and at the bottom. The vanilla-frames should not be made of resinous wood; split rattan is the best. The calcium-chloride vessels should be double-bottomed, the upper bottom being perforated, in order to allow the liquid (CaCl_2 is extremely deliquescent) to escape. As a rule, the process of drying takes from twenty-five to thirty days. The box should be opened every two or three days, and all mouldy pods removed. The usual charge for a whole box is 40 lb. of calcium chloride and 100 lb. of vanilla-pods. Any mouldy pods removed during the process of drying should be sunned, collected, and dried in a separate box.

When sufficiently dried, the vanilla-pods are exposed on small frames for several days in a covered and well-ventilated place, and then put in tins holding from 30 to 50 lb. each. The pods are kept in these tins for several weeks, well closed, and are examined every few days, all pods showing traces of mildew being carefully wiped. When the pods appear to have reached full perfection of aroma the last stage but one in the treatment is reached. It consists in washing the pods in a receptacle containing clean water of a temperature of 60°C . (140°F). About three pints of water should be used for every pound of vanilla-pods, and the pods well stirred by hand during the washing-process. They are then lightly wiped and put to dry in the shade. In a few days they are ready for sorting according to length and quality, bundling, and boxing. Vanilla ought not to be shipped until at least a month after being boxed. Every few days it should be examined, and all pods showing traces of moisture removed.

The action of calcium chloride is of course due to the avidity with which it absorbs moisture. The advantages of the calcium-chloride process are that the loss of aroma almost inseparable from the old curing-processes is avoided, and that there is a great saving of hand-labour (which, in Réunion, costs about 1s 6d a day). Vanilla has realised very high prices recently, and its culture is extending in various parts of the Tropics. In Réunion there is now hardly a sugar estate which has not more or less land under vanilla. Many large planters cultivate nothing but vanilla, and in the parishes of Ste. Rose, St. Philippe, and St. Joseph the little plots of ground round the huts are covered with vanilla-creepers. When the pods are ripe they are sold green to neighbouring merchant, realising quite a small fortune for the grower. The only drawback to the crop is that it gives rise to a great deal of theft. Many small fortunes have been made by illicit vanilla buyers, but the detection of the culprits is almost as difficult as that of diamond-thieves at the mines.—*Chemist and dyer, Oct. 30.*

COCA (*ERYTHROXYLON COCA*, LA M

BY J. F. BAILEY.

CULTIVATION.—The Coca is cultivated very largely in the Andes of Peru, Bolivia, Columbia (especially in the very moist mild climate met with at from 2,000 to 5,000 feet above sea-level), parts of Brazil, and many other countries of South America. The plants are propagated from seed, which should be sown as soon after gathering as possible (as like many other seeds in this climate, they do not keep well), in a plantation set apart for the purpose. When the seedlings are about six inches high they may be transplanted to their permanent situations.

COLLECTION, PREPARATION, ETC.—Great care must be taken in the gathering, drying and preservation of coca, as its activity and value depend in a great measure on its mode of preparation. The leaves should be gathered as soon as they have arrived at maturity, at which period they are bright green on the upper surface and yellowish-green on their under surface, and have an agreeable and somewhat aromatic odour. The leaves are gathered separately and carefully by hand with the twofold object by preventing them being crushed or bruised in the process; and also so as not to injure the young leaf buds which are left behind for the purpose of obtaining a second crop of leaves. They are then spread out and dried slowly in the sun. This operation must be performed with great care, for if the leaves be dried too rapidly, they lose their odour and green colour; and if stored away before they are thoroughly dried their colour is also changed, and they acquire a disagreeable odour and taste.—*Queensland Agricultural Journal* for October 1897.

PLANTING NOTES.

EUCALYPTUS OIL.—The trust in the therapeutical efficiency of this oil has passed its zenith and is evidently much on the decline. Most of the oil is still coming from Australia whose total export of the various eucalyptus oils amounted to the value of £5181 in 1895. As the average value per pound is about 1s 6d this amount represents about 69,080 lb. of oil. Algeria is still producing considerable amounts of oil; however, it cannot successfully compete with Australia. More recently the distillation of eucalyptus oil has also been introduced into Northern Portugal. The leaves used are from *Eucalyptus globulus* La Billardiere and *Eucalyptus resinifera* Smith. The latter species is remarkable for its rapid growth; the oil obtained from the same consists mainly of a hydrocarbon of turpentine oil odor, so that it hardly will meet with much favor. We expect soon to receive samples of the oils of both species for estimation.—*Schimmel & Co.'s Report.*

LEMONGRASS OIL.—The shipments from the coasts of Malabar have been considerably greater than those stated in our last Report. They amounted to:—

Season of	1891/92	1450 cases.
" "	1892/93	1863 "
" "	1893/94	2332 "
" "	1894/95	2370 "
" "	1895/96	3079 "
" "	1896/97	3000 "

These figures show that the production keeps in a close ratio with the increased consumption. Each original case contains 12 wine bottles filled with oil. Small instalments of oil of inferior quality are regularly shipped from Ceylon, but the production of this oil seems to be constantly on the decrease in Ceylon as is to be seen from the blue-books of the Straits-Settlements, while that of oil of citronella is very considerable. The demand for lemongrass oil was brisk and most of the recent crop has been sold in advance and for delivery in fall. We are booked for 500 cases. In consequence of this demand, the prices have advanced from 2d per lb. to 2½d, and may go still higher during the time of delivery and use.—*Schimmel & Co.'s Report.*

THE LANKA PLANTATIONS COMPANY, LIMITED.

DIRECTORS.—George Allen, Esq. (Chairman), William Austin, Esq., Henry Bois, Esq., Edward Pettit, Esq.

AGENTS IN COLOMBO.—Messrs. J. M. Robertson & Co. SECRETARY.—Mr. Charles M. Robertson.

The following is a copy of the report presented at the seventeenth ordinary general meeting of the Lanka Plantations Company, Limited, held at the office of the Company, on Wednesday, the 17th November, 1897, at twelve o'clock noon precisely.

1. The Directors now submit their report for the twelve months ending 30th June last, together with the balance sheet and accounts of the Company made up to that date and duly audited.

2. The coffee crop shipped to London was 572 cwt., against 605 cwt. last year and realized £2,688 15s. 8d. net. The acreage under coffee alone is nominally 187 acres.

3. The total crop of cocoa gathered on Yattawatte amounted to 1,272 cwt., against 1,355 cwt. last year, and realised £3,735 8s. 4d. During the season 46 acres were planted with cocoa, 24 acres of which have been interlined with liberian coffee, and 58 acres of available land adjoining the estate have been purchased, making a total of 250 acres new land. The cost of the land and the new planting are charged to capital cocanant.

4. The tea received from the Company's estates amounted to 701,112 lb. and has been sold at an average of 7.53d. per lb. net, realizing £22,002 8s. 4d. Last year the Company received 646,161 lb. which was sold at an average of 8.15d. per lb. net, and realized £21,967 10s. 2d. The cost of production has, however, been increased by the rise in the sterling value of the rupee, consequent upon the closing of the Indian Mints, and by loss on the sale to the colonies of imported rice, owing to the famine in India. A fully equipped factory has been erected on the Rillamulle Estate, and the cost charged to capital account.

5. The following statement shows the acreage and state of cultivation of the Company's estates on the 30th June last:—

Estate.	Coffee.	Tea.	Cocoa.	Grass.	China and Patena.	Forest and Timber Trees.	Total.
Ampittia-kande, and Arnhall ..	50	414	..	4	167	70	705
Fruit Hill ..	..	227	..	..	10	..	237
Fordyce, Garbawn, Gona-galla and Paramatta ..	..	784	..	17	..	185	966
Rappabannock ..	..	322	..	31	303 $\frac{1}{2}$	90	473 $\frac{1}{2}$
Rillamulle ..	..	232	..	..	6	20	258
Thotulagalla 137	235	..	..	4	83	96	555
Yattawatte ..	..	..	*717	95	503	82	1,197
	187	2214	717	151	599 $\frac{1}{2}$	493	4361 $\frac{1}{2}$

* 63 acres interlined with liberian coffee.

6. The net profits for the past year amounted to £8,281 0s. 4d., to which must be added the sum £2,060 7s. 11d. the balance brought forward from the year 1895-6, making together £10,341 8s. 3d.

7. Having already paid a half-year's interim dividend on the six per cent. Preference shares to the 31st December, 1896, amounting, less property tax, to £426 6s. 0d., the Directors recommend payment of the dividend on these shares to the 30th June last requiring, less property tax, a similar amount, and having deducted £1,493 8s. 0d., being one-tenth of the sums charged to suspense account during the 10 years ending 30th June, 1896, they further recommend a dividend of 10/ per share, being 5 per cent. free of income tax on the ordinary shares amounting to £7,500, carrying forward a balance of £495 8s. 3d. to the next account.

8. The Directors who retire on this occasion are Mr. George Allen and Mr. Edward Pettit, who being eligible offer themselves for re-election.

9. Mr. John Smith, the Auditor, also retires, and being a shareholder offers himself for re-election, —By order. C. M. ROBERTSON, Secretary.

12, Fenchurch street, London, E.C., 5th November, 1897.

THE KANAN DEVAN HILLS PRODUCE COMPANY, LIMITED.

NEW ISSUE OF SHARES.

CAPITAL ... £1,000,000.

DIVIDED INTO

25,000 Six per cent. cumulative preference shares of £10 each.

75,000 Ordinary shares of £10 each.

(Of which £500,000 of ordinary shares have already been issued to the Consolidated Tea and Lands Company, Limited, and the Amalgamated Tea Estates Company, Limited.)

PRESENT ISSUE—

10,000 Six per cent. cumulative preference shares of £10 each.

15,000 Ordinary shares of £10 each.

DIRECTORS.

Sir John Muir, Bart., of Deanston; and of Messrs. James Finlay & Co., 22 West Nile street, Glasgow, and 34 Leadenhall street, London; and of Messrs. Finlay, Muir, & Co., Calcutta and Colombo —Chairman. Sir Robert Drummond Moncreiffe, Bart., of Moncreiffe, Bridge of Earn, Perthshire. P. R. Buchanan, Esq., of Darleith, Cardross. William Allan Coats, Esq., Director of Messrs. J. & P. Coats, Limited, Thread Manufacturing, Paisley.

A. B. Murray, Esq., 33 Renfield Street, Glasgow, and Rosebank, Partick; A. M. Brown, Esq., of Messrs. James Finlay & Co., 22 West Nile Street, Glasgow; William Walker, Esq., of Messrs. James Finlay & Co., 22 West Nile Street, Glasgow; Robert Scott, Esq., of Messrs. Morgan & Scott, 12 Paternoster Buildings, London; R. H. Sinclair, Esq., 19 Kelvinside Terrace, Glasgow.

BANKERS.

The Bank of Scotland, Glasgow and London; The Royal Bank of Scotland, Glasgow and London; The British Linen Company Bank, Glasgow and London The Clydesdale Bank, Limited, Glasgow and London The Capital and Counties Bank, Limited, London; The National Bank of India, Limited, London, India, and Ceylon.

AGENTS IN INDIA AND CEYLON.

Messrs. Finlay, Muir, & Co., Calcutta and Colombo.

SOLICITORS.

Messrs. McGrigor, Donald, & Co., 172 St. Vincent Street, Glasgow.

AUDITOR.

Alexander Sloan, Esq., C.A., 140 Hope Street, Glasgow.

AGENTS IN LONDON.

Messrs. P. R. Buchanan & Co., 45 Leadenhall Street, London.

SECRETARIES.

Messrs. James Finlay & Co., 22 West Nile Street, Glasgow.

OFFICES.

22 West Nile Street, Glasgow.

PROSPECTUS.

This Company was formed in May, 1897, for the purpose of acquiring and developing the lands and estates which originally belonged to the North Travancore Land Planting and Agricultural Society, Limited, particularised in section A of the accompanying schedule. The purchase price was fixed by Mr. W. Milne and Mr. L. Davidson, as follows:—

Value of Land, .. £102,775
Value of Estates, .. 43,750

£146,525

The purchase price has been paid, possession has been given, and the transfer of the property to the Company is in course of completion.

Since its formation, the Company has succeeded in securing the following further and adjoining lands and estates:—

The property of the Aneimudi Tea Company, Ltd.,	R159,600
The property of the Toliar Valley Planting Coman.Ltd.	70,000
The property of the Chittavarrai Planting Company Ltd.	7,000
The Benmore Estate, ..	38,000
The Cuddalaralle Estate ..	30,565
The Kanniamallai Estate..	100,000
The Haichatch Estate ..	29,000
The Peria-Kanal Estate ..	37,500
The Puli-Vassel Estate ..	25,000
	<hr/>
	R496,665 at
	exchange, say 1/3 = £31,041 11 3
The Parvithi Estates, ..	8,500 0 0
The Vagavarrai Group of Estates, &c., ..	19,000 0 0
	<hr/>
	£58,541 11 3

Particulars of these are given in section B of the accompanying schedule.

The Directors have also recently purchased—

The Estates of the Noakacharee Tea Company, Limited. Assam for ..	£100,000
The Lynsted Estate, Bogawantalawa, Ceylon	30,000
The Maddegedera Estate, Kalntara, Ceylon	35,000
	<hr/>
	R165,000

Particulars of the last-named Estates are given in Section C of the accompanying Schedule.

In regard to these last three purchases (Section C), it may be explained that the Directors thought it desirable to secure the property of the Noakacharee Tea Company, as, in their opinion, a combination of good Assam estates with high country estates, such as the Company's property in the Kanan Devan Hills, North Travancore, will secure the most permanently successful results. In addition to this, the Directors considered it, as a favourable opportunity offered, advisable to secure some estates capable of earning a dividend on the whole paid up capital during the period in which the Company's lands and young estates in North Travancore were being opened up and developed.

To complete the purchase of the properties named in Sections B and C, and to develop the same, some additional capital is required, and the Directors have accordingly resolved to make a new issue of £250,000, viz. :—

10,000 six per cent. cumulative Preference shares of £10 each,	£100,000
15,000 ordinary shares of £10 each,	150,000
	<hr/>
	£250,000

all of which are now offered for subscription to the Shareholders of the Consolidated Tea and Lands Company, Limited, to the Shareholders of the Amalgamated Tea Estates Company, Limited, and also to the employes of the Kanan Devan Hills Produce Company, Limited.

The Directors are of opinion that it is to the benefit of the Company to encourage the Managers, Superintendents, and Assistants (on whose work so much depends) to become Shareholders. They also think it fair that the Shareholders of The Consolidated Tea and Lands Company and of The Amalgamated Tea Estates Company, who as such Shareholders are now so largely interested in The Kanan Devan Hills Produce Company, should have an opportunity of becoming personally interested in it if they so desire. As, however, it is essential that this Company should, during the period of its development, be worked as a private Limited Company, Shares will only be allotted to those who desire an investment. The Company will be worked on some-

what similar lines to those on which The North and South Sylhet Tea Companies were so successfully conducted.

With the addition of the new purchases, the Company possesses :—

	Uncultivated			Cin-	Total.
	Land.	Tea.	Coffee	chona	acres.
In Travancore,	92,200	2,131	606	926	95,863
In Assam,	10,326	2,442	—	—	12,768
In Ceylon,	141	778	—	—	919
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	102,667	5,351	606	926	109,550

TRAVANCORE.—A considerable proportion of the land in Travancore is of the very finest description, and is capable of yielding large crops of fine quality tea, and also coffee. It will be seen that there are 2,131 acres of tea, 606 acres of coffee, and 926 acres of cinchona, at present under cultivation. With the exception of the cinchona, and 515 acres of tea and coffee in bearing, the whole of this area consists of young tea and coffee, principally planted in 1894, 1895, and 1896, which will not yield much crop for two years. A further area of 2,000 acres of tea and 300 acres of coffee is being brought under cultivation in 1897. The whole of the Company's land in Travancore under tea cultivation is at an elevation of from 4,000 to 6,000 feet above sea level, and it is estimated that there are still 16,000 acres of forest and good grass land at a similar elevation, and suitable in every respect for the profitable growth of good quality tea and coffee. The lands at a lower elevation are also very rich, capable of producing large crops of coffee and medium tea, and suitable, it is believed, for the growth of rubber. To the last-named industry the Directors propose to turn their special attention. Important roads are in course of construction on the Company's Travancore property, to connect it with the east and west coasts, and these will greatly add to the value of the lands. There is a large permanent Coolie force, and labour is easily procurable. There is a good staff of European Managers and Assistants, under the supervision of Mr. W. Milne, the Resident Superintendent. It is proposed to extend as rapidly as possible the cultivation of high-grown tea as well as coffee and rubber in Travancore.

ASSAM.—The estates of the Noakacharee Tea Company, now acquired by the Company, are very valuable. They are situated in the district of Jorehant, Sibsagar, Assam, a locality of proved excellence in the production of high quality tea. There are 2,300 acres of tea in bearing, which are estimated to yield a profit of £7,000 per annum. But the feature which makes the purchase more particularly attractive is the possession of 7,600 acres of valuable freehold forest land, which will be rapidly developed.

Mr. Mann, the Visiting Agent for The Consolidated Tea and Lands Company, Limited, places the value of the whole property at £116,000, and the Directors succeeded in securing it on behalf of the Company for £100,000. In writing of this land, Mr. Mann remarks :—“The forest land is very valuable. If extensions are contemplated on a large scale, and at no distant date, the jungle forest would not be prohibitive, even if valued at R150 per acre, which would raise the value another £24,000. It must be borne in mind that this property is all practically freehold, which is now scarcely to be had in Assam. What still remains to be opened out is well timbered, and, were it now taken up under Government lease, there would be, at least, R80 per acre demanded by Government on account of Timber.”

There is always a good demand for good Assam teas, which are in comparatively limited supply.

CEYLON.—The Lynsted Estate is a first-class high country estate, and is estimated by Mr. F. W. Clements, Visiting Agent, Ceylon, to yield a profit of £2,870 per annum.

The Maddegedera Estate is a specially attractive low country property, and is estimated by Mr. L. Davidson, Visiting Agent, Ceylon, to yield a profit of £3,200 per annum. Taking the profits of 1897 and 1898 of the bearing area in Travancore at £2,000,

the profits of the Company for those two years from all sources should be about £15,000 per annum, which will provide a satisfactory dividend on the called up capital. A large increase of profit may reasonably be expected when the young cultivation in Travancore comes into bearing. This point should be reached in 1899. The encouraging prospects of this Company will be immediately recognised from the fact that it possesses a total area of 100,000 acres or thereabouts of land, which, as will be seen from the Schedule, is practically Freehold, and a considerable portion of which is exceptionally rich, and suitable for the growth of tea, coffee, and other Eastern products.

THE SCOTCH TRUST AND LOAN COMPANY OF CEYLON, LTD.

Capital	£250,000
First issue (fully subscribed) ..	£150,000
Of which paid up	£45,000
Reserve Fund	£10,000

DIRECTORS.—James Haldane, Esq., C.A., Edinburgh; John Wilson, Esq., of Messrs. Honeyman & Wilson, Edinburgh; Henry Johnston, Esq., Q.C., Advocate Edinburgh; and J. H. Beilby, Esq., 10, Clarendon Crescent, Edinburgh.

SECRETARY.—Francis A. Bringlee, C.A., 123 George Street, Edinburgh.

The following is the report by the Directors of the Scottish Trust and Loan Company of Ceylon, Ltd., to the Twentieth ordinary general meeting of shareholders, held within the Company's Registered Office, No. 123 George Street, Edinburgh, on Wednesday, the 27th of October. The Directors present their Twentieth Report, being for the year to 31st August, 1897.

ESTATES IN THE COMPANY'S POSSESSION.—The yield of tea from the estates continues satisfactory, both the crop and the net proceeds having been in excess of those of last year. The adverse factors during the past season have been the rate of exchange, the enhanced cost of rice, and a slight fall in the price of tea.

The coffee crop was slightly shorter than last year, but better prices made it equal in value. This product will be coming forward in diminished quantity, and the fields are by degrees being planted up in tea. The new clearings are well advanced, and further small extensions will be made during the coming season.

FACTORIES, BUILDINGS AND MACHINERY.—Special attention has been devoted to these. The machinery is in efficient working order, and the buildings are maintained in thorough repair. The New Factory on Sarnia is almost finished and forms a valuable addition to that estate; it has, however, cost more than was originally expected.

The Directors have pleasure in recording their appreciation of the work of the staff in Ceylon, who have been successful in arranging their labour supply to suit the needs of the estates, with only a moderate increase in the advances to coolies.

MORTGAGES HELD IN CEYLON BY THE COMPANY.—The loans have been increased during the year by the sum of £1,600 in a further purchase of Terminable debentures of the Tonacombe Estates Company of Ceylon, Limited, bearing interest at 6 per cent. A loan of £9,000 over Lawrence estate is to be repaid in November, and the proceeds will be applied in meeting debentures maturing at Martinmas, and in reducing the temporary advance from the Company's bankers.

DEBENTURE DEBT.—The debentures have been reduced by £2,300 during the year, and the directors propose to pay off at Martinmas the sum of £3,600 falling due at that term.

As the Company's debentures have now been practically redeemed, the directors propose, in response to a very generally expressed feeling among the shareholders, to take the necessary steps to reduce the liability on the Company's shares by writing off £5

per share of uncalled capital, thus making the shares £5 shares, with £3 paid. Before the Company can proceed to the matter of reduction of capital, it is necessary to alter the Articles of Association of the Company. The necessary motion to that effect will be submitted to an extraordinary general meeting to be held after the close of the Company's annual general meeting.

ACCOUNTS.—The balance at the credit of profit and loss account is £8,395 12 0

And the Directors propose—

To pay a dividend of 5 per cent per annum, free of Income Tax £2,250 0 0

Note.—Two and a half per cent of this was paid as an Interim dividend at Whitsunday 1897.

And a Bonus of 7½ per cent free of Income Tax £3,375 0 0 £5,625 0 0

Thus leaving £2,770 12 0 to be carried forward to the next account.

The directors desire to record an expression of their regret at the loss they and the Company have sustained by the death in December last of their valued colleague. Mr. Thomas Dickson, who, from the inception of the Company in 1878, occupied the important post of Managing Director, and since 1880 that also of the Company's Agent in London. The directors have appointed Mr. W. Bowden Smith of Colombo, who will shortly be resident in London as Agent there, in place of Mr. Dickson, and Mr. A. Gordon Dickson as Assistant Agent. Until Mr. Bowden Smith's return from Ceylon, the duties of London Agent are being discharged by Mr. W. Herbert Anderson. The late Mr. Dickson was, in ordinary course, the retiring director, but the Board do not recommend that the vacancy caused by his death be filled up.

The Auditor for the current year falls to be appointed.—By order of the Board.

FRANCIS A. BRINGLEE, Secretary.
EDINBURGH, 19th October, 1897.

PLANTING NOTES.

COCONUTS AND PADDY AT THE STRAITS.—The District Officer, Kuala Selangor (Mr. A. Hale), reports:—

A customary holder refused \$200 for an acre of coconut trees, half in bearing, half too old or too young, at Jeram. I assessed a lot of land at Dungun for Jeram people, who want to extend their coconut plantations.

The District Officer, Ulu Selangor (Mr. R. C. Grey), reports:—

The most important event of the month was the receipt of an application from Towkay Loke Yew for some thirty-two square miles of country in the Ulu Bernam district for the purpose of padi-planting. The Towkay came to see me on the subject on the 9th, and we then discussed some of the details of his scheme. He intends to import an army of Chinese agriculturists, and he and his partners in the enterprise are prepared to spend a large sum of money in irrigation. I have not yet visited the place as Towkay Loke Yew has not been able to accompany me, but as soon as we have had an opportunity of seeing the country I shall be in a position to report more fully on the matter. In the meantime the scheme seems so commendable that I think every possible assistance should be given to the Towkay. The greatest difficulty with which miners, and probably also planters, have at present to contend, is the high price of rice, and the most pressing want of the time is that rice planting should be undertaken on a really large scale. For these reasons the initiation of a scheme of this sort should rank among the most important events of the history of the Native States. If the price of rice in the country were definitely reduced, labour would become cheaper, and probably more plentiful.

SCIENTIFIC PLANTING.—Dr. Leather, Agricultural Chemist to the Government of India, has addressed the planters of Northern India through their representative body, the I. T. A., stating that his engagement was about to terminate, and enquiring whether it would be worth his while to commence practice as an Agricultural Chemist in connection with Tea, Indigo, &c. Unluckily, sufficient inducement could not be offered him at the present time, as there is "practically no work for an Agricultural Chemist." No work indeed! Rather should it be said that the necessity for such work is not recognised. Madras the Benighted will soon, we hope, give North India a lead, and a long one, in this matter.—*Ibid.*

TEA PLANTING IN REUNION: A POSSIBLE OPENING FOR A CEYLON MAN.—A Reunion sugar planter—whose name (Scotch) is not unknown in the past banking and surveying annals of Ceylon—is anxious to have tea tried in his neighbourhood. Writing to a relative acquainted with Ceylon he says:—

"Can you give me some good information as to the culture and manipulation of tea as it is cultivated in Ceylon; above all as to the price of labour. You will render me a service because here in Reunion tea grows admirably and is of very good quality, and I think if we could meet with an Englishman who would come to try it here, he would be well received by my family and neighbours, because you know our land is, as in Ceylon, 5,000 feet high and even more. If you know any one who would come and see for himself I would receive him with pleasure and show him much suitable country for growing tea."

We learn that the writer's place is easily got at being about three hours' journey from where the steamers from Mauritius land, and it is only 14 hours from Mauritius. The climate is delightful; but the doubt will be as to a sufficiency of labour for tea culture. Any one interested can have the address on application.

TEA IN JAVA.—Mr. J. H. S. Davidson, who went to Java some four months ago, in the interests of the firm of Messrs. Davidson & Co., has returned to Colombo with a very good impression of tea growing prospects there. He says that, though tea has been grown for a long time past in Java, the success of the place as a tea growing country undoubtedly lies in the future. Enormous tracts of land are being opened up, and there is a great demand for the newest kind of machinery. Mr. Davidson has had good opportunities of seeing tea cultivation in India, Ceylon, and Natal, and he says, he never saw a place better fitted for the industry than Java. From what he could see the soil is excellent and there is very little trouble in regard to labour. It is all Malay labour, of course, and it is free; that is to say there is no such thing as coast advances. He was also much struck with the facilities for travelling in Java. The gradients are not so steep as in Ceylon and he says that, besides a railway which runs into the heart of the tea-growing district, they have remarkably good roads. A kind of tea they go in for there to some extent is known as "white tips." It is a very delicate, light liquoring tea made without fermentation. He only met two English planters in Java, but both were doing well. One is Mr. Bingley, who was in Ceylon for a time, and the other Mr. Evans. Mr. Bingley has with him Mr. Adams, who went out from Ceylon at the recommendation of Mr. Wright not very long ago. According to Mr. Davidson, when all the newly opened estates in Java come into bearing, it will make an appreciable difference on the tea market.

CINNAMON OIL, CEYLON.—The result of the last cinnamon auction, which took place on May 3rd, was not as satisfactory as the preceding ones. Only about one-half of the bark offered was sold and prices declined by about 3d to 1d per lb. The prices realized for both commodities, bark and chips, seem to be profitable to the planters; for the issue of the 2nd of August of the "Tropical Agriculturist" published in Colombo contains an urgent warning against the contemplated extension of cinnamon plantations, correctly arguing that the consequence would be over-production and low prices.—*Schimmel & Co.'s Report.*

"THE AGRICULTURAL GAZETTE" of New South Wales, issued by direction of the Hon. Sydney Smith, M.P., Secretary for Mines and Agriculture. Vol. VIII. Part 9. Edited by W. H. Clarke. The following are the contents for September 1879:—Useful Australian Plants, J. H. Maiden; No. 43—*Tiraphis micrion*, Benth; No. 44—The Reflexed Panic Grass (*Panicum reversum*, F.v.M.); Botanical Notes—Note on two so-called Madagascar Beans—No. 1—A variety of the Lima or Duffin Bean (*Phaseolus lunatus*, Linn.; var. *inamemus*); No. 2—The Lablab or Sim Bean of India (*Dolichos lablab* syn. *Lablab vulgaris*). Weed eradication on a Canadian Railway. A note on the Lulla or French Honeysuckle (*Hedysarum coronarium*); Melanose of the Orange—Results of Experiments at Castle Hill, G. B. Owen; Agricultural Education, F. B. Guthrie; Plant Diseases and Legislation, B. T. Galloway; New Labour saving Implements, J. L. Thompson; Influence of Bees on Crops, Albert Gale; Profitable Poultry Breeding for the Local and London Markets, Geo. Bradshaw; The Keeping of Grapes, P. Mouillefert; Rules for Tuberculin Test issued by Board of Health; Trees for Shelter and Break-winds, H. V. Jackson; Bee Calendar for October, Albert Gale; Orchard Notes for October, George Waters; Practical Vegetable and Flower Growing for October, W. S. Campbell; General Notes; Replies to Correspondents; List of Agricultural Societies' Shows; Label for Specimens.

PETER LUND SIMMONDS, F.L.S.—The Society has lost an old and well-known member by the death of Mr. P. L. Simmonds, on the 3rd October. Mr. Simmonds' real name was Lund. He was born at Aarhus, Denmark in 1814, and was adopted by Lieutenant George Simmonds, R.N., whose name he took. Mr. Simmonds was a voluminous writer on technical and commercial subjects. In 1853 he published a volume on "The Commercial Products of the Vegetable Kingdom," and from that date, until within a few years of his death, he continued to produce a constant succession of books, which, if they were sometimes deficient in minute accuracy, were always full of useful information. Perhaps his best known works were "Waste Products and Underdeveloped Substances," 1862, and "Tropical Agriculture," 1877. He became a member of the Society of Arts in 1855, and in 1862 he was elected a life member, without payment, in recognition of the work he had done for the Society, and his services in the application of sciences to the arts. His contributions to the *Journal* have been very numerous, and include a great deal which does not bear his name. He read no less than sixteen papers before the Society on a variety of subjects. In spite of his constant and laborious work he was never prosperous, and as advancing age rendered him incapable of the journalistic work which formed his main support, he fell into pecuniary difficulties. About five years ago some of his friends were successful in obtaining for him admission to the Charterhouse, a refuge which few can have better deserved. His end was hastened by an unfortunate accident. About a fortnight before his death he was knocked down and run over by an omnibus in the Gray's-inn-road, the result of which was that one leg was fractured and he received scalp wounds on the back of the head and forehead of a serious character. He was buried on the 7th October, in the Charterhouse burying ground, Bow Cemetery, after a funeral service in the chapel of the Charterhouse.—*Journal of the Society of Arts,*

JARRAH WOOD FOR CEYLON.

Amongst the many passengers on their way from England to Australia by the O.R.M.S. "Grotava," is Mr. William Traylen, J.P. of Guildford, Western Anstralia, who is travelling between Australia and England for the sixth time within eighteen months and six times he has landed at Colombo. Mr. Traylen is an ex-member of the Legislative Assembly of Western Anstralia and while in the house occupied the responsible position of Chairman of Committees. He is much interested in the introduction into Ceylon and India of Jarrah wood, the principal indigenous timber of Western Australia, and has been the means of bringing to Ceylon specimens of the timber for the purpose of making a definite trial with them. One of these—a pile 35 feet in length—he is offering through Messrs. Whittall & Co., to the Colombo Harbour Works with the view of it being employed (as a test of its staying capacities) in the new breakwater: other timber he is offering to the Public Works Department with the view of it being used as railway sleepers on the Ceylon Government Railways: further specimens deposited with Messrs. Whittall & Co. are to prove the superiority of the wood for other purposes, especially as shingles, for the roofing of bungalows, etc. Though more costly, Mr. Traylen claims that the Jarrah shingles would prove far more economical in the long run than the country-grown ones now in use. Further, the wood resists the attack of white ants and the terredo in the tropics, and so far as marine purposes is concerned it is not affected seriously by the attacks of the chilura. In one respect at any rate Jarrah is a reversal of the English oak, inasmuch as the best timber is on the outside.

"I believe," said Mr. Traylen, to our representative, "you will be well satisfied with its life, and in years to come you will find it work out cheaper than teak. At present I have no idea what you pay in Ceylon for Moulmein teak, but I understand that it is getting scarcer and dearer."

"And what," asked our representative, "is the price you ask for Jarrah?"

"We ask £3 10s. per load of fifty cubic feet in Western Australia. There we use the wood for every thing, but what interests you most, is that it is very largely used for marine work and for railway sleepers. For the latter purpose I think I can fairly say no other wood is now used by us. Messrs. Whittall & Co. have specimens of Jarrah, which have been used for thirty years in the water and you can see how it stands everything. Remember you must have well grown Jarrah. Here is what Mr. Ednie Brown, our Conservator of Forests, says:—

In all cases, this tree delights in an ironstone formation, and it would almost appear as though the rougher and the more the site is composed of ironstone rocks and barren of almost any other vegetation, the better the tree will grow. It is certainly beyond a doubt that, under such circumstances, the timber attains its greatest degree of soundness, strength, and general durability. There are, it is true, some belts and patches of Jarrah forest to be found upon many of the lower-lying portions of the district referred to, where the geological formation of those is composed of ironstone—as for instance in the country lying between Quindalup and Karridale—the timber is good in every respect; but where these lower-lying portions have fairly good sandy-loam soils the timber is sure to be more gummy and less durable than that on the higher ranges,

Some of this jarrah was sent some years ago to India and there was an unfavourable opinion formed of it: but of the hill-grown Jarrah we have received none but good accounts and I am sure it will suit Ceylon well. We have eight millions of acres of it and much of that is actually untouched yet."

THE FOOCHOW TEA IMPROVEMENT COMPANY, LIMITED.

(Extracts from Prospectus.)

Capital.—\$250,000, Hongkong Currency.

Dividend into 5,000 shares of \$50 each, of which it is proposed to issue at present the sum of \$125,000, in 2,500 shares of \$50 each, and the balance of \$125,000 in 2,500 shares, as may be hereafter determined on. Of the 2,500 shares now to be issued, 500 shares, which will be fully paid up, will be taken by the Vendors, in full payment of the properties, business, goodwill, machinery and effects purchased from them by the Company, and the remaining 2,000 shares are now offered to the public.

Directors.—Mr. Gustav Theodor Siemssen of Messrs. Siemssen and Krohn, Foochow, Merchants; Mr. Ernest Joseph Moss, of Messrs. Dodwell, Carrill & Co., Foochow, merchants; Mr. William Graham, of Messrs. Jardine, Matheson & Co., Foochow, merchants; Mr. Richard Henry Wallace Fraser, of Messrs. Fraser, Ramsay & Co., Foochow, merchants; Mr. Michael Gabriel Cisselef, of Messrs. Tokmakoff, Molotkoff & Co., Foochow, merchants; and Lui Yueh Yen and Huang Pai An, of Foochow, merchants. Secretary.—Mr. William Pitcairn Galton, Foochow.

The Company is being formed to acquire as a going concern the business of Tea Planters and Tea Merchants heretofore carried on by the Association called "The Foochow Tea Improvement Company," at Foochow and Pehling in the Fohkien Province of China.

Recent experiments in the manufacture of tea carried out by the Association at Pehling with the aid of machinery have been attended with much success, inasmuch as teas of greatly improved character and quality have been produced, and it is therefore considered that the time has now arrived when capital on a larger scale can be successfully employed in various parts of the Fohkien Province. In this connection, it should be stated that the Chinese Government officials have shown themselves favourably disposed towards the Company, and have expressed their intention to protect and assist it in every way.

The property to be acquired from the Association, in consideration of the allotment of the 500 fully paid up shares, comprises the goodwill of the business and all trade marks and chops used in connection therewith; the lands and premises in the Fohkien Province of China used for the purpose of the business, with a two-storied factory, 100 feet by 48 feet, and a house for the Chinese manager, an office, and coolie quarters; also machinery, consisting of a new "Venetian" firing machine, and three new rolling tables, the largest being a Jackson's 24 inch; also a sifting machine; the whole being worked by a water wheel, 12' in diameter and 2' broad, also the following machinery, namely:—1 Campbell's oil Engine, 10 horse-power; one Davidson's Sirocco, two Blackman's Fans and one Davidson's cutter; also 4,400 withering trays and stands, and scales and requisite godown appliances. The Company is also purchasing a cash balance at the credit of the Association, amounting to \$1,795.16. It is proposed that as the lands are situate in China they shall be vested in two Chinese shareholders as Trustees for the Company. This course is necessary, because doubts exist as to the legality of Foreigners holding land in China.

The Chinese growers in the vicinity of the Factory, who are extensive growers of tea, have always been willing sellers of green leaf, of which an ample supply is at all times available for manufacture at the same price as the price which they can obtain from their own

countrymen, and from the first they have always welcomed foreigners.

As regards the prospects of the financial success of the Company, the Directors would particularly draw attention to the advantage China now has over India and Ceylon in cheap silver, the exchange value of the rupee exceeding that of silver by fully twenty-five per cent.—This fully compensates for the taxation which China tea has at present to bear. The cheapness of land; the low scale of wages, and the excellent quality of Chinese labour are likewise facts which cannot be overlooked.

The machinery has been erected by, and is in charge of an English Engineer, who is the manager of the Company's property and resides at the Factory, and who has for some years been in charge of a tea factory in India. The Chinese manager resides at the Factory, and was recently sent to Ceylon by the Association, where he had practical experience in tea making on several large estates. It is proposed to take over the business as a going concern as from the 10th July 1897. The present intention is to enlarge the existing factory at Pehling, and to establish other factories in suitable districts.

COFFEE IN BRITISH CENTRAL AFRICA.

The following list will give an idea of the extent of the estates in Cholo:—

Mr. Adamson 200 acres of young and old coffee. Mr. McKinnon 200 acres, in bearing. Mr. Hunter 200 acres, 80 in bearing. Mr. Cox 250 acres, 80 in bearing. Mr. Whyte 200 acres, young coffee. Messrs. Buchanan 150 acres, in bearing. Mr. Noits 200 acres, 80 in bearing. Messrs. Pettitt 400 acres, 200 in bearing. Clamp & Stroud 100 acres young coffee, and 50 acres ready for planting. Mr. Taylor 140 acres young coffee and 60 ready for planting. Mr. Sinderham 250 acres, 60 in bearing. Mr. Kaesar 200 acres, 50 in bearing. Mr. Boyd 120 acres, 40 in bearing. Mr. Blair 100 acres young coffee. Messrs. Sharrer 150 acres young and old coffee. do. 200 acres ditto.

The following estates are on the Blantyre-Katung's road:—

Mr. Sharrer 120 acres of young coffee. Mr. McClaggan 120 acres in bearing. Messrs. Lamagna 700 acres in bearing. Mr. Hunter 100 acres, 20 in bearing. Mr. Sinderham 100 acres, 20 in bearing. Messrs. Pettitt 100 acres in bearing. Mr. Lloyd 50 acres of young coffee.

COFFEE IN ZOMBA DISTRICT, B.C. AFRICA.

Mr. R. Ross Stark has supplied us with the following information. Songani estate, which is situated about 6 miles north of Zomba, (the headquarters of the Administration), has a total extent of 1,787 acres. 250 acres of this have been cleared, and 200 are planted. 100 acres have into bearing this season, yielding a crop of 18 tons (or 3 cwt. per acre). Next year, as more land come into bearing, a crop of 25 to 30 tons is confidently expected. The plantation was opened some 4 years ago and a small crop of 3 tons was taken off a small acreage in bearing last year. The Zomba-Liwonde road passes within two or three minutes of the estate and this gives us direct communication with Blantyre and the lower river on the one hand, and Liwonde and the Lake on the other. The prospects of coffee in this district are excellent. At first the elevation of Songani, (about 2,500 feet,) was considered by some to be rather low for successful coffee planting, but this has been proved to be a mistake. As shade is now becoming the rule in B.C.A., the lower elevation estates will benefit the most from it, and should give more remunerative crops, than those at the higher elevations of over 3,000 feet.

PLANTING NOTES.

THOUGH CEYLON has not been subjected to seismic disturbances I read that the planters there are erecting factories entirely of iron; this certainly is a step in the right direction and worthy of emulation on the part of Assam people, one or two of whom, I am concerned to hear, are about to reconstruct their buildings of masonry.—*Cor., The Planter.*

CACAO HUSKS AS CATTLE FOOD.—The *Indische Mercur*, of Oct. 30, says, that at the recent gathering of German chocolate manufacturers held in Hamburg it was stated *inter alia* that experiments in the use of cacao husks as cattle food had yielded favourable results. This is good news for cacao planters, and ought to cause a rise in the price of the beans!

COFFEE CULTIVATION AT THE GOLD COAST.—During the last two years the Government has introduced machinery for pulping and curing coffee, and consignments of both coffee and cacao from the Gold Coast have been forwarded through the Crown Agents for sale in the London market. This plan afforded the best means for testing the commercial value of the produce, and the result shows that coffee and cacao can be grown in West Africa capable of realising good prices in European markets. Much, however, still remains to be done to induce the natives to cultivate and cure their produce in a satisfactory manner.—*H. and C. Mail*, Nov. 5.

WEST AUSTRALIAN JARRAH.—We call attention to the interview on this subject on the preceding page. We visited the chief Jarrah Forest of Western Australia in 1895, and have ever since watched the development of the use of the timber. Mr. Traylen has left a copy of a valuable work with us:—

Report on the Forests of Western Australia, their Description, Utilisation, and Proposed Future Management, with Plan and Illustrations, by J. Ednie-Brown, F.L.S., F.R.H.S., Conservator of Forests for Western Australia, Late Conservator of Forests for South Australia and Director-General of Forests in New South Wales).

ARE BANANAS BENEFICIAL?—In an exchange we read that a boom in bananas, baked bananas, has been started in the United States, the well-known fruit being now said to be an "ideal food" for the nervous, the anæmic, and for brain-workers. Strange to say, the raw fruit is said to be dangerous, as it contains "germs"; but when baked it acquires properties never heard of before. In this country we cannot get bananas in perfection; but they have them in fine condition in New York, to which city and other places on the Atlantic seaboard they are quickly transported from the Bahamas. Fruits of *Musa paradisiaca* and *M. sapientum*, the banana and the plantain, have long been known as a staple article of food in tropical countries, where they are cultivated just as the cereals and the farinaceous tubers are in temperate regions. In fact, cultivation has produced considerable variety in form, colour, and flavour. Humboldt and Bous-singault estimated that in a suitable climate, and well cultivated, a banana plant will produce on an average three bunches of fruit weighing 44 lb. each per annum, and that in hot climates more than 130,000 lb. of good food could be grown per acre—an amount greatly in excess of the yield of potatoes, which are, moreover, said to be less nutritious. That has, however, been disputed; but all travellers and investigators aver that the banana is an excellent food baked, roasted, fried, or boiled. In this country bunches weighing as much as 80 lb. have been grown in hot-houses.

COFFEE-GROWING IN NEW SOUTH WALES.

The following note has been submitted by Mr. C. Skelton, who recently visited the northern districts to report on the prospects of coffee-growing:—

Since my article on coffee-growing appeared in the *Agricultural Gazette* for January last, I have, at the instance of the Minister for Mines and Agriculture, inspected the Clarence, Richmond, and Tweed Rivers districts, with a view to ascertaining their capabilities for the production of coffee. In all three districts I saw large tracts of land, cleared and uncleared, well suited for the purpose; soil and climate are all that could be wished for, as also are the specimens of coffee trees I saw growing in the different districts, strong healthy, well-grown trees; in many instances, at the time of my visit, laden with crops. With the wonderful fertility of the soil and the general suitability of those parts of the Colony for the purpose, it is surprising that the industry has not progressed beyond the experimental stage; for, with the exception of a small plantation of 800 or 900 trees made by Mr. Bale, at Chatsworth Island on the Clarence River, and groups of two or three trees in gardens in the different districts, coffee, to any appreciable extent, has not been tried.***

In the northern rivers districts, I learned the usual rates for felling are from £1 to £1 2s 6d per acre; lopping will probably cost 10s an acre more, but it will be found after the fire to be 10s well expended, as it will, to a very great extent, do away with the usual piling and clearing up after the fire. To attain the same end, always set fire to the lee side of the clearing, and let it burn up against the wind; it will burn more slowly, but more effectively.**

The conditions for planting here being somewhat different from India and Ceylon, where cheap coolie labour is obtainable, I believe it would be an advantage to set out the coffee trees wilder apart than 6 feet, as formerly stated; say, 7 feet by 7 feet, or even a foot more; this would admit of the use of a one-horse light scarifier between them to keep the ground clear of weeds; it must be a very light scarifier, as the roots of the coffee are very near the surface. This space would also allow of the passage of some sort of vehicle to pick up the bags of cherry coffee in crop-picking time for transport to the curing works.***

Where the plantation is a considerable one, and pulping machinery, fermenting and washing cisterns, &c., have to be employed in the curing of the crop, it is scarcely possible to give directions that could be successfully carried out by a novice. When it is taken into consideration that in Ceylon, no man was deemed fit to take charge of a plantation until he had served for at least three years under an experienced planter, it will be understood there is a good deal to learn, and the proper conduct of curing operations is by no means the least part of it. The variations in the prices of coffee in the European markets—as much as 30 per cent and even more—are almost wholly due to the manner in which the curing of the different parcels has been carried out. It was principally for this reason, that in my report to the Minister, I suggested the opening of two demonstrative plantations by the Department of Agriculture, as object lessons to intending planters in the districts referred to. I can see no other way, with any hope of success, of imparting the requisite information.—*Agricultural Gazette*, for Oct.

COCA CULTIVATION IN BRITISH INDIA.—After consideration, the Government of Madras has decided not to engage actively in the manufacture of cocaine, but to do all in its power to foster the cultivation of coca in British India. The Curator of the Government Gardens, Nilgiris, has therefore been requested to obtain a small supply of seeds every year and to offer for sale the plants reared therefrom.—*Chemist and Druggist*, Nov. 6.

DRYING PEACHES FOR HOME USE.

MR WILLIAM ANDERSON, of East Kempsey, sends the following note on drying peaches for home use:—“Peel the peach. Cut it into about five pieces, cutting from the outside into the stone. Take a strong needle and a piece of cotton a yard and a half long (No. 16 sewing cotton will do), make a small slip-knot at the end of the cotton and thread the peaches on, putting the needle from the outside of the peach to the inside. Hang up the strings of fruit in a verandah, or where the wind and sun will get at them (I do not take mine in at night unless the weather is wet). Two or three days will dry the fruit, when it should be removed from the cotton, and placed, a few at a time, in the oven, being allowed to remain there till very hot, but not scorched or burned. Pack away in tins or some airtight vessel till required for use.”—*Agricultural Gazette*, for Oct.

NATAL TEA INDUSTRY.

It is satisfactory to learn that, notwithstanding the much-talked-of trade depression, the Natal tea industry appears to be making steady progress. The fact that Messrs. J. L. Hulett & Sons, Limited, have found it necessary to erect new premises, warehouses, offices, &c., in Durban, is an indication of the gradual advance of this industry. The total output of the season just commenced is expected to amount to 1,000,000 lb., of which the firm under notice will probably produce about two-thirds. The trade secured with the Cape Colony and the Transvaal is gradually increasing, and when the free interchange of Colonial products is agreed to between the States and Colonies of South Africa, Natal tea growers and manufacturers hope to find a much larger and more appreciative market. It is noteworthy that Messrs. Hulett & Sons have recently established offices in London, and are doing their utmost to push Natal teas in the Old Country. The opinion recently pronounced by a tea expert at Johannesburg that Natal teas are now so well manufactured that they are equal in appearance to those of Ceylon and India, augurs well for the success of the efforts being made to obtain a footing in the Home market, and it will be interesting to watch the result of the experiment.—*Natal Mercury*, Oct. 29.

COMMERCIAL OIL OF CITRONELLA.

Citronella oil, which is now extensively used in perfumery and for other purposes, is chiefly obtained from Ceylon and Singapore. It has been noticed for some time that the native-distilled oils have an aroma much inferior to those distilled by two English firms, viz.: Messrs. Fisher, of Singapore, and Messrs. Winter and Son, of Galle (Ceylon), and that these two classes of oils also show very marked differences in physical characters, as the following average figures indicate:—

The oils of the first class, i.e., native-distilled, have a high specific gravity, .910 at 15° C. an optical rotation of -14° in a tube of 100 m.m., and yield a slight deposit upon treatment with five volumes of 80 per cent. alcohol.

The oils of the second class have a specific gravity of .886 to .889 at 15° C., a rotation of from -4° to -6° in a tube 100 m.m., and are readily soluble in 80 per cent. alcohol.

No details are known of the method of distillation adopted in the two cases, but it is stated that there is no difference in the variety of grass from which the oil is obtained. It has been suggested that the observed differences are due to the sophistication of the oils of the first class, but the nature of the adulterant, if any, has never been determined, and this view of the matter has been questioned.

To clear up the existing uncertainty, Messrs. J. C. Umney and Swinton have examined a number of commercial samples of both classes of oil, and their results were communicated to the recent British Pharmaceutical Conference. The following are the most

important of these:—On submitting the oils to steam-distillation considerable differences were observed. In the case of oils of the second class practically the whole readily passed over, whereas those of the first class gave a residue amounting to about 37 per cent. of the total quantity. This behaviour would suggest that the oils of the English firms are steam-distilled, while those prepared by the natives are obtained by fire heat. The residue, after purification, distilled between 245° and 280° C. at ordinary pressure, and had a high specific gravity. It is stated to possess all the characters of a sesquiterpene, but differs in physical properties from any previously-described bodies of that class. It is odourless and therefore a valueless constituent of the oil, and as it is only fairly soluble in alcohol, it affects the solubility in that liquid. Its high specific gravity accounts for the differences shown by the two classes in this respect, but as it is optically inactive its presence does not explain the higher optical activity of the native-distilled oil. To determine the cause of this, the first fractions of the oils were examined, in order to ascertain the nature of the terpenes present. After refractionation the first 6 per cent. of each was collected. In the case of the native-distilled oils this boiled below 170° C., and had a rotation of -42° in a tube of 100 m.m., its specific gravity was .859 at 15° C. These characters do not correspond with camphene, the only optically active terpene hitherto found in citronella oil, and, by acetylation and subsequent saponification, camphene was proved to be almost entirely absent. The corresponding fraction of the oil of the second class had a rotation of only -11° in a tube of 100 m.m., and its boiling point rose to 190° C. It was proved to consist chiefly of camphene, the active terpene of the former class being absent. There can be no doubt, therefore, that the high optical activity of the native-distilled oils is due to the presence of this terpene, which does not exist in, or has been removed from, the oils of the second class. The authors conclude from this that the native-distilled oil is in no way sophisticated, but is a genuine natural oil. Its high specific gravity and rotatory power are due to the presence of the above-mentioned sesquiterpene and terpene, which also affect the solubility in alcohol, and, by acting as diluents, impair the odour value.—*Imperial Institute Journal.*

BRAZIL COFFEE NOTES.

A telegram of the 17th inst. from Ceará says that the Baturité coffee crop is expected to be large.

Dr. André Werneck says that at the present cost of growing coffee the price of 12½ an arroba does not pay expenses. He accordingly suggests that whenever the price falls below that rate coffee shall be exempt from export duty, which should moreover, he thinks, be regulated by a sliding scale when prices are higher.—*Rio News*, Oct. 19.

CEYLON AND INDIAN TEAS.

An old Ceylon friend in London writes again to hint at improvement in the 'make' of Ceylon teas:—

"So far as I can understand from the brokers the Ceylon samples I last sent you were high grown teas, but what I wished to impress upon the planters was the *make* of the teas and it did not matter one fig whether they were high or low. Any one would observe the superior finish of the Indian teas and it a very exceptional thing to see Indians manufactured like the undesirable teas I sent. I must say I think Ceylon people are not inclined to take suggestions that would result to their own benefit. Teas of the kind I refer to must be classed with low classed teas as they are not suitable for blending with teas well made and an improvement of 1d. a lb. would well repay a little extra care. Of course the present position of the market blinds then to

the fact that the present price will not long continue and it is only attention to manufacture that will keep up their average to a paying point."

THE CACAO CANKER—II.

Shortly after the publication of the last Circular in this Series, the reports on specimens sent to Kew were received through the Colonial Office. These, with the covering letters, are given below, with such footnotes as are needed to make them more readily intelligible. * * *

[Mr. Chamberlain's letter is simply a formal covering letter in which he states no specialist will be sent out, in view of what Mr. Thiselton-Dyer writes:—

"I enclose a report upon these specimens, which I think leaves little room for doubt that the disease is due to a fungus, the growth of which has been promoted by unsuitable methods of cultivation. I further enclose a memorandum by the Assistant Director as to the remedial measures which the circumstances suggest. With this information before him the Director of the Royal Botanic Gardens, Peradeniya, ought to be able to deal with the problem. I am not therefore prepared to recommend that a specialist should be sent to Ceylon as suggested by the Governor."—Ed. T.A.]

Memorandum from the Assistant Director Royal Gardens Kew, to the Director.

The probability is that the canker in cacao trees in Ceylon is caused by a fungus, the nature of which is at present imperfectly known.

2. It is understood that since the attack of the *Helopeltis Antonii* some change has taken place in the method of cultivating cacao in Ceylon. More shade is used than formerly, and the trees are covered in to such an extent that the ground underneath is constantly kept moist and covered with a heavy layer of damp dead leaves. There is no definite information in regard to the amount of drainage provided. This is a vital point. In all damp situations and those liable at any time to the lodgment of water during heavy rains there should be drains cut two feet or more deep between every row of trees. In fact, the bottom of the drain should be below the level of the feeding roots of the tree.

3. In Trinidad and Grenada draining cacao has lately received considerable attention. Where the soil is "sour" through accumulated moisture the trees have died over considerable areas. The only cure for this is deep draining, turning over of the soil, and the application of a small quantity of lime or other suitable ingredient.

4. Everywhere young cacao appears to require some shade, but the extent to which mature trees require shade depends very much on the locality. In Trinidad the trees are usually shaded all over the island. In Grenada, on the other hand, the trees have little or no overhanging shade, but are usually protected by shelter belts planted or allowed to grow on the ridge.

5. The Ceylon cacao planters would do well (1) to examine the drainage of their estates very carefully; (2) to break up the soil where the trees have died and treat it with lime to kill the mycelium* in it; (3) to isolate the healthy trees from the unhealthy by deep trenches, and give only the amount of shade absolutely necessary.—D. MORRIS.

Report by Mr. G. Massee, Principal Assistant (Cryptogams) in the Herbarium, Royal Gardens, Kew.

The material sent for examination is insufficient for the determination of the fungus, but the exact agreement in structure, &c., of the mycelium* pre-

* The body of a fungus, made up of fine colourless threads, as may be readily seen on examination of a piece of mildew or mould with a good lens.

sent in the different pieces of bark suggest a fungus as the cause of the disease, and furthermore, that the fungus belongs to the group causing root disease. If the roots of a diseased tree are removed and portions kept moist under a bell-jar, the characteristic snow-white nodulose mycelium would in all probability cover the roots in a few days.

The sporophores* of such fungi are only produced on dead and thoroughly decayed host plants.

The two conditions favouring the spread of root disease are: (1) accumulation of humus,† &c., on the ground, which retains moisture and favours the spread of the mycelium from tree to tree; (2) overhead shade.

Diseased trees should be isolated by narrow trenches, 8 to 10 inches deep. These retard the spread of the mycelium. The removal of the roots of dead trees and sterilization‡ of the soil (by fire, &c.) is most important.

Ascertain if the disease attacks native trees, may be in a modified form.—G. MASSEE.

It will be seen from the above that the home authorities regard the fungus as one of the class of root-disease fungi. Without the reproductive organs, the exact identification of a fungus is all but impossible, and until quite lately no sign of such organs has been discovered on any of the diseased cacao.

It is obvious that if the canker on the stem be merely an indication of diseased roots, the treatment recommended in the preceding Circular will have to be modified: mere removal of diseased parts of the stem will be evidently only a temporary measure.

Most observations made in Ceylon seem to contradict the supposition of its being a root disease, and the publication of this Circular has therefore been delayed for further investigation of the subject. It so happens that the group of fungi causing many of the bark cankers of trees is very closely allied to the group causing root diseases.

These bark canker fungi as a rule can only enter the stem by way of wounded surfaces on the bark, but a very slight wound is often sufficient. The frequent connection of the cacao canker with wounded places has been pointed out in the preceding Circular.

Reproductive organs which appear to belong to the fungus causing the cacao canker have recently been discovered on the bark of the stem, and indicate that the fungus does belong to one of the two groups just mentioned. As no sign of these organs can be found on the roots, and the mycelium mentioned in Mr. Massee's report has not been seen on roots treated in the way there described, it seems more probable that the canker is only a bark and not a root disease. Again however the final decision of this question requires experiments in the infection of healthy trees, &c., which are now being carried on at Peradeniya, and also further reference to the authorities at home, it has been decided to publish this Circular without further delay.

The presence of the disease, as stated in the preceding Circular, is largely connected with insufficient drainage, and Dr. Morris's recommendations on this subject deserve careful attention. In many cacao plantations in Ceylon the soil has become sour through insufficient drainage, and the application of lime in some of these cases has been most beneficial.

Besides its action in removing the sourness of the soil, the application of lime helps to kill the fungi that may be present, and is therefore much to be recommended.

* The spore-bearing organs of the fungus: the spores are the detached portions which reproduce the fungus; placed under suitable conditions a spore germinates and gives rise to a new mycelium.

† Decaying organic matter, whether of animal or vegetable origin.

‡ The killing of all living matter: spores, mycelium, &c.

Dr. Morris's remarks on shading should also be noted. Mature cacao can do with very little shade from the sun, but requires protection from wind. In the Botanic Garden at Anuradhapura the *Forastero* cacao does excellently with practically no overhead shade at all, hot and dry though the climate is. The shade in most Ceylon plantations was provided to avoid the attacks of *Helopeltis*, and now that the trees have grown very large it is probably denser than is necessary for that purpose. The reduction, if made, should be very gradual, otherwise the sudden increase of the crop will tend to weaken the trees. This reduction would act upon the fungus causing the canker in two ways: by drying the soil and thus helping to prevent its getting sour and so weakening the trees, and by the direct action of the sunlight, which checks the growth of fungi and is often fatal to fungus spores upon which it acts. Care should be taken to see that cacao is well sheltered from wind: not merely is wind harmful to the plant itself, but it also carries the spores of disease from one plant to another.

The period at which further spread of the disease usually takes place is now approaching, viz., the wet weather of the north-east monsoon, and especial care should be taken to destroy as far as possible all diseased trees, and parts of trees, to prevent the disease extending. The reproductive organs both of root and bark diseases are produced only on dead and decaying parts of diseased trees, and if these reproductive organs can be destroyed, or prevented from forming, as the case may be, the disease will thus be prevented from spreading to fresh trees.

To this end it is essential that the destruction be by fire, which alone is certain to kill the fungi. Also, the destruction should be on the spot where the diseased tree grew. If infected trees or parts of trees are carried about the estate, they will spread the disease as they go by scattering the fungus spores. For the same reason coolies should be prevented from going amongst healthy trees immediately after working amongst diseased ones. They should wash themselves before doing so. It would be advisable to employ a separate gang of coolies in working with diseased trees.

All diseased trees should be cut down to the ground, or better rooted up, and burnt upon the spot, and at the same time all the dead leaves and other rubbish lying round about them should be burnt. The surface soil should be turned over and treated with lime and the ground left fallow for some time. If planted again in cacao, *Forastero* varieties should be employed (see remarks on pages 10 and 11 of the preceding Circular).

On estates where the disease is widespread it would be well to burn all the dead leaves and lime the soil, as there will probably be fungus spores lying on the ground ready for germination in all parts of the estate.

In dealing with diseases caused by parasitic fungi, the aim is prevention rather than cure. Once a tree is fairly attacked cure is usually impossible, and it is best to kill and destroy it.

In the neighbourhood of diseased trees not merely the soil, but also the surrounding healthy trees (including of course the shade trees) will be more or less covered with spores of the disease. Those on the soil may be killed by the lime treatment above described, but considerable danger remains from those on the trees, which under favourable conditions will germinate there and produce further attacks of the disease. These spores may be killed by the application of various fungicides. The best

DEAFNESS. An essay describing a really genuine Cure for Deafness. Ringing in Ears, &c., no matter how severe or long standing, will be sent post free.—Artificial Eardrums and similar appliances entirely superseded. Address THOMAS KEMPE, VICTORIA CHAMBERS, 19, SOUTHAMPTON BUILDINGS, HOLBORN, LONDON.

general fungicide is Bordeaux mixture. In Europe this can be applied to leaves as well as stems, but as it is said to cause damage to the former in wet seasons, it would be well in Ceylon to apply it only to the stem. This, however, is of less moment, as the disease does not appear to attack leaves or young shoots, and if all the leaves that fall from the plants are raked up and burnt the danger from the spores that may be resting on them will be lessened. The composition of Bordeaux mixture is:—

Copper sulphate (blue vitriol) ..	6lb.
Quicklime	4lb.
Water	45 gallons.

The vitriol should be dissolved in a little water and boiled; to it should be added, while hot, the lime which has been slaked in a small quantity of water and stirred into a paste. The two should be thoroughly mixed and the mixture diluted to 45 gallons. It should be tested by holding a clean steel knife in it for two or three minutes. If a raddish stain of copper is formed on the knife there is not enough lime present, and more must be stirred in until the mixture is neutral and no longer produces any stain. Before use, and while in use, it must be kept thoroughly stirred, as the important part of it is the sediment rather than the fluid. The mixture may be applied with a brush or a spraying apparatus. The latter, if used, must be thoroughly cleaned with hot water immediately afterwards, or the tubes and taps will be clogged.

Another useful fungicide is the lime and sulphur wash, but it must not be applied to the leaves. Its composition is:—

Unslaked lime ..	25 to 40 lb.
Salt ..	15 lb.
Sulphur ..	20 lb.
Water ..	60 gallons

To mix, take ten pounds of lime, twenty of sulphur, and twenty gallons of water, boil till the sulphur is thoroughly dissolved; take the remainder of the lime and fifteen pounds of salt, slake, mix with the first lot, and add enough water to make up to sixty gallons. Strain and use when milk-warm.

Either of these mixtures will kill the spores on the bark, but if the disease is already established on the tree it is useless to apply them, and the tree should be killed.

Of course the stems of the shade trees should be treated with the mixture as well as those of the cacao itself.

Heavy rains will soon wash off most of the fungicide, and a new coating should be given every month or so.

If care is taken to destroy all dying and dead stems, leaves, &c., on which the fungus might develop its reproductive organs, and if fungicides are applied regularly for at least six months, there would seem to be a fair chance of eradicating the disease to a large extent. The completely exterminate it may be regarded as all but impossible. All that can be done in cases like this is at best to reduce the prevalence of disease to a large extent by killing and burning diseased trees, applying the preventive measures to the survivors, disinfecting the soil as far as possible, and taking more care in cultivation to keep the trees in good health, and thus render them less liable to disease.

The chief causes of ill-health among cacao trees have already been mentioned in the preceding Circular, and attention may again be drawn to the recommendations there made, especially those relating to the treatment of wounds and the planting of *Forastero* varieties.

There is a good deal to be said in favour of the method employed by some planters of allowing the suckers to grow. Unskilful removal of them affords openings for disease to attack the trees. Probably on estates where there is much disease it would be better to leave them on the trees.

JOHN C. WILLIS,
Director, Royal Botanic Gardens,

THE CACAO DISEASE.

The Director of the Botanical Gardens continues his good work and the receipt of Reports from Kew Gardens enables Mr. Willis (in his circular No. III) to discuss at some length and in a way marked by practical good sense, the pest affecting so many of the Ceylon cacao fields especially in the Wategama and Matale Districts. It is clear as the outcome of the discussion which is reproduced above—that there is no royal road to a cure—no heroic remedy;—but planters will find some good advice and suggestions which are well worth trying. More can be done by the planters themselves by intelligent experiments in the fields affected, than in any other way, and if results are carefully reported, the whole community concerned, cannot fail to be benefited. We need do no more now than direct special attention to what is written on the subject by Messrs. Morris and Willis given above.

MINOR PRODUCTS :—DRUG REPORT.

(From the *Chemist and Druggist*.)

London, Nov. 11th.

CARDAMOMS.—A fairly large supply (211 packages) was offered today, of which about 130 found buyers at barely steady prices, and in some cases a slight reduction in value. Ceylon-Mysore, fair long round medium palish, realised, 3s 9d to 3s 10d; fair medium brownish 3s 6d; small palish 3s 4d; very small ditto 3s 1d; medium brownish split and dull 2s 6d to 2s 8d per lb. Tellicherry cardamoms were all bought in. Fair to dull bright Seeds sold at 3s 7d to 3s 8d per lb.; dull ditto 2s 6d; really fine seeds are help 4s per lb.

COCOA-LEAVES.—The cocoa-leaves offered on our market nowadays are of much poorer appearance than those which we were accustomed to see a few years ago. At today's sales 86 bales were shown. They consisted mostly of ordinary partly broken greyish Truxillo leaves, which are held at about 6d per lb., and of Huanocho leaves of dark colour, which were bought in at 8d per lb.

CROTON SEED.—The only parcel of East Indian croton seed offered at auction was one of four bags very dark mixed seed from Colombo. This was bought in at 50s per cwt. nominally. Another parcel of 10 bags dark grey small seed from Shanghai, which has been offered before, was also bought in at 50s per cwt.

KOLA-NUTS.—Steady. At auction today a fairly large quantity was offered. Good washed African are held at 6d to 7d per lb., dark to fair at 4d per lb. No sales were made.

OILS (Essenti l).—Citronella oil is quieter at 1s 4½d per lb. nominally on the spot. To arrive 1s 2½d per lb., c.i.f. is asked for drums, although recently as much as 1s 4½d per lb., c.i.f. was paid. Lemongrass oil still rising. Cajuput oil still remains very scarce and dear. At auction 2 cases of 60 bottles each were offered. They were imported as far back as 1880, and sold at the high figure of 1s 1d per bottle, showing a decided advance in price. Two cases white Jamaica Oil of bay (each 28 quart bottles) were bought in at 7s per lb. Cinnamon oil of fine quality is scarce. Two cases fair (T Perera) oil were brought in at 1s 6d per oz., and 2 cases "sweet" oil at 5s per oz. Eucalyptus oil was plentifully represented at today's public sales. The chief consuming season is now at hand, but nevertheless the market shows no life. Nine cases pale yellow oil of good aroma from Melbourne were bought in at 1s 2d per lb., four cases pale "Cygnet" oil at 1s 7d per lb., eight cases fair "K.M.C." Tasmanian oil at 1s 8d per lb., and ten cases (two 35-lb. tins) fine globulus oil from Lisbon at 1s 9d per lb. For ten cases fair quality oil from Adelaide 1s 1d per lb. was suggested as the price. Twenty-five cases "Lubra" brand were bought in at 2s per lb., and for ten cases nondescript of fair appearance a bid of 9½d per lb. was refused. Distilled W.I. Lime oil is still plentiful. At today's auctions four cases of good quality from Jamaica and Dominica were shown, and sold at 3s 4d per lb., which shows an advance of 1d on the recent figure. There were also two cases of expressed lime oil, of nice appearance, each containing twelve 16½-oz. bottles. One realized 4s 3d per lb., a considerable reduction on the last price.

VANILLA.—862 packages of mostly new crop Bourbon and Mauritius will be offered at auction tomorrow (Friday) when lower prices are expected.

THE
AGRICULTURAL MAGAZINE,
COLOMBO.

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

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

Vol. IX.]

DECEMBER, 1897.

[Nos. 6 & 7.

SAESON REPORTS.



ESTERN Province.—Paddy. Yala harvest over; Maha cultivation begun, and some damage caused by rain, but a fairly good crop is expected.

Central Province.—Paddy. Yala harvest nearly over, prospects of yield good; Maha sowing and transplanting going on. Rainfall in Matale 7·67 in. Health of cattle good.

Northern Province.—Paddy. Sowing practically over, and most of the plants are up. More rain wanted. Rainfall in Jaffna 1·88 in. Health of cattle satisfactory.

Southern Province.—Paddy. Maha crop sown, weather favourable on the Galle side, but rain wanted in the Hambantota district. Rainfall in Galle 1·76 in.

Eastern Province.—Paddy. Late pinmari being harvested and in some places threshed; Munmari cultivation for 1898 progressing. Rainfall in Batticaloa 1·14 in., in Trincomalee 2·81 in. Cattle murrain still in the Batticaloa district.

North-Western Province.—Paddy. Maha crops progressing, and prospects fairly good. Cattle murrain reported to be on the increase since September in the Kurunegala district. Rainfall at Puttalam ·64 in.

North-Central Province.—Paddy. Yala crops reaped, cultivation began for Maha in some places. Murrain prevailing in some villages in Eppawala and Kalagama Korales.

Province of Uva.—Paddy. Preparations for Yala going on, and in some parts sowing commenced. Fruits and vegetables plentiful and cheap.

Province of Sabaragamuwa.—Paddy. Yala harvested, reaped and stored; the yield on the Ratnapura side not good. Maha prospects good in Kegalle district, but unfavourable in Ratnapura. Health of cattle good, saving some cases of foot-and-mouth disease.

OCCASIONAL NOTES.

Erratum.—In the November number, on page, 41, the mean rainfall for October at the School of Agriculture should be ·139 and not ·19 in.

Early in November the students of the School of Agriculture and Training School were taken by the Superintendent over Messrs. Vavasseur's Coconut mills by arrangement with the Manageri and saw the various operations in connection with the desiccation of coconuts and the preparation of coir fibre. Our thanks are due to Messrs. Vavasseur & Co. for permitting the students to go over their works.

Mr. E. Roosmalecoq, Instructor in Surveying and Levelling at the Technical College, has been appointed teacher in surveying to the students of the Forestry School, and has already taken up duties.

In his address on the opening of the new session of the Legislative Council on November 5th, His Excellency the Governor made the following statement:—"An endeavour is being made to bring the Gardens into closer touch

with the public by the publication of periodical circulars on important subjects. Mr. Willis (the Director of Botanic Gardens) intends to arrange for personal instruction by members of the Staff, whether by lectures away from Peradeniya, or by demonstrations in the Garden and elsewhere. The latter branch of work, however he thinks should be connected with the School of Agriculture, and he proposes to bring it before the Committee dealing with that institution."

Arrangements have been made for the appointment of a "Scientific assistant" to the Director of Botanic Gardens. For the first occupant of the post the Director is trying to get a man with sufficient training in the study of fungi to enable him to work out the life histories of the fungi of the cocoa and betel diseases and others. Another man might be afterwards obtained who would study rubber thoroughly, then perhaps a skilled viticulturist to teach vine-growing in Ceylon, and so on.

Tous-les-mois, St. Vincent arrowroot and Queensland arrowroot are different names for *Canna edulis*. The farina from the tubers of this plant, which has been more than once referred to in the Magazine, [vide vol. VI., No. 3, page 28, and vol. IX., No. 4, page 35] is considered to be equal to or more valuable than ordinary arrowroot, though not so white. In 1894 a crop of *Canna edulis* was raised on the School of Agriculture grounds. We may mention that the preparation of arrowroot from this plant is not unknown to the natives. In Badulla and the Rayigam Korale it is cultivated for this purpose.

We read in the Government Resolution on the report of the Agricultural Department of Bengal for 1896 the following reference to *Agricultural Education*:—"The Agricultural Conference held in Calcutta in 1896 recommended (1), that the course of study in primary and middle schools should be revised so as to include a graduated series of lessons in agriculture and in other subjects of elementary science; (2), that agricultural classes should be opened in connection with the Seebpore Engineering College; and (3), that a certain number of appointments in the public service should be reserved for those who have received an agricultural education. The sanction of the Government of India has recently been received for the opening of agricultural classes at Seebpore, and the details of the scheme, which will soon be published, for giving effect to these recommendations of the Conference, are now being worked out. We also note in the same connection that agricultural exhibitions were held in no less than 15 centres during the year, and that they were all assisted by Government with grants of money which were chiefly spent in prizes. The expenditure of the Department on *agricultural enquiry and improvement* alone (excluding pay of superior establishment, silk experiments, veterinary work, &c.) was Rs.10,354; and the Lieutenant-Governor expresses his opinion that the expenditure which is spoken of as *small* is more than justified by the information collected and practical results achieved.

We would draw special attention to the recommendations referred to above, especially to that by which a certain number of appointments will be reserved for those who have received an agricultural education. It is to be hoped that the Ceylon Government will also come to recognise the necessity of holding out some inducements in order to draw to the School of Agriculture each year a number of students of fair intelligence and respectability, so that the teachings of modern agriculture might find in them a good nidus, and eventually leaven the whole mass of our rural population.

Among the visitors at the School of Agriculture during November was Professor J. L. Janson, Professor of Agriculture in the Imperial University of Japan, Tokiyo. Prof. Janson spent a couple of hours on the premises, in going over the grounds, and visiting the Government dairy in which he was particularly interested. It would appear that while the work of the Japanese Agricultural College has developed in the direction of agricultural chemistry, little or nothing is being done in the way of dairying and cattle breeding. Altogether the Professor's visit was a most interesting one, and having done a great deal of travelling, his agricultural experience is both extensive and valuable.

The Colonial Veterinary Surgeon left for the Kurunegala district during the latter part of November, as cattle plague was reported to be prevailing there. Mr. Sturgess, who made some serum inoculation experiments on the last occasion he visited an infected district, intends to carry out further experiments, this time with bile, on the lines recommended by Dr. Koch.

By the time the present number of the *Agricultural Magazine* reaches the hands of our readers, the Christmas season will have begun, and we therefore take the opportunity afforded us here of wishing each and every one of our supporters and well-wishers a bright and happy Christmas and the prospect and a prosperous New Year.

As usual, the present issue of the Magazine appears as a double number at this season. Subscribers will please therefore note that Nos. 6 and 7 appear in a combined form.

We would draw attention to the advertisement on the cover referring to bee hives.

Tagasaste or Tree Lucerne (*Cystisus proliferus*) which has been so much written about as a fodder plant would not seem to have much chance of extended cultivation in the Island. Mr. Nock, of the Hakgala Gardens, writing about the tree says: "The *Cystisuses* generally do not do well here, being very uneven in growth,"—one year making long shoots and the next scarcely any at all, and then going right out during the heavy rains or drought. However, *Cystisus canariensis* has done fairly well for some years, and last year we raised a few plants of the Tree Lucerne (*C. proliferus*). They did well for a time, and then most of them

suddenly died. We have now one plant over 3 feet high which is perfectly healthy, and the foliage looks soft and tempting as a fodder. I am afraid it would never thrive in the lowcountry." The Superintendent of Government Botanical Gardens, Sabaranpur, writing to us says: "I have several times tried Tagasaste. It succeeded very well during the cold season, but always died off in the rains. I should say it has no chance with you on the plains, but it might thrive at one of your hill stations."

What is known as "Jarrah timber" is got from *Eucalyptus marginata*. We note that *Timber*, of May 20th, 1893, published a letter from Cathcart W. Methuen, Engineer-in-Chief of the Natal Harbour Board, in which he describes experiments made with Madagascar timber as compared with Australian Jarrah wood, and states that the Madagascar timbers were practically untouched while Jarrah was much worm-eaten.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF NOVEMBER, 1897.

1	Monday	.. Nil	17	Wednesday	.. Nil
2	Tuesday	.. '21	18	Thursday	.. Nil
3	Wednesday	.. 1'62	19	Friday	.. Nil
4	Thursday	.. '88	20	Saturday	.. Nil
5	Friday	.. Nil	21	Sunday	.. Nil
6	Saturday	.. '07	22	Monday	.. Nil
7	Sunday	.. Nil	23	Tuesday	.. Nil
8	Monday	.. Nil	24	Wednesday	.. Nil
9	Tuesday	.. Nil	25	Thursday	.. Nil
10	Wednesday	.. 3'44	26	Friday	.. Nil
11	Thursday	.. Nil	27	Saturday	.. Nil
12	Friday	.. 2'18	28	Sunday	.. Nil
13	Saturday	.. Nil	29	Monday	.. Nil
14	Sunday	.. '64	30	Tuesday	.. Nil
15	Monday	.. 1'39	1	Wednesday	.. '13
16	Tuesday	.. Nil			

Total.. 10'56
Mean.. '35

Greatest amount of rainfall in any 24 hours on the 10th, Wednesday, 3'44 inches.

Recorded by A. R. JEREMIAH.

THE VALUE OF PLANT ROOTS AS TILLERS OF THE SOIL.

This is the title of a communication to the last number of the Royal Agricultural Society's Journal, made by a writer (Robert H. Elliot) who states that he began life as an agriculturist in Mysore, and has since then been farming in Scotland. The object of the communication is stated at the outset to be to show how, in the face of foreign competition, farmers could produce more cheaper than now, and at the same time largely improve the fertility of their soils. But we will let the writer speak in his own words.

To clearly apprehend how both these objects can be carried out, it is necessary in the first instance to remark on the causes of the decline of fertility in most soils. And, first of all, let

us examine the conditions when the soil is taken in from forest lands, or from the original turf which has never been disturbed from time immemorial. If, then, we clear down the former, as I often have, we find that, partly from the land not having been exposed to the elements, but mainly from its being interpenetrated with the rootlets of jungle, shrubs, and tares, the soil is in the most perfect physical condition. But as time advances the rootlets of course decay, and the soil then loses its original condition and becomes a bad nidus for the plant; and so much so, that while in newly-opened land the young coffee plants flourish exceedingly, in the land that has been long ago opened the plants cannot be successfully grown without much cattle manure, or with the aid of virgin topsoil taken from the adjacent forest land. And many years ago we had excellent proof that the failure of the young plants was not owing to the decline of the, strictly speaking, chemical condition of the soil; for on comparing an analysis of the original soil with an analysis of soil from which sixteen crops of coffee had been taken without manure, we found that the soil was little the worse, and only showed a slight deficiency in lime, the leaves which annually fall from the large trees which shade the coffee having evidently supplied the exhaustion caused by the crops. The examination was carefully conducted by the late Professor Anderson, of Glasgow, and a brother-planter who called on him to hear the result very naturally asked how it was that, if the soil was only so slightly impaired, we could hardly grow young coffee plants in it, or but very unsuccessfully. "Simply," replied the Professor, "when turf land is first ploughed up, it being deeply interpenetrated with grass roots, is in the same condition as a new forest soil, and no fertility is apparent till after the lapse of a greater or less number of years. Then as the vegetable matter becomes exhausted the soil solidifies and becomes not only tough but shallow, as it is no longer thickened and disintegrated by roots, a decline in fertility being the result; and though tillage may lessen the evil for a time, the particles of soil, being no longer kept apart by vegetable matter, soon run together, and thus the land becomes a bad nidus for the plant. There are of course exceptions to every rule, and I may mention one of them, which after all proves the vast importance of a fine physical condition of the soil. . . . A small quantity of manure on land in good physical condition, such as a fine sandy loam, goes much further than in another of inferior physical condition, because the soil is continually a good nidus for the plant, and the roots can always readily ramify through it in search of food." Sir John Lawes says with reference to his own great work: "All our experiments tend to show that it is the physical condition of the soil, its capacity for absorbing and retaining water, its permeability to roots, and its capacity for absorbing and radiating heat, that is of more importance than its, strictly speaking, chemical composition."

-We have now seen the value of roots in maintaining the physical condition of the soil. To further extend our view of their importance,

we must next consider the value of roots of certain classes of plants for bringing up nitrates, ash constituents and moisture from below, and look upon them besides as sub-soil ploughing agents.

With certain crops (parsnips) it is found that though the land was worked only a foot deep, that the soil immediately below the part dug is in finer physical condition than the cultivated land above, due to the roots penetrating and minutely subdividing the hard subsoil. We give another illustration from India, where the same result is seen when forest gradually extends itself into adjacent grass land, and the roots of the trees permeate the land below the roots of the grass, and so turn the whole soil to a considerable depth into beautiful cultivated condition. Again, agriculturists in France, in order to improve certain arable lands, are known to sow on them a mixture of gorse and grass (to be cut for hay) with a view to improving the depth and texture of the soil which after some years is again ploughed up. We have now taken account of (1) the action of roots in dis-integrating the soil, and (2) their power to act as subsoil ploughs, and so to enable the roots of grasses and clover, and other plants, not only to supply themselves with moisture from great depths in the soil, but also to retrieve and bring to the surface nitrates and ash constituents which are far beyond the reach of ordinary plants at present used in agriculture, and thus, I need hardly say, add enormously and without any special outlay, to the manurial resources of the farmer. We have lastly to consider the direct manurial action of roots as they decay in the soil.

Humus, or decayed vegetable matter existing in the soil, is well known to be one of the most important constituents in all fertile soils, and it is this which largely gives great value to newly-cleared forest lands and freshly broken up old pasture. Through two agencies of cultivation, cropping and drainage, it is gradually partly consumed and partly washed out of the land, and I think I am correct in saying that, in the opinion of our most experienced agriculturists, one of the greatest difficulties is the exhaustion of the soil, mainly arising from the decline of this most necessary agricultural agent. And this is proved by the fact that if we put back on the soil as large an amount of vegetable matter as it contained originally, the poorest soil, will again and for some years, produce good crops, with the addition of little or no manure.

SCIENTIFIC MANURING. COCONUTS.

Communicated.

It will be a happy day for Ceylon when manuring is carried on generally on scientific lines. If we find a friend use a manure with satisfactory results, we take it for granted that it will yield like results if we use it ourselves, quite regardless of any difference there may be in the soil. We have not advanced sufficiently far in the path of agricultural progress to employ a chemist to analyze and report on our soils before

we use any manures. So far as the tea industry is concerned, thanks to Mr. Hughes, a complete analysis of the tea plant enables planters to apply manures to replace the elements of fertility removed by a tea cup.

Coconut planters unfortunately are not so highly favored. They do not count amongst their members men of sufficient progress who have a complete analysis of the coconut tree, and they have no Association to undertake what the individual has not the public spirit to do. "All about the Coconut Palm" has a series of analyses undertaken by Mr. Lepine of all parts of the coconut tree. The correctness of this table of analysis was taken for granted till Mr. Cochran recently undertook the analysis of the husk of a coconut. The disparity between his figures and those of Mr. Lepine was so startling as to shake confidence in all the figures of the latter. With this single reliable analysis of the husk, a system of scientific manuring for coconuts is recommended. This may strike one as not very scientific, but it is the best course to follow under the unfortunate circumstance in which coconut planters are placed, or rather have placed themselves.

Messrs. Freudenberg & Co. have with praise-worthy enterprise introduced into our market the chief manures which have been known to yield good results, and which are in general use in European agriculture, and they have with equal enterprise enlisted the services of Mr. Cochran to introduce them to the public with analyses of their composition and essays on the methods of applying them.

In Mr. Cochran's analysis of the husk of a coconut grown by the sea-shore, he found salt the dominant mineral constituent. He is not sure whether on this account he should recommend its application to coconut trees with other manures. It will be safe for him to do so, especially in situations removed some distance from the sea, and where in consequence the tree is not grown under natural conditions. On sandy, non-retentive soils it will be best to apply salt in grains on the surface of the soil towards the end of each monsoon. In the absence of reliable analyses of the products of the coconut tree, the plant food contained in manures, the application of which is known to yield good results in most soils, is taken as a basis to calculate the manurial ingredients of a coconut tree.

Nitrogen	...	1	lb.
Phosphoric Acid	...	1.25	"
Potash	...	$\frac{3}{4}$ —1	"

Thomas' Phosphate Powder being more soluble than the phosphate in bone meal, Mr. Cochran has thought fit to reduce the quantity of phosphoric acid in the mixture he recommends. Whether this is wise is a question. Perennials do not want so highly soluble and readily available manures as annuals. What the latter fails to take up during its limited life means in the first place a corresponding shortness of crop, and secondly a pecuniary loss. Chemical research has proved that drainage water has been found to contain manurial substances in solution. Not so with perennials, especially with the vast network of roots of the coconut palm. Hardly anything goes to waste. Everything is greedily sucked up. And

too readily available manure stimulates the tree to too heavy bearing and the natural reaction follows. For the cocconut palm the available plant food ought to be continuous. The quantity of potash for each tree has been increased and rightly. The mixture recommended is:—

Castor Cake ...	15 lb.
Phosphate Powder...	3 "
Sulphate of Potash ...	2 "
which is equivalent to	
Nitrogen...	1.05 lb.
Phosphoric Acid ...	1 "
Potash ...	1.18 "

This dose is to serve for two years, but if husks are removed for the estate 1 lb. of Sulphate of Potash ought to be added in the year following the application. Not knowing the price of Sulphate of Potash, Mr. Cochran cannot say whether it will be more economical to sell husks and buy and apply Sulphate of Potash or to burn the husks on the estate for the Potash they contain. Only few estates are so situated as to be able to sell their husks, and whether it is wise even for them to do so is a question, for according to Mr. Cochran's own analysis the ashes of husks contain besides Potash, Salt, Phosphoric Acid and Lime, all very valuable manurial agents.

KAINIT.

This is a Potash Salt that Mr. Cochran expects to yield very good results when applied to cocanuts:—

	COCONUT HUSKS.		KAINIT.
Potash ...	31%	...	12.8%
Salt ...	38 "	...	34 "
Magnesia...	3.6,	...	10 "

As the other products of the cocconut tree do not contain so much Potash as the husk, Mr. Cochran is of opinion that Kainit will be found to contain sufficient Potash for the requirements of the tree. As one ton of Sulphate of Potash has as much Potash as 4 tons of Kainit, the question is suggested as to whether it will be cheaper to apply the one or the other. Four tons of Kainit has, besides the Potash it contains, 1.28 tons of common salt, a very necessary manure for cocanuts. To form an opinion one requires the relative prices of the two manures. To price will have to be added transport of 3 tons extra and cost of application of same. Where transport is concerned, the more concentrated a manure is the better. No fear need be entertained about Kainit containing salt in excess of the actual requirements of the cocconut tree as indicated by analyses, and no necessity will arise to balance it by the addition of Sulphate of Potash. The natural conditions under which the cocconut palm grows, on the salt-saturated soil of the sea-shore and in an atmosphere heavily laden with salt, should not be forgotten. Besides, salt plays a very important part in altering the chemical and mechanical condition of soils.

CALOTROPIS GIGANTEA.

This plant known in India as Madar or Mudar, and among the Sinhalese as *wara*, is the subject of investigation by Messrs. Macdonald, Boyle & Co., the patentees of machinery for treating ramie

fibre. The bast fibre of the wara has attracted considerable attention in the past, and has been often referred to as one of the best of eastern fibres. The difficulty so far has been the inability to rapidly and cheaply separate and clear the fibre. If the ramie fibre machinery is found to do this as well as it has proved to do with ramie itself, a great success will be attained, and the wara which is a hardy weed in many parts should prove a dangerous rival to ramie.

Mr. Liotard, who has devoted much time to the study of Indian fibres, has, however, expressed a very unfavourable opinion with regard to Calotropis fibre, and that on two grounds, (1) the small percentage of fibre, and (2) the shortness of the fibre. Other observers, curiously enough, are loud in praise of it. The following statement contains the results of Dr. Wight's experiments as to the comparative strength of the fibre:—

Name of Fibre.	Weight in lb. the fibre can sustain.
Coconut... ..	224
Hibiscus Cannabinus	290
Sansiviera Zeylanica	316
Cotton	346
Agave Americana	362
Crotalaria Juncea	407
Calotropis Gigantea	552

A decided recommendation for Calotropis is the fact that it is not particular about the soil in which it grows, and flourishes in poor dry sandy situations as is well seen along the seaside railway line. It has been suggested that the plants should be employed to reclaim waste lands with poor soil.

In India the leaves and twigs are much sought after as a manure for paddy-fields, and wet lands so manured are found to yield a much superior crop. Another use to which the herbage is put is to reclaim lands impregnated with salt. The decomposition of the leaves somehow or other "kills the salt" as the natives say. So that in growing the plant for fibre, if nothing but the fibre be removed off the land and the leaves and rejected parts of the stem be returned to it, there should be little exhaustion of soil. As regards the value of the floss or silky coma got from the pod there has been much speculation, but Dr. Watt mentions that at the time of the last Indian and Colonial Exhibition held in London, he had an opportunity of discussing with manufacturers the prospects of Mudar floss, and that a Lancashire spinner had declared that he had completely overcome the difficulties offered by this floss and was prepared to purchase any quantity. The spinner referred to is said to have put some money into the hands of a missionary for the experimental cultivation of a few acres. Dr. Watt reports that the results have been encouraging, and hope is even held out that by careful selection of seed and attention to cultivation it might be possible to change the character of the floss and improve its length. Mr. Cameron of Mysore states that a demand has lately arisen for Mudar floss, Messrs. Collyer & Co., of London, offering 5d. a lb. for it.

In 1895 a letter from Messrs. Thirkell & Co., London, addressed to the editor of the *Observer*, was published in that paper, and there the

following passage occurs:—"In conclusion we would ask for samples of the silk cotton or flss from the seed-pod of the *Calotropis gigantea*, or Mudar for which a demand appears to be springing up again, present value about 6d. per lb. landed in London." Among the other products of *Calotropis gigantea* may be mentioned a dye, gutta-percha, liquor and "manna," and wood for charcoal, while the medicinal properties of the lant are well known and widely reputed.

DR. WATT ON COCONUT OIL.

While a brief abstract has been given of coconut oil, it is necessary to deal with this subject in greater detail. Enquiries are frequently addressed to the Government of India by merchants interested in the trade in this substance, so that it has become necessary to put on record as complete an account as can be collected from the scattered publications that exist, even should that prove but a statement of the littleness of our knowledge. One of the earliest, and to this day the most satisfactory descriptions of the Indian coconut oil industry is that written by Lieutenant H. P. Hawkes, and published in 1857. Gazetteer writers have contented themselves with treating the subject as too well known to call for any detailed description, and at most only the meagrest accounts have been given to the merchant desirous of starting a new or extending an existing trade, the question of primary importance to which he calls for a reply being the province or district with which he should open dealings. The chief products of the coconut are coir fibre, oil, and toddy, or the juice from which sugar and spirits may be prepared. We know that in Bombay the juice is largely extracted from the tree, that in Mysore the fibre is the chief preparation, and that in Madras and Travancore enormous quantities of both fibre and oil are exported; while Bengal, on the other hand, imports immense numbers of coconuts and a large quantity of copra, but exports very little of the products of the palm. It can nowhere, however, be discovered whether any two of these primary products, or all of them, can be derived from the same trees or even prepared by the same cultivators—certain plants or portions of the plantation being periodically set apart for these several industries. Under coir fibre it has been said that green or unripe coconut is alone used for that purpose, while most writers seem to agree that the ripe kernel is necessary for the oil. It would be most instructive to know if cultivation had resulted in the production of certain races of coconuts famous for their oil-yielding properties, just as the inhabitants of the Laccadive Islands appear to have developed a small fruited one with a specially good fibre. In connection with commercial reports on coconut oil it is generally stated that the finest qualities are obtained from "Cochin." (Spon places Cochin after Ceylon.) It will be recollected that this same statement occurs regarding the fibre derived (or supposed to be derived) from that Native State. The writer has failed to discover any account of the Cochin oil industry, and is almost

forced to the opinion that by "Cochin coconut oil" as with "Cochin coir" may be meant the superior qualities of the oil derived from the Madras Presidency. If ripe coconuts are essentially necessary for the preparation of the oil, then the Maldive and Nicobar Islands might be looked to as the great seats of the oil industry. But while these islands export perhaps little short of from 15 to 20 million ripe coconuts a year, they do not appear to manufacture coconut oil, and the ripe husks are of no use for fibre. So, in a like manner, the Laccadives would not be looked to as a source of oil; these islands are famous for their coir, the inhabitants growing a peculiar coconut that would seem to be inferior to the Malabar either as an oil-yielding or an edible nut. The imports from the Maldives and Nicobar Islands into Madras are very unimportant as compared with those recorded against Bengal, yet Madras, and not Bengal, appears to control the coconut oil market. This fact would lead to the inference that the locally-grown nuts of Madras were largely employed for the expression of oil—the very considerable imports from the Laccadives affecting mainly the coir industry. But if this inference be correct there remains the difficult position that the ripe nuts, serviceable for oil-making, yield no fibre. The presumption would therefore appear to be that a very much larger amount of the Madras coir comes from the Laccadives than we have any definite knowledge of at present, or that a large preparation of the coast coconuts or those of certain localities only are always or periodically set apart for oil-yielding. It may, of course, be the case that the trees are, so to speak, pruned by the removal for coir of so many green nuts from each tree, the remainder being allowed to ripen for oil purposes or as articles of diet.

This brief review, from want of definite information, may be accepted as indicating the direction that future reports might assume; but it may safely be concluded that, as with coir, so with coconut oil, Madras is the chief seat of the trade. Certain writers familiar only with Bengal (with the waving feathery clumps of coconuts dispersed through its suburban jungles or surrounding its mango topes) have advocated the claims of the Lower Provinces as a future region of oil-production. This would appear to be a pure hallucination which the enormous imports of ripe nuts should have prevented. It is extremely doubtful if Bengal is ever likely to do more than meet the local and internal demand for ripe nuts and oil. The European oil merchant, if he finds the suggestion impracticable which has been offered in an early paragraph, viz., to call in the aid of the Maldive and Nicobar Islands,—will do well to concentrate his attention on the Madras Presidency.

BANDAKAI FIBRE.

Enquiry has been made through the *Ceylon Independent* as to the possibility of extracting fibre from the plant locally known as "Bandakai" (its botanical name being *Hibiscus esculentus*),

and we therefore give the following references to the subject:—

The bast yields a strong useful fibre of a white colour, which is long and silky, generally strong and pliant, and composed of very strong individual fibres. It is employed economically in some parts of India, but in many districts where the plant is much grown as a vegetable, the excellence of the fibre seems to be unrecognised. It is undoubtedly valuable and seems to possess qualities specially fitting it for the purpose of paper-making. According to Roxburgh its breaking strain is 79 lb. when dry, 95 lb. when wet. It contains 74 per cent of cellulose, and in Messrs. Cross, Bevan & King's experiments it was found to lose 9.8 and 14.2 per cent of its weight when boiled in 1 per cent solution of caustic soda for five minutes and one hour respectively. The average yield of fibre by Death and Ellwood's process was found to be 84½ lb. per acre, while by retting it amounted to 6 maunds and 17 seers. (The acre yield of fibre by the same process from *Hibiscus abelmoschus*, Sinhalese "Kapu Kussa" was 800 lb. by retting 12 maunds and 17 seers; the average breaking weight of the fibre whether wet or dry being 107 lb.). Liotard in his *Paper-making Materials of India* notices the fibre, mentioning that it is very fine and well suited for paper making, and in another passage says that paper has been made with it, though only on a small scale, in the Lucknow Central Jail.

In France the manufacture of paper from this fibre is the subject of a patent; it receives only mechanical treatment and affords a paper called *banda*, equal to that obtained from pure rags. In Burma, Madras and other parts of India, the stem is allowed to rot unused. This valuable fibre which could thus be obtained very cheaply does not appear to attract the attention that it merits. (*Dr. Watt.*)

The okro (*Hibiscus esculentus*) has long been known to yield a long silky fibre. Specimens of Indian okro fibre in the Kew Museums resemble hemp in colour and texture. It is evidently well adapted for making ropes, twine, and sacking, while the residual portion can be utilized for paper-making.

Recently the preparation and use of okro fibre has been revived in the Southern United States, where the plant is largely grown during the summer season, and also in Cuba. In a report by Mr. Consul Ramsden the following information is furnished: "The fruit is well-known in the English West Indies under the name of 'okra' and is used as a vegetable, but although Pichardo, in his 'Diccionario de Voces Cubanas' mentions the plant as being applicable to rope making, I am unaware that it has been used as a fibre, and, therefore, refer to it here. Last year Messrs. Bosch & Co., of this city, made an experiment with some, and sent 400 pounds of the dried fibre to London, where they say it was much liked, and found to be worth £40 per ton. Three crops are obtained in the year, and its preparation by maceration gave very little trouble. The stem produces a fibre of fine quality, and about 4 feet in length, and apparently strong. Further trials will probably be made here. I send sample of it with this

report." With regard to the commercial value of this Cuban fibre, Messrs. Ide & Christy of 72, Mark Lane, E.C., to whom it was referred reported as follows: "The sample shows the fibre to be only moderately stronger than jute, imperfectly cleaned and very yellow in colour. We value it at £18 to £20 per ton today in London. It is possible that the colour could be greatly improved by more careful preparation, and that in that case its value might be increased by £4 or £5 per ton. We cannot imagine it possible that fibre of this type could have been found worth £40 per ton last year in London as stated to the Consul and mentioned in his report." (*Kew Bulletin*, No. 46.)

We find the following reference made by us to Bandakai fibre in our issue of September 1893: Within the past few years, says the *Auckland Weekly News*, much attention has been given to okra as a fibre plant in the Southern States of America. Mills are said to have been erected in England as well as in Germany and France by a Mr. Sadlow, for working up the raw material, which he says he can produce at ½d. per lb. This information came originally from an American source, and may of course be overdrawn, but one fact is clear, and that is that the fibre referred to is a valuable one and its production, cost and value are worth careful enquiry. In an official report on the cultivation of jute and other fibres, *Hibiscus esculentus* is referred to thus: The fibre is harsh and brittle for which reason it is not manufactured to any large extent in Bengal, but in Myren Singh and Dacca it is occasionally prepared for adulteration with jute. The defect in the fibre it would seem is due to the process adopted in making it, for in the Southern Presidency it is so manufactured as to retain considerable strength and pliancy, well-suited to the manufacture of rope, string, gunny bags and paper, and bearing considerable resemblance to the true hemp of Europe. The quantity prepared annually is large, and there is an exportation calculated many years ago at between 6,000 and 7,000 cwt., and valued at between £27,000 and £28,000.

SERUM INOCULATION FOR RINDERPEST,

Of the two methods recommended by Prof. Koch—the serum treatment and the bile treatment—for inoculating cattle with the object of rendering them immune against rinderpest, it would appear that the former will prove to be the most effective. Space does not admit of our referring to the difficulties which stand in the way of carrying out Koch's method of treatment with bile, or of describing Dr. Edington's improved method of using glycerinated bile (both of which when properly carried out have without doubt been the means of saving much loss of life), but we must not omit to quote the important communication made by the Colonial Veterinary Surgeon of the Cape with reference to the serum treatment:—

Professor Koch, in the early stages of his experiments at Kimberley, verified the fact already discovered, that serum obtained from salted cattle gave an immunity from rinderpest when injected

in large doses of 100 c.c., but that immunity conferred was only "passive in its nature and temporary in its effects." In order, therefore, to increase the immunising power of the serum, and at the same time reduce the necessity for so large a dose, he added to it 1 per cent. of rinderpest blood. This mixture acted more satisfactorily, but at that time he considered that it was neither so safe nor so effective as the gall obtained from sick animals. Contemporaneously experiments with serum were conducted conjointly by the chief veterinary surgeons, Mr. Pitchford, of Natal, and Mr. Theiler, of Transvaal, on similar lines. Since then Drs. Danysz and Bordet, the French scientists, have devoted their attention principally to the perfection of the serum method of treatment both as a preventive and curative agent. As they express it, "their main object was to procure a serum which could be successfully applied to a herd in which the disease had already made its appearance, and where the employment of methods which brought on the disease in a light degree could only aggravate the condition of the animals already affected," and the results of their numerous experiments show that this object has been attained.

With respect to the manner in which herds inoculated with serum should be treated, they say: "It is known that the blood of salted oxen does not give permanent immunity from rinderpest, but that animals injected with this blood acquire the property for a limited time of withstanding the attack of the disease more easily. If they are brought in contact with rinderpest after the injection with blood, they contract the disease but recover, and become salted. When the animals are already sick, or if they already possess the germs of rinderpest at the moment of injection, nothing else remains to be done than to inject blood to make the disease less serious for them. On the other hand, the animals that are not affected by rinderpest at the moment of injection must become infected, so that they can catch the disease in a light form which the blood will help them to get through, but which is also sufficient to thoroughly salt them. Rinderpest can be transmitted either by allowing the animals to mix with sick oxen, or by injecting rinderpest blood, and it must be known which of the two means is the better. We are convinced from the trials that infection solely and exclusively developed through rinderpest blood cannot be regarded as good, as it is impossible—within the range of our knowledge—to apply it in practice in such a manner as to obtain good results."

From the foregoing it will be observed that the principal advance which Drs. Danysz and Bordet have made in the application of the serum treatment to rinderpest consists in the method which they have devised for communicating the infection to the serum-inoculated cattle; so that they contract a modified form of the disease from which they recover and become salted. Other scientists, but principally Semmer, Nencki, Sieber, and Wyznilkiewicz, had previously discovered that the serum of animals which have recovered from the pest has immunising properties, but these experts trusted to repeated injections

of the serum while the animals were liable to the disease rather than to one large injection followed by immediate exposure to infection, so that the inoculated animal should contract a mild form of the disease at once, under the modifying effects of the serum, from which they would recover. This is the most important point in Drs. Danysz and Bordet's application of the serum method of treating rinderpest.

It has to be noted, however, that these French experts do not consider the serum treatment so suitable for dealing with clean herds as with herds already infected, or herds which can be exposed to infected animals immediately and continuously after inoculation. They say: "The injection of small quantities of rinderpest blood into animals that have been previously inoculated with the blood of salted animals is not sufficient to infect a beast in such a degree as to secure for them a continuous salting after the cure. . . . To attain a good result a carefully regulated quantity of blood must be injected, large enough to occasion a small degree of sickness, small enough to guard against serious sickness or death. But the correct measure of such a quantity of infected blood cannot be determined in practice, as it depends on how much strength the preventive blood previously injected possesses. Two samples of preventive blood never have the same strength. . . . It happens differently with animals which have received an injection of preventive blood, and coming into contact with animals infected with rinderpest immediately afterwards. Such animals always get an attack of rinderpest, which is not deadly, when the preventive blood used is good, but which is sufficient to well salt the beast." Further, if healthy animals which have been inoculated with preventive blood or serum are exposed to infected cattle immediately and continuously afterwards, it is of little importance whether the dose of serum injected is unnecessarily strong or not, so long as it is sufficiently strong to give complete immunity at the time; because the subsequent infection being continuous each animal contracts a mild form of the disease as the strength of the immunity conferred by the serum gradually admits. This cannot be accomplished satisfactorily by an injection of rinderpest blood, which has to be made at a definite time after the serum inoculation, because if the dose of serum is very strong the majority of the animals may resist the after-blood inoculation and manifest no signs of fever, and consequently will not become salted. On the other hand, should the dose of serum be comparatively weak, and the after-blood inoculation be too long delayed, the animals inoculated would be liable to contract a virulent form of rinderpest, from which many would die.

In like manner if a healthy herd of cattle is inoculated with a strong dose of serum, and at the end of 24 hours they are driven in amongst an infected herd, and kept there from 12 to 24 hours and then withdrawn, this has been found to give very unsatisfactory results, because during the short exposure many of the inoculated cattle did not contract the disease but caught the infection subsequently from their companions (since the immunity had passed off by that time) and died of

virulent rinderpest. Experience indicates therefore that the plan which gives most promise of success is to inoculate with a large dose of good serum or defibrinated blood obtained from a salted animal which has been fortified by several injections of rinderpest blood, and to expose the inoculated cattle immediately and continuously for several days afterwards, until every one has contracted a mild form of disease from which very few will die. While this is the position at present, "we have every hope," says Dr. Hutcheon "of being able to devise a method by which clean herds which cannot be exposed to infected cattle may be successfully inoculated with serum. Drs. Turner and Kolle have recently been directing their attention to this matter, and in a telegram which I received from these gentlemen on the 8th inst. (Sept.) they state that "there is no longer any doubt that the best way to immunise cattle is by injecting into them one cubic centime of virulent blood, and directly after infecting them with serum." Should their confidence in this matter be confirmed by extended experience, the inoculation of healthy herds with preventive serum will become a comparatively simple matter, which it is not at present."

Dr. Hutcheon cautions cattle owners against the indiscriminate use of serum; for it is a mistake to think that to bleed a salted animal and inoculate healthy stock with the blood is all that is necessary, since the result will be useless and disappointing.

FRUIT CULTURE.

Let us suppose that the land intended for the orchard has been thoroughly broken up and converted into mellow well-aerated soil, and the drains also laid out in the manner described. Open drains are in many ways objectionable; they are so much space wasted, the side-slopes inevitably become gardens of weeds and harborers for pests innumerable.

The next consideration is the laying out and locating places for the trees. The question of how many trees to put to an acre, is one about which there are many opinions. The question, however, should not be "How close can I stick my trees without being considered mean to them?" but rather "what distance apart would be best for their healthy growth?" The tendency is naturally to put them far too near each other, because they come to the ground as mere plants and we have little idea of the proportions to which they will grow in 5 or 6 years. It is best to remember in allotting the space that the foliage-head of two adjoining trees must go halves for the space between them: and what is true of the branching head is also true of the branching roots which must share the feeding ground between them. The smallest distance which can be allowed between tree and tree is 20 feet; set squarely, this will give 109 trees to the acre. The more liberal allotment of 22 feet apart, giving 90 trees to the acre, will probably pay better in the long run. The device of planting by which any one tree in a row is *between* two trees of the next is now universally adopted as the best. The underground feeding

space of the roots is thereby more evenly divided, and the effect of high wind much diminished.

In planting, the holes should be dug out before beginning, one among other advantages being that the earth thrown out is all the better for being exposed to the sun and air, and particularly so where the land is inclined to be heavy. It is best for two men to attend to the actual planting out of the trees. A little of the upcast earth should be thrown into the bottom of the hole and the soil is then loosened up by a chopping action. More earth is then added until it is found by trial that the tree will sit easily on the loose contents and the collar stand a little higher than the level of the surface in which the hole has been dug. The contraction of the filling will take up that surplus and leave it true. The roots are then carefully looked over, all broken roots are cut off with a sharp sloping cut facing downwards, and the fibres distributed evenly upon the cushion of soil in the hole. They must be divided evenly around the circumference of which the stem is the centre. Little by little the attendant should shovel in small quantities of loose earth, and this is packed and worked in by the planter's hands, so that close contact, and above all the absence of hollows, may be ensured. At the same time the planter should see to the accurate setting of the tree both for line and uprightness. Then both men shovel in the earth to the surface. Neither immediately on the roots nor even on the surface soil is there any need for the ill-considered tramping and jumping which is often practised. The contact of earth and root system should be firm yet gentle. The ramming in of earth which may be necessary when planting a post will not do when dealing with a living organism from which we expect delicate rootlets to grow and for which we desire to prepare a suitable feeding ground. It is far better to manipulate the first additions of soil around the roots should be by the hands instead of the foot, so that the proper degree of firmness and closeness may be insured without losing the open texture of the soil. Then even if rain is falling at the time the final operation must be watering, and from $1\frac{1}{2}$ to 2 gallons of water, according to the size of the hole, should be gently and slowly poured in through the rose of a can. It will not do to slush it from a bucket. The effect desired is to settle the particles of soil finally in their places and establish average and equal pressure round the root. A sudden dash of water will convert the top and layer into mud which will dry into an impervious caked surface, whereas after watering the soil round the tree should be as open and porous as before. If the time could be chosen, the planting should be done in cool overcast weather, without bright sunshine or much wind. In a few days' time the callusing of the cut roots should be over and new white feeding fibres spring forth. Then the tree will have caught on to its new situation.

PRESERVATION OF GRAIN BY WEEVIL.

(Note by Prof. Churck.)

The only cheap and perfect application of the prevention of the attacks of weevil upon

corn and grains consists in the employment of bisulphide of carbon. The quantity required, provided the grain is kept in closed vessels, is very minute—not more than $1\frac{1}{2}$ lb. to each ton of grain—so that 8*d.* is the cost of preserving a ton of wheat. The bisulphide leaves no disagreeable taste or smell behind, and the quality of the grain remains unimpaired. When bags are used instead of the iron cylinders specially prepared for use in the bisulphide process, the protective influence of this chemical soon ceases, and a fresh application of the bisulphide must be made. In either case the liquid is applied as follows. A ball of tow is tied to a stick of such a length that it can just be plunged into the middle of the vessel containing the grain. The tow receives the charge of bisulphide like a sponge and is then *at once* plunged into the sack or cylinder and left there, the mouth being closed tightly. When necessary the stick may be withdrawn and the charge (1 oz. bisulphide to 100 lb. grain) renewed.

(Note by F. W. Cabaniss, Asst. Director of Agriculture, Burma, on the Prevention and Destruction of Black Weevil.)

I have been trying for several years a number of experiments, with the object of finding a cheap and simple method of preventing the ravages of this weevil. I think that I have found it in the use of naphthalene powder. My method of using the powder is here given for the benefit of the grain dealers of Burma. It is best to place the naphthalene powder at the bottom of the bin or bulk of grain. To accomplish this take a bamboo, about $1\frac{1}{2}$ inches in diameter and long enough to reach from the top to the bottom of the bulk of grain. Punch the joints out of the bamboo, so as to be able to pass a stick through from one end of the bamboo to the other. Have the stick made to fit the cavity in the bamboo. Pass the bamboo, with the stick in it, down through the bulk of grain from the top to the bottom. Withdraw the stick, and drop into the top of the bamboo about half a teaspoon of naphthalene powder. The bamboo can then be drawn out, as the naphthalene is safe at the bottom of the bulk of grain. If the bulks are large this should be done once to every 10 feet square of the bulk. Repeat the application every 15 or 20 days as the powder evaporates.

The weevil that can leave the grain will do so, and those that cannot leave are killed by the odour of the naphthalene. I do not believe that naphthalene thus used can cause any injury whatever to grain. For seed purposes the germinating powers appear not to be affected in the least. For marketable grain the colour is not affected, and the odour will leave in a short time if fresh naphthalene is not applied to it. The quantity of powder used is infinitely small in proportion to the quantity of grain, and the powder is entirely destroyed by evaporation, so that for food purposes the effect is *nil*.

Naphthalene powder can be procured at the Medical Halls in Rangoon at Rs. 2-8-0 per ounce, and a few ounces of it will be sufficient for one season for any grain dealer in Burma.

[There are two species of weevil (*Curculionidae*) belonging to the division *Rhynchophora* which attack stored wheat and other grain. One is *Calandra (Sitophilus) Granaria*, and the other *Calandra (Sitophilus) Oryzae*. The former is found principally in Europe America and Canada. The latter which requires a high temperature is chiefly confined to India and other hot climates.]

GENERAL ITEMS.

Good coca leaves yield 75 per cent or more of cocaine, but the average is less, and if fermented often *nil*. The London market price of cocaine in July 1897 was 9*s.* 3*d.* to 9*s.* 6*d.* per oz. Great care must be taken in the gathering, drying and preservation of cocoa, as its activity and value depend in a great measure on its mode of preparation. The leaves should be gathered as soon as they have arrived at maturity, at which period they are bright-green on the upper surface, and yellowish green on their under surface, and have an agreeable and somewhat aromatic odour. The leaves are gathered separately and carefully by hand with the two-fold object of preventing them from being crushed or bruised in the process, and also so as not to injure the young leaf buds which are left behind for the purpose of obtaining a second crop of leaves. They are then spread out and dried slowly in the sun. The operation must be performed with great care, for if the leaves be dried too rapidly, they lose their odour and green colour; and if stored before they are thoroughly dried their colour is also changed, and they acquire a disagreeable odour and taste. Commercial coca either consists of the leaves more or less pressed together in compact masses or of the leaves in a loose state. In either case the leaves are not curved or rolled in any degree, but perfectly flat. The properties in the leaves are injured by transportation and often by keeping; they should therefore be packed in tin-lined cases.—(J. F. Bailey in the *Australian Tropiculturist*.)

Hygrroryza aristata (Sin. Gojobba) is what is commonly known as "wild rice." It is an aquatic grass found floating on the surface of water or creeping on wet land. The grain, which in India ripens in September, is there eaten by the poorer classes who collect it by sweeping the heads of the grass with baskets. According to Roxburgh, cattle are fond of the plant. We have not heard of the grain being consumed in Ceylon.

There are three varieties of gingelly (*Sesamum indicum*) from which oil and ponnac are got, viz., the white, black, and red-seeded varieties. All are extremely rich in oil, but especially the first mentioned. According to analyses Dr. Leather, Agricultural Chemist to the Government of India, white gingelly contains 48.13 per cent of oil, black 46.50, and red 46.20 per cwt. of oil, while the percentages extracted by the country mill were 38.1, 30.9, and 30.9 respectively.

Artificial Indiarubber, the most recent product of the laboratory, which is a mixture of

rape oil and sulphur dried down to solidification, though to a certain extent successful, has not by any means the requisite durability.

It has been well-known that a solution of iron sulphate has long been employed for the destruction of ground mosses which overrun plantations during damp weather. It has also been found that the same solution will cleanse the trunks and branches of trees of the numerous lichens which infest them, and may also be employed with success against the numerous colonies of *Agaricus campestris* (the common mushroom) which spring up in cultivated spaces. This peculiarity of iron sulphate has led to new efforts being made with it against parasitic fungi on plants in general.

On orders received from the Viceroy of India, Messrs. Carter & Co., the well-known seedsmen, shipped no less than 108 tons of carrot seed, which were collected and despatch within

nine days of the receipt of the Viceroy's telegram ordering the seed. The original order was, however, for 200 tons at a rate not exceeding £80 per ton delivered in Bombay. The seed which was brought over during the famine crisis was deemed sufficient to sow about 42 square miles of land.

There is a demand for cow-pea seed among the Queensland sugar growers who have come to recognise the merits of the plant as a nitrogen gatherer. Of leguminous crops the cow pea matures most rapidly and occupies the ground at the shortest time, and produces perhaps the greatest amount of nitrogen. When grown and ploughed into the land just before it reaches maturity, a manure is thereby added to the land containing about 100 lb. of nitrogen, equivalent to that produced by the addition of 4 cwt. of sulphate of ammonia or 8 cwt. of dried blood per acre.

