THE

TROPICAL AGRICULTURIST

MONTHLY.

Vol. X. COLOMBO, DECEMBER 1ST, 1890. [No 6.

ANALYSES OF TEA, TEA SOILS AND TEA MANURES.

MR. JOHN HUGHES analysed specimens of soils of a large proportion of the hill districts of Ceylon, in which tea is now grown, but with reference to their suitability for coffee culture, indicating the mechanical treatment and the nature of the manures best calculated to improve the soils and help our then staple product. But since Mr. Hughes was here on the requisition of the Planters' Association, tea has been grown in localities, such as the Kelani Valley, which were not even conceived of as suitable for coffee. Tea also flourishes in stiff and ferruginous soils, not so well adapted for coffee, and tea, being a leaf-producer and not cultivated for fruit as coffee was, is not so much benefited by the application of lime as coffee and coffee soils were. It seems to us, therefore, that not only ought our Planters' Association to respond readily to Mr. Hughes's offer to analyze specimens of Ceylon teas, but that the scope of the chemist's examination and report should be extended so as to include reports on the soils in which the teas are grown and indications of the nature and quantity of fertilizing matter necessary, or likely to improve the quantity and quality of the produce. More than two years ago the Agricultural and Horticultural Society of India formulated an exceedingly comprehensive scheme of dealing with teas, soils and manures, and also the technical details of the manufacture of tea. The proposed scheme originated in a letter from Messrs. Jardine, Skinner & Co. pointing out the very haphazard manner in which tea in India and Assam was manured. The letter was accompanied by specimens of oil cakes used on various estates (one of which, by the way, bore the elegant name of "Rose Kandy") and asked information as to the fertility of each as a leaf-stimulator. It was added that managers, as a rule, had little idea of the comparative manurial value of oil cakes, although a lakh of rupees and upwards was spent *annually* on oil cake in Cachar alone. On this letter the comment of the Secretary is :—

"The information which is required for basing an opinion on the merits of different oil-cakes as a manure for tea, does not appear to exist. This should include analysis of the soils on which the tea is grown, of tea leaf, of the manures accessible, and other points of the like nature, without which the scientific treatment of the subject is impossible. The Society, and indeed all who are interested in the great Tea industry, are therefore greatly indebted to Dr. Warden, who has expressed his willingness to make a set of the required analyses which, when tabulated, will show at a glance what the different soils require. The importance of the data which will thus be collected can hardly be over-estimated, for much of the information will be as useful to cultivators of sugar-cane, indigo, &c., as to Tea planters. Messrs. W. O. Bell-Irving and P. Playfair are appointed as sub-committee to give Dr. Warden such assistance as he may require."

At a meeting of the Indian Tea Association :—

"An unanimous opinion was expressed that Dr. Warden's report on Tea Manures and Tea Garden Soils would be likely to prove most instructive and valuable, and as such, sure to be much appreciated by all interested in tea growing. On receipt of details as to the manner, &c., in which the samples should be collected, the Tea Association will be only too pleased to do the needful. It is suggested that samples be sent from three or four representative gardens in each district, say Cachar, Sylhet, Assam and the Dooars, and that gardens possessing different descriptions of soil be selected. One garden to send, say black peaty bheel soil, another plateau mould, a third stiff soil, and a fourth a specimen of Teelah formation. Some idea should be given as to the amount of earth (surface and subsoil) required as a sample, and the depth at which the latter should be taken, also as to the quantity of oil-cake, bone-dust, cow-manure, &c., necessary for a fair test muster."

It will thus be seen that Indian Tea Gardens embrace all the varieties of soil which exist in Ceylon, although the terms "bheel" and "teelah" do not enter into our vocabulary, as descriptive respectively of swamp and hill land. Samples of soils and plants were actually sent to Dr. Warden, but the illness of members of his staff prevented the analyses, and details of the wider scheme were specified in the journal. The necessity for action was shown by the statement that in Cachar, Assam, and Sylhet there were many "concerns" still of the highest class and remunerative with a yield of from 4 to 6 maunds (320 to 480lb.) per acre; but since gardens were being opened out which yielded 6 to 8 maunds (480 to 640 lb.), the old estates, if not

renovated would fall back into the third or fourth class. The proposal therefore was that

"A competent chemist should he employed for the purpose of making the investigations indicated above, viz., the analysis of the tea plant, the root, stem, hranches, leaves and seed; the soils on which the plant is grown and the manures, both such as may be available on the spot, and those it is possible to transport with sufficient economy to make tbeir use practicable. Linked with tbe enquiry as to the fertility of soils would be questions relating to the treatment of the tea plant, and of the leaf in the process of manufacture, points on which most useful information may be ohtainable by carefnl scientific enquiry. As for example, the causes which tend to variations of quality in the teas produced, the chemical changes which take place in the leaf during the process of manufacture, and a nnmber of similar points which if they cannot be dealt with chemically may, when a full record of all local circumstances is availahle, be referred to the leading authorities in different departments in Europe." It was resolved that a competent chemist should be engaged for the purposes indicated for a period of at least two years; that the results, as obtained should be published; that R10,000 should be guaranteed by the Indian Tea Association; that portions of the necessary expenditure should be recouped by fees levied for special reports on soils of individual gardens and soils submitted for analysis. There are other details of minor importance and the memorandum concludes as follows:—

"At present the tea industry is regulated by more or less empirical methods; the precise conditions which influence the commercial value of the teas are practically unrecognised. A high priced tea and a low priced one, as far as is at present known, are chemically indistinguishable. The tea plant can be made to yield a larger crop hy the return to the soil of certain principles abstracted by the leaf, and which is at present given back hy the indiscriminate use of manures, while those which influence the quality of the leaf are, from a chemical point of view, an unknown factor. There are general rules regarding the restoration to the soil of constituents abstracted which are as applicable to the tea plant as to any other crop, and the systematic application of which will most certainly improve the yield. But although it cannot with certainty be predicted that any special rules will be deduced as an outcome of the enquiry, the applieation ofwhich will certainly improve the quality of tea, yet there is every reason to believe that general deductions will be arrived at which will indicate to some extent the system which should he adopted to this end."

The memorandum is dated Sept. 1889, but up till now, we have not seen in the proceedings of the Society that the Indian Tea Association has taken any more active steps to carry out the scheme, than our own Ceylon Planters' Association has done in the case of Mr. Hughes's proposal. Mr. Hughes is now well enough known in Ceylon to justify us in saying that no better qualified chemist could be chosen to carry out analyses and experiments such as are contemplated in the Indian memorandum.

Our planters know generally that tea requires more nitrogenous manures than coffee did. That no better fertilizer could be used than cattle manure, provided it were easily obtainable from extraneous sources, or if the keeping of cattle on estates, largely for the sake of their manure could be made to pay. We also know that no better oil-cake can be used to supply nitrogen largely and potash in an appreciable degree than white castor cake, while coconut poonac is good, but not so valuable as a fertilizer, especially where wild pigs and similar animals abound. We know that by a very large number of authorities it is held that to supply tea with the desiderated proportions of nitrogen, potash and phosphate of lime, a perfect combination is that of white castor cake and bones broken small. If the latter are steamed so much the better, perhaps. But so highly nitrogenous a substance as fish must be valuable, if only its effects are lasting. Kainit, too, might be found valuable. In a recent experiment fish manure alone put luxuriant leaf on the tea bushes and no blossom, while fish manure with an admixture of bones, stimulated blossom (which is undesirable,) as well as leaf. A small quantity of super-phosphate added to the fish would probably have been preferable. Such questions and others regarding manures, in connection with knowledge of the constituents of the tea plant and the soil in which it grows, a competent chemist could settle. And surely it is more than probable that such a man as Mr. Hughes, watching, repeating, and experimenting on all the processes of the manufacture of the leaf, under different circumstances of elevation and weather and of the leaf itself as to degrees of withering, rolling, fermentation, roasting, &c., would be able to help planters to obtain uniformly those good results, which at present are obtained only occasionally. We believe, therefore, that a portion of the funds of the Association, with, perhaps some help from Government, would be well spent in securing the services of Mr. Hughes, or some other competent chemist, if that gentleman cannot accept the mission, to conduct in different districts of Ceylon, and on a series of typical plantations and in their factories, a series of experiments in cultivation, the application of manures, and the manufacture of the gathered leaf, such as we have indicated in quoting and commenting on the comprehensive Indian Memorandum. We submit the question for the seriou consideration of the producers of tea in our island. Our teas have a high character for their fine quality. Our efforts ought to be directed to sustaining and even improving the character of what is now the staple product of Ceylon.

RECENT GEMMING FINDS.

Several valuable gems have recently been found in Rakwana and the Morawak Korale, which are likely to have an appreciable effect on the market, especially amongst London capitalists. *Apropos* of a para. in our contemporary the "Times" yesterday headed "Gemming in Morawak Korale," which says:—"We are told that a cat's-eye was recently discovered on Rangwelltenne which has just been sold for R12,000,"—we are informed that it was not found on Rangwelltenne, the mining rights of which belong to the Ceylon Gemming and Mining Co., but it was found in the Morowak Korale, and Rangwelltenne is in Rakwana. This catseye was sold in Colombo three days ago to a Moorman for the sum named. An experienced man who has had an opportunity of inspecting the stone says it is one of the finest that has been found of recent years.

Another very fine stone of 26 carats. was recently found on Knowhill estate, adjoining the Ceylon Gemming and Mining Syndicate's estate, Golden Grove.

THE HARDY WHITE PASSION-FLOWERS.—Messrs Fuller, Courtenay Nursery, Newton Abbot, write to protest against a doubt raised by a correspondent as to the correctness of the statement that the plant in question originated in their nursery as a seedling from P. cœrulea. Although the plant was first described in these columns, we were of course dependent upon others for a correct statement as to its history. Messrs. Fuller say they raised the plant, aud there is, so far as we know, no reason whatever to doubt their accuracy; but, if it be a seedling, other people may have raised it before, and others may raise it again. —*Gardeners' Chronicle.*

REGULATIONS FOR LAND SALES. IN CEYLON.

A new set of regulations for sale of unreserved Crown lands is published in the last *Gazette* and will come into operation from the 1st proximo. They are much the same as those given in our latest "Handbook and Directory" with the exception of a few amendments; while several new clauses have been added to them. Clauses 1, 2, 12 and 13, and the last part of clause 4 commencing from "For the opening" &c., and that of clause 9, from "and the amount of stamp duty chargeable" &c., have been expunged, and clause 11 has been made to read "On receipt of the purchase money in full, the Government Agent will apply to the *Colonial Secretary* for a grant in duplicate," &c. In the table of fees the progressive increase of R40 per 100 acres will in future be for lots between 2,000 and 6,000 acres and not 5,000 acres as hitherto. The following are the new clauses referred to :—

As a general rule, all unreserved Crown lands will be sold by auction, and at a price not less than 10 rupees per acre.

Sales of unreserved Crown land are classified as follows :—

(*a*) Those of forest, jungle, or patana not hitherto cultivated.

(*b*) Those of land already occupied, but the possession of which the occupants desire to regularise.

(*c*) Those of land which the occupants fail in acquiring, or that have been seized in default of payment of tax.

Under class (*a*) fall :—

(1) Land sales initiated by the Government to advance the progress of agricultural or planting enterprise.

(2) Lands the sale of which is applied for by parties desirous of adding to existing holdings or of possessiug land in a district of their own selection.

To class (*b*) belong :—

(3) Lands occupied originally without deeds of title and improved for a period of less than 5 years, but sold to the occupant on payment of the appraised value.

(4) Lands occupied originally without deeds of title and improved for a period of more than 5 years and less than 10 years, but sold to the occupant at the rate of 10 rupees per acre, and lands held on permit or license continuously for not less than 2 years.

While under class (*c*) come :—

(5) All lands under (3) and (4) which the occupants fail to acquire under the conditions therein stated, besides those seized in default of payment of tax.

When lands exposed for sale under rule 2 (*a*) and (*b*) exceed 50 acres in extent, or in cases where small contiguous blocks aggregate 50 acres or more, the same shall be advertised in the *Gazette*, with the name of the applicant, if any; and these and other advertisements may be inserted, as at present, by the Surveyor-General in the Local, Indian, or Home papers, under such limitations as the Government may from time to time appoint.

Before any block of unreserved forest, mukalana, lands adjoining forests and lands adjoining river or streams, or chena over twenty years' growth can be brought forward for sale, the opinion of the Conservator of Forests shall be taken as to the desirability or otherwise of the alienation before publication of intended sale in the *Gazette*; and in cases where the block exceeds 50 acres in extent, a report on the land, with explanatory sketch, shall further be submitted to His Excellency the Governor, showing its situation, altitude, proximity to existing estates, drainage of watershed, extent of forest reserves in the neighbourhood, and probable existence of minerals or gems.

Land over 5,000 ft. elevation shall not be alienated, and land of any elevation whatsoever, which, in the opinion of competent authority, from its position upon or at the side of a ridge, or at the source of streams, or on the banks of streams, or for any other cause, should not be alienated, may be permanently reserved and marked in the record maps "Not to be sold."

When any block or lot of land has been reserved as above by order of Government, such block or lot shall not be brought forward for sale at any future time unless the conditions under which it was reserved have in the opinion of the Governor ceased to exist.

Reservations on rivers or streams should be carefully demarcated and preserved, more especially when there is dependent paddy cultivation below; while in the case of estates bordering on villages, suitable reservations round the village should be allowed for the wants of the inhabitants in forest produce, grazing, and so forth. The land abutting on paddy fields shou'd, as a general rule, be reserved for the villagers.

Rules for the Guidance of the Government Agents and Surveyor-General in bringing forward unreserved Crown Lands for sale.

In respect to land sales under 2 (*a*) of the Regulations for Land Sales dated September 13th, 1890, the Government Agents, under instructions from Government, will make arrangements for bringing forward for sales suitable blocks of land in such district or districts as the Government may deem expedient. With regard to sales under 2 (*b*) and (*c*), the necessary arrangements will devolve upon the Government Agents in conjunction with the Surveyor-General.

When Crown land exposed for sale at upset price has any standing timber or other forest produce upon it, it shall be optional with the crown on its own behalf to fell and remove the same, or to sell all or part of such standing timber and produce to the purchaser, at a valuation to be made by the Forest Department.

Government Agents and officers of the Survey Department are enjoined, when dealing with applications, to be particularly on their guard against any attempt on the part of applicants to select the pick of the land in separate blocks, or to obtain allotments in such positions as to detract from the value of neighbouring unsold land, and by rendering this latter inaccessible in the future to other applicants, to obtain command of the market. To prevent these attempted deteriorations of crown property, frontage to routes of communication (roads, rivers, &c.) should be evenly distributed, means of access to all lots provided by suitable road reservations, and the land blocked out as the configuration of the ground and not as the desire of the applicant dictates.

Forest and woodland being of vital importance to the interests of the community, whether for the supply of material wants, for grazing, for assuring the water supply, for maintaining the balance of bird and insect life, or for preserving the beauty of the landscape, the Surveyor-General and Government Agents are held responsible that in bringing forward lands for sale due attention is paid to these important considerations.

Sales of land under rule 2 (*a*) will be held from time to time at such place and on such date as the Government may by Notification in the *Government Gazette* appoint. Sales under rule 2 (*b*) and (*c*) will be held when practicable at the different kachcheries twice a month, after six weeks' advertisement by Notification in the *Government Gazette*, and care will be taken to prevent the days of sale in the several Provinces from clashing with each other.

SOME INFERIOR MADRAS TOBACCOS.—In May last the Commissioner of Agriculture forwarded to Messrs. Corry, Soper, Fowler & Co, of London, for report, samples of certain tobaccos grown in this Presidency. Of these tobacco grown in Chebrole, Kistna District and Cudicota, Cuddapah District, are reported to be of no value and not worth sending to Europe. That grown at Medur, in the Kistna District, the firm offers to buy at 2d per pound in London, and the tobacco from Pannatola in Jammalamadugu in Cuddapah District at 1¾d delivered at London. The tobacco growers in these districts are not likely to accept the offer of Messrs. Corry, Soper, Fowler & Co., as the rates offered by them are lower than the local selling prices of the leaf.—*Pioneer*, Oct. 12th.

LETTERS FROM JAMAICA: NO. 32.

WEATHER—COFEE CROPS—PRICES FOR COFFEE IN LONDON—CEYLON VERSUS JAMAICA—LABOUR SUPPLY—THE FORTHCOMING EXHIBITION—RAILWAY EXTENSION.

Blue Mountain District, for Packet of Aug. 12th:

DEAR SIR,—It is quite six months since I addressed you: the only excuse I can make is that I have not had sufficient materials for a letter.

First, as to weather among these Blue Mountain hills: we had during the five first months of the year, more rain than we needed—not that it was heavy, but continuous showery weather with very few intervening fine days, so that it was impossible for us to do much coffee preparation till June, for as you know we have to prepare our coffee on the estate ready for shipment. On the other hand other parts of the island, even those below us and not far off as the crow flies, have suffered from drought, and I fear it will cause light and short crops in the low-lying districts of the island which are mostly owned by *settlers*, and would in Ceylon be termed native coffee. My own coffee in the high fields in exposed places suffered very much from the cold cutting N.-E. winds, and the constant showers; the ends of the branches turned black and had quite a frost-bitten appearance. It was only in the highest coffee in Ceylon, and in hollows, that I have seen the like. It is evident that 4,000 should be the limit at which Jamaica coffee should be planted; 3,000 feet is by far the best height, as we are so much more to the northward, and have quite a marked winter. I am glad to say that most of my neighbours had good crops and did very well; on old Jamaica properties crops seem to alternate: after a large yield. One must look for a shorter one the coming year.

As to prices, Ceylon appears to have done better in London than Jamaica in Liverpool. I saw in the *T. A.* list that one Ceylon property had touched 132s and 133s: this is what our best marks usually obtain for number one quality. I fancy the highest price is given in London for "peaberry," but this is seldom separated in Jamaica, as the sizers do not seem to be perforated to extract the peaberry: my sizer, one of the old fine sort, does not. Some little time ago I noticed in one of the *Tropical Agriculturists* a letter from a Jamaica planter, who was evidently not a *Blue Mountain* but a *Manchester* coffee planter. In one of my previous letters *No. 22*, I described Manchester coffee, and how totally it differed from ours, being grown under the shade of trumpet trees, without which shade it strangely cannot thrive: the land is flat, the soil red, as in parts of Devonshire; and there is a subsoil of marl which is fatal to the coffee tree if the roots reach as far. On the other hand our hills are very steep, suitable land has to be picked out, and the conditions far more favourable than those of Udapussellawa and Haputale in Ceylon, but we have no open patanas, the sea is only some ten miles off, and the hills altogether are very much more scarped and abrupt.

As regards Immigration, it is to be again resorted to, but not before an attempt has been made to obtain indentured labour *locally*, by a system of yearly contracts, the employer to pay Government the sum £2 10s for each labourer so supplied, over and above his daily wages. £2 of this sum is to be handed to the labourer as a premium at the end of his contract. I am not of opinion that this plan will meet with much success, and it certainly will not be popular amongst the planters and other employers of labour, who will not care to pay the £2 10s extra yearly for labour procured locally. In the case of East Indian coolies it is different, as it is natural the planter should bear the principal cost of importation. Neither do I think the 3s 4d extra a month will induce our local Jamaican to bind himself to any such arrangement, as he loves his liberty too dearly, and might fancy it was a dodge to introduce a species of slavery. As to the local coolies who have served their time, a few might be induced to tender for the sake of the £2 bonus, but they mostly prefer to become keepers of rum and other shops. As to such coolies who are free and are now working on some of the sugar estates, this new plan ought to suit them, as by binding themselves for a year they would get two pounds a year in addition to their present wages. It would in my opinion be best to send for coolies at once, and if they could be got from the Madras Presidency instead of Bengal, a much better working man and physically stronger, would be obtained, some perhaps with experience of Ceylon or Mauritius.

Our Exhibition buildings are, from the account I read in the newspapers, progressing satisfactorily and there is the hope that they will be all but completed by the middle of January. The Governor has been visiting various parts of the island and stirring up the people to action. The consequence is that two or three local exhibitions in other towns in the island are to be held so that the people will get a good idea of what the large Exhibition is intended for. That the Exhibition will draw attention to Jamaica and her products, and make her to be better known all over the world, there is no doubt; but no one seems to expect a financial success, as our own population is not sufficient to make it pay, the expense of travelling will deter many from visiting it, and it is too long and expensive a trip to expect many to come from Europe where they can see very much finer exhibitions; but no doubt it may induce many Americans and West Indians to visit us, if sufficient accommodation is available. With this view a law has been passed to induce people to build hotels without delay, Government guaranteeing 3 per cent interest on sums so legally invested, so it is hoped sufficient accommodation may be available by the time the Exhibition opens, towards the end of January. I hear also that the railway is being pushed on, and that the first 12 miles will be ready by contract time, *i.e.*, one year after commencement; this is the section of main line to Montago Bay; the branch to Port Antonio has not yet been commenced. W. S.

GEMS GALORE!

The big catseye found in the Morawak Korale has been purchased by the same Moorman dealer who had collected together the fine gems recently described in our columns. His offer of R16,000 for this latest find has been accepted and the Moorman has started off for Galle to take over this precious stone.—The Rangwelletenne sapphire reported to us as worth £100, is now being cut under Mr. Siedle's care and is pronounced worth at least £200. A few more of such stones will make a handsome dividend for the "Gemming and Mining Company of Ceylon Limited" apart from their other returns.

THE EXPERIMENT which has been made to cultivate tea in South Africa has not been successful. The Natal Tea Company has decided to perform a "happy despatch" by voluntary liquidation. The first subscription of £3,000, it appears, is all spent, while the tea produced last year did not pay the working expenses. The chairman's explanation was the familiar complaint—insufficient capital.—*L. and C. Express.*

CEYLON TEA: HOW TREATED IN LONDON TEA WAREHOUSES.

A well-known proprietary planter favors us with the following account of his experience in this matter :—

Oct. 16th.—I can't agree that in the "great Bonded Warehouses," our teas are treated in a sensible fashion! for during my last "holiday" at home, I spared no pains in watching the treatment tea received in London. In the "Bonded Warehouses" referred to, *each* and *every* chest and ½ chest is ripped open; then a man comes along with a knife and slits the tea lead, right along the full length of every chest; a handful is then taken from each chest and submitted for examination to the selling brokers' representative, who decides whether or not the teas are to pass as "Factory bulked"; if they are not so passed, out on to the floor it all goes, to be bulked by the warehousemen. Navvies in fact; who turn it over and over with iron showels, when sufficiently bulked it is most roughly repacked, and stamped down by the navvies in their hobnailed boots. From the time the lead is first slit open, days may elapse and do elapse, before any steps are taken to in any way protect the teas from the air. One time when I was being shown round, I noticed a strong smell of coffee roasting, which was being carried on close by; large quantities of tea were at the same time being bulked! So much for the sensible fashion in which our teas are treated in the "Great Bonded Warehouses"!

HILLCOUNTRY PLANTING REPORT.

THE WEATHER—A VISIT FROM MR. NOCK—THE BATTLE OF THE WATTLES — ACACIAS AND EUCALYPTS — OTHER TIMBER AND SHADE TREES—GRAND VIEWS—THE TREE TOMATO—HINDRANCES TO PROGRESS ON THE RAILWAY EXTENSION—ANOTHER CALM DAY.

NANUOYA, Oct. 18th.

Yesterday was a beautiful day, and there was a gentle deposit of rain during the night which is indicated this morning by the rain-gauge as equal to 16 cents. The fears of those who are planting have been thus dissipated for the time. As a consequence, no doubt, of the rain falling on ground heated by yesterday's strong sunshine, there are masses of white vapour on the mountains, but the sun is shining brightly down into the valley. "Every leaf is at rest," and there is the promise of another fine day. [Which has been amply fulfilled.]

Yesterday we had a very interesting visit from Mr. Nock of Hakgala, who came for the purpose of obtaining information and specimens to enable Dr. Trimen to identify some of the many exotic trees growing here and especially to clear up, if possible, the confusion existing regarding the numerous and variable species of Australian acacias or wattles. About *A. armata*, with its thorn-like leaves and its primrose-coloured, catkin-like blossoms, there is no question: it is simply ornamental. The difficulty has been about *A. decurrens*, with its two varieties (at least), and *A. dealbata*. We are about certain that we have the best varieties of both, grand trees of a dozen years' growth on a quartzy ridge. What we take to be *A. decurrens*, and what Mr. Nock thought was its superior variety *mollissima*, agrees in foliage with Mr. Kellow's specimen sent to us, its warmer golden colouring of flush in ours being probably due to its more mature age. Indeed our trees look as if they had reached full maturity, the large quantity of gum they secreted having led to considerable decomposition of the bark and the formation of a series of curious round knobs, some of which were detached and handed to Mr. Nock, while others, being connected with the wood of the trees, could not be removed. The specimens of both trees show great growth for their age, but their mode of growth differs exceedingly. What we take to be *A. decurrens* has grown umbrageously, throwing out a large number of thick branches; so that, as Mr. Nock remarked, a tree, if cut down, would yield a large quantity of "cord-wood,"—that is timber for fuel. Its mode of growth certainly seems to indicate that it is more suitable for firewood than timber for house building or other purposes, although the trunk and even some of the enormous horizontal branches would yield planks and deals of good size. What, from its silvery foliage, we take to be *A. dealbata* grows into straight tall handsome trees, with a moderate array of branches, which are not spreading, but assume more of the semi-perpendicular form. There can be no question as to this being the finer tree of the two, while, from the absence of gummy and other secretions, it shows no sign of having reached anything like the termination of its fresh and growing existence. The sending up of suckers by this tree seems to depend on circumstances. Until yesterday we called our tree "the *A. dealbata* which does not send up suckers." But we found that one specimen had sent its roots out into loose soil and that from these roots suckers were springing. For yielding a large supply of firewood, it will probably be advisable to encourage rather than suppress the tendency of *A. dealbata* to send up suckers. Mr. Nock took away specimens of other acacias, as well as of the numerous varieties of eucalypts growing on Abbotsford. One of the latter, of exceeding rapid growth, closely resembles *A. decurrens* in its branching habit, some of the branches, indeed, vying with the trunk in size. The blue gum, *Eucalyptus globulus*, of which we have many, are not trees to be proud of, except in specially favourable localities; but the red and white gums grow well. *E. robusta* is here as in all these districts a very luxuriant grower, while, rather to our surprise, one of our best and quickest growing trees is the famous jarrah tree, *E. marginata*. Mr. Nock admired our truly noble specimens of *Albizzia moluccana*, so prized in Java as a shade tree. When covered with snow-white flowers, as some of ours have been, these trees are beautiful objects. But they are brittle and the timber poor as firewood, although, doubtless, it would prove suitable for tea chests. Grevilleas do well here up to close on 6,000 feet, but Nuwara Eliya seems to be beyond their limit. A few planted near the bund in good soil, have grown fairly well, but their tops were broken by wind. Mr. Nock much admired our *syncarpias*. As one of the best firewoods we have large numbers of different species of casuarinas, and for the same purpose we are growing the luxuriant bushy frenelas, trees which for shelter and shade purposes could scarcely be surpassed. Mr. Nock was in great admiration of our young plantations, in which, wattles, casuarinas, eucalypts and cryptomerias are conspicuous, while other trees are being tried, as well as with the large number of older trees scattered about the estate. We have now found that, with the exception of wattles, casuarinas and above all bamboos, trees grown amongst tea do little or no harm to the principal culture. Indeed we rather think that at our higher elevations the shelter of trees is useful. Never having been here before, Mr. Nock was enchanted with our grand and extensive views, as of mountains, valleys and patanas, terrace after terrace, between 4,600 and nearly 6,000 feet altitude, was attained near our beautiful lakelet, which supplies water for working the

"tandem wheels" at the factory. *En passant* I must express my admiration of the grand leaf, as well as the fine fruit, of the tree tomato. A leaf from plants grown on a trellis at 4,700 feet measured 21 inches by 15.

INDIAN TEA NOTES.

Dehra Dun, Sept. 30th.—On the 23rd we had 1·25 inches of rain, and since then it has been cloudy but no rain. The rain has done a lot of good.

Luckimpore, Sept. 22nd.—Rainfall for the week 4·71 inches. Mosquito blight very prevalent and general in the district, and it is a struggle for most gardens to keep up with last year. Increases on last year are diminishing slowly with little hope of pulling up again. The mornings and evenings look very much like an early close. Rainfall to date 142·98 inches.

Dooars, Dam Dim, Oct. 4th. The weather during the past week has been very unsettled and varying. Showers have fallen at night, and days are fairly warm. Snow fell on the lower range of Bhootan hills, which is uncommon for this time of year. Rainfall from 20 to 30 inches ahead of last year on same date. Outturns going further behind, but quality showing some improvement.—*Indian Planters' Gazette.*

NOTES ON PRODUCE AND FINANCE.

THE DEALERS AND THE DUTY.—The tea dealers have carried their point about the proposal to weigh tea to the half pound, and the Customs authorities will not insist, at least for the present, on any departure from the old plan. All over the country tea dealers had protested against the new order, and now that it is temporarily rescinded it will probably never be heard of again. The tea trade of the country is a powerful interest, and the Government cannot afford to add to the ranks of its enemies.

TEA AT THIRTY SHILLINGS PER LB.—Commenting on the remarkable price paid for some small boxes of Ceylon tea, as recorded by our "Commissioner in the 'Lane,'" last week, the *Grocer* says:—"One of the rarest and most curious kinds of tea that has been imported into this country in modern times was offered by auction in Mincing Lane on Tuesday last, when a small parcel of three boxes Ceylon, weighing only five pounds each, very showy, and described as "choicest golden-tipped flowery Pekoe," fetched the astonishingly high price of thirty shillings and sixpence (30s 6 i) per pound. Just fancy seeing tea marked up at such an extravagant figure in a grocer's shop window! and the effect, we should think, would be to scare away customers, instead of inviting them to buy, for no one surely but some magnate or a crowned head would ever think of drinking tea that cost so much money, as, at the rate of nearly twenty-three pence (1s 11d) per ounce, it would be dearer than many bottled wines of the finest vintages. The estate or garden in Ceylon where the said tea was grown is named 'Hethersett,' and it is probable that the proprietors and owners there may be stimulated to fresh exertions to produce a larger quantity of the same sort, and then perhaps further consignments may be sent forward for the approval of those who pride themselves in being connoisseurs in drinking tea of the greatest excellence."

PUSHING THE SALE OF TEA.—A correspondent of *The Times* writes: "Whilst my wife was entertaining a number of friends at her afternoon tea, the servant announced 'Mr. ——,' who walked into the room, and, seeing a lady without a bonnet, asked her to patronise his tea, at the same time offering her circulars of 'The ——— Company,' Tower Hill. The lady happened to be a visitor staying in the house. My wife had some difficulty in getting the intruding tout to withdraw. Publicity may, perhaps, tend to abate a nuisance of this offensive kind. I may mention that twice within the past twelve months my privacy has been intruded upon by touts. They came to the door in broughams and took the servant in by asking for me by name. My servants are pretty wide-awake now, but 'Mr. ———' managed on this occasion to elude the vigilance of the one who answered his double knock and ring."

HOP TEA.—Mr. Patrick Macgregor, late of Assam, is, as will be seen from a reference to another column, showing the men of Kent how to make hop tea. Although less hopeful than the promoters of this new industry as to its success we feel sure that Mr. Macgregor will bring the necessary energy to bear upon the new undertaking, and he may succeed in making hop tea popular.

TEA LABELS IN RUSSIA.—We referred recently to the quantity of adulterated tea sold in Russia. In order to protect the public and to assist those who wish to sell pure tea, the Government now permit tea dealers in Russia to sell their wares under Government labels, which are placed on packets of tea of various weights, by persons employed by the Government for that purpose, and who work under the control of official inspectors. The cost of labelling, which is small, is defrayed out of the money realised by the sale of the labels. The labelling is not imperative, but most of the tea merchants in the retail trade have recourse to this expedient to increase their sales.

COFFEE AND ITS ADULTERATION.—Public analysts complain with justice that there is no unanimity on the magisterial bench on the important subject of food and drug adulteration. One analyst finds that 57 out of every 100 samples of coffee he examined contain on an average 40 per cent. of chicory. On this point the difficulty of the magistrates is not to be minimised. Some people prefer a mixture of coffee and chicory, and if anywhere in the packet carried away by the customer the words "sold as a mixture" are found, one magistrate may hesitate to inflict a fine. Another, bearing in mind that coffee is worth at least sixteen pence a pound while chicory costs but four pence, will hold that the purchaser is not bound to stay in the shop and read the printed wrappers of each article he buys. If he asks for coffee and gets coffee and chicory the seller is punished. The more lenient magistrate, it is complained, will make no distinction between the case of a man whose packets are one-half chicory and another who only makes them one-third chicory and gives two-thirds of the weight in genuine coffee. Some uniformity of practice among magistrates on this subject would tend to minimise confusion.

THE INDIAN GOLD MINE BOOM.—By way of preparing people on this side the *Financial News* has the following:—"Private advices from Calcutta report that a gold fever has broken out in India, and that great preparations are making for the floating of companies in England. The Western Bengal Prospecting Company has been got up by Mr. G. Tosco Peppe, one of the most active promoters, who will shortly offer it here for £200,000, in return for which the English purchasers are to have the right to prospect 1,500 square miles of territory. The Souapet Company has been floated in Bengal, and has begun buying up adjoining properties, including the Chota Nagpore. Messrs. Ogilvie, Gillanders, and Co. are credited with the intention of introducing the Kapurgadilh Gold Mines on this market, and Messrs. Jardine, Skinner, and Co. are reported to have acquired the Patcom for a London syndicate. Other properties, of more or less value, destined for English investors are the Kharsawan, the Pat Pat, and the Tamar, of which more anon."

BURMAH RUBY MINES CO.—The company, for which there was such a rush for shares, was floated in February, 1889, and was formed to acquire a concession granted by the Secretary of State in Council of India for the Ruby Mines of Burmah. The grant was fixed for seven years only, from November 1889 (with certain provisions for renewal), at a rent equal to about £28,000 per annum, the Government, in addition, receiving one-sixth of the net profits. The price paid for the transfer of the grant was £55,000 in cash. No dividend has as yet been paid. The market quotation, which carried a good premium all last year, and retained some of it during the first months of this, now shows a discount.—*H. & C. Mail.*

CEYLON AND CHINA TEA IN RUSSIA.

The decline in the export of tea from China to Great Britain has been partially counterbalanced by an increase in the export to Russia, a circumstance from which the apologists for China's suicidal policy in regard to her principal article of trade have derived more consolation than is fairly warranted. It is only a question of time how soon China tea will be relegated to the same relative position in the Russian market that it occupies in the English market. Russian buyers will find out sooner or later that they can get tea of equal quality at much cheaper prices. Ceylon planters are taking active steps to bring this fact prominently before the subjects of the Czar, and when they have succeeded Russian tea drinkers will not be slow to take advantage of it. At present the Ceylon Planters' Association has a Commissioner in Russia, and an interesting letter from him giving particulars regarding his mission was recently published in the Ceylon papers. From St. Petersburg he writes that from all the information he has been able to collect since his arrival there is a great future before Ceylon tea in Russia, where it is already pretty well-known and appreciated for its purity and cleanliness of manufacture. It is not the fact, he says, that the teas are found too strong and dark in infusion, as the Russians like a somewhat strong tea and do not at all object to a dark reddish colour, but what they do not like, at least in St. Petersburg, is the sweet raspberry taste given to Ceylon teas by the water of the Neva. Whether any alteration may take place in the popular taste in this respect or whether the objection can be removed by some alteration in the manufacture of the tea remains to be seen, but at all events all the dealers, both wholesale and retail, were desirous of seeing and tasting the samples. These samples were to be distributed with a short circular printed in the English, German, French, and Russian languages. From St. Petersburg the Commissioner proposed to go to Moscow and Nijni Novgorod, to push Ceylon tea there.

But to secure success in Russia "tips" are necessary. "To get the key of everything," he says, "of every door of success in business or otherwise, you must tip everybody, from the lowest moujik to the most influential swell; and it is only by doing so that we shall introduce our Ceylon teas in this country. I have been told that a Chinaman, last year, spent something over 30,000 roubles in opening a large tea retail warehouse on the Newsei Prospect (the largest and most central street here); he has now made his fortune. The Brazil Coffee Company spent three years ago, roubles 50,000 to introduce their coffee here, and are now doing all over Russia, a very considerable and paying business, as their coffee is known to and drunk by almost everybody. Another Coffee Company of the same kind, who would not spend the necessary currency in tips or otherwise and tried to do without it, did nothing at all and failed." Presumably the Ceylon Tea Fund will not let a small expenditure for "tips" stand in the way of their tea, whatever opinion the members may entertain individually as to the morality of tipping in the abstract.

The prospect for China tea seems bad enough from whatever point of view it is looked at, and when we see the Ceylon planters making such vigorous efforts to wrest from it another of its chief markets one is compelled to believe that, with all their advantages, they are bound in the long run to succeed. It is interesting to note the enterprise of the Chinaman mentioned above, who opened a retail tea warehouse in St. Petersburg and succeeded so well in his venture. But, granting there were many like him amongst his countrymen, what possible chance can China tea have so long as the Government continue to handicap it with heavy export duties whilst its competitors can be exported free or, as in the case of Japan, on payment of a very mild duty? The total extinction of the China tea trade is merely a question of time if the Peking Government continues to pursue its present policy. The decline in the total export of tea from China this season up to date is about twelve million pounds. Ceylon, on the other hand, has gained about nine million pounds; India, we believe, will show a still larger increase; and in Japan also there has been a forward movement. If China would adopt a bold policy and sacrifice the revenue derived from tea the export would immediately begin to expand and a good deal if not the whole of the lost ground would be recovered. There is just a possibility of the demand for China tea being revived by another cause, which, however, is not a pleasant one to think of. There has lately been some talk of the plant in India being attacked by blight. So far this does not seem to have done any great damage, but as high culture often seems to invite disease from which plants have been free in their more natural state the progress of the tea industry in India and Ceylon may in time be arrested by blight, as was the case with coffee cultivation in Ceylon.—*Hong Kong Daily Press.*

CINNAMON CHIPS.

While Mr. Jardine was in Colombo today our representative took the opportunity of asking him whether the combination entered into about twelve months ago by cinnamon growers as regards cinnamon chips was receiving general observance, and whether the agreement had had the desired effect. Mr. Jardine replied to the effect that he was constantly receiving letters stating that the combination was not being adhered to by certain growers, but his correspondents would not mention names, and expected him to act the part of detective and then take upon himself the risk of exposing the delinquents. This Mr. Jardine does not feel himself called upon to do, and notwithstanding the letters he has received he himself is convinced that three-fourths of the cinnamon growers who entered into the combination have honourably adhered to it. But it is a strange and puzzling fact that though all these men agreed twelve months ago not to make chips the exports up to date show no decrease. As the price of cinnamon has gone up considerably so has the price of chips advanced to nearly double what it was a year ago. This may perhaps be regarded by some growers as an opportunity too good to be lost, and the question is—have any of the big growers retired to some distant part of the jungle for the purpose of making chips "on the quiet"? The failure of the rain which is generally characteristic of the south-west monsoon in the cinnamon districts has had a bad effect upon cinnamon generally, and rain is very much wanted for the November crop.

RAISING TOBACCO in California is by no means an experiment, It can be grown very successfully over a wide range, but the process of curing has been a stumbling block in the way of success as a business venture. It was thought some years ago that the Culp process was a solution of the difficulty, and quite a large amount of tobacco was raised in Pacheco, and worked up for the market in accordance with that formula, but the manufactured article did not find favor with consumers and the business died completely out wherever it had been started. We are reminded of this experience by receiving a few leaves of the plant grown by José Roges on the land of S. Blum & Bro., near Pinole. They show a thrifty growth, and give evidence of the adaptability of the soil and climate for its cultivation, and if Mr. Roges succeeds in curing it, as we learn it is his intention of doing, so as to make a good merchantable article, he can make a fortune for himself and add a valuable industry to the State.—*Contra Costa Gazette.*

THE AMSTERDAM CINCHONA AUCTIONS.

AMSTERDAM, Oct. 2.—At today's cinchona auctions 2,301 packages Java bark sold, with a rather weak tone, at an average uuit of 9 cents (about 1⅞d per lb), prices on the whole being scarcely maintained as compared with the preceding sales. Manufacturing barks in quill, broken quills, and chips realised from 9 to 78 cents (1¼d to 1s 2d per lb.); and root from 28 to 69 cents (5d to 1s 0½d per lb.) For druggists' barks in quills and chips, from 6 to 103 cents (1d to 1s 6½d per lb.), and ditto root, 9 to 24 cents (1½d to 4¼d per lb.) was paid. The principal buyers, in order, were Messrs. C L. Schepp & Zonen, Rotterdam; Matthes & Bormeester. Amsterdam: the Anerbach factory, and the Amsterdam Quinine Works.—*Chemist and Druggist*, Oct. 4th.

PAPER PACKING FOR TEA.

We are interested in learning that so satisfied are the proprietors of the Elkaduwa group of tea plantations with the prepared paper introduced as packing, instead of tea lead, by Mr. Maitland-Kirwan, that they are continuing to use it. Some time ago we announced the despatch of a break of tea so packed, but made up in 20 lb. boxes. This was pronounced quite a success in Mincing Lane. The Manager of Elkaduwa is now despatching another break, but in full chests of 95 lb. packed with the paper in place of lead. If this also meets the approbation of the buyers at home, the saving will be considerable, and Mr. Maitland-Kirwan will then no doubt take steps to advertise and sell the new packing, giving prices and his own experience of the economy effected.

BAMBOO CHARCOAL.—It is generally thought that bamboo being so light and small make a bad fuel wood, and no one would think it of any value as fuel for forges ; yet it is considered the best material for making charcoal for blacksmith work, and is in large demand all over Mysore. It is said to give off more heat than the best coke and to require less blast. A maund of bamboo charcoal fetches twice as much in the village-markets as the best charcoal than any other full. The method of charring bamboo is different to that used for harder woods—the stacks or kilns being carefully covered with green leaves and then plastered with wet clay. While the burning is going on, care is taken to exclude air as much as possible, without extinguishing the fire.—*Bangalore Spectator.*

MR. KELLOW'S WATTLES: "ACACIA DECURRENS."—When adding a note to the letter "From the Hills" the other day on this subject, we could not lay our hands on the dimensions of some of his fine wattles (that do not send up suckers) furnished to us by Mr. Kellow. Here is the memorandum—one which ought still further to encourage planters to go in for "acacia decurrens," especially the Uva men with patana reserves. Mr. Kellow wrote :—

"Dimensions of some of my Acacia decurrens:—

	Height. ft. in.		Circum. at base. in.
No. 1—Acacia decurrens planted out in Nov. '87	.. 42 3	high	33
No. 2— Do do do	.. 36 0	,,	24
No. 3— Do do do	.. 33 6	,,	24
No. 4—Acacia germinated seed put into supply baskets June '89	27 6	,,	20
No. 5—Acacia germinated seed planted in Nursery June '89 and not removed	.. 24 7	,,	—

Number five is one of a batch of plants sold to the Forest Department 12 months ago but not removed so that it has not had fair play (all patana land). If you want a successful belt I should strongly advise supply baskets as then the plants receive no check."

THE MAGAZINE OF THE SCHOOL OF AGRICULTURE for November opens with an article on Vegetable Manures and Cheap Fertilizers, dealing with green manures, peat, coir-dust, saw-dust, leaves, sea-weed and straw. Mr. W. A. de Silva continues his paper on indigenous food products and also writes on the cultivation of the Tomato. "Aba" supplies another instalment of "Ceylon bee culture," and takes up the subject of poultry in a separate contribution. The rest of the contents consist of a note on heredity and sexuality, general items, occasional notes, and school news.

TEA COMPANIES' SHARES continue in the same dull and neglected position, and the latest accounts from many gardens do not lead one to expect that they can do otherwise than badly this season. The crop continues to be an unusually poor one as regards quality, for extremely little really fine tea is offered at our weekly sales. Prices here continue on an unsatisfactory level and will not be compensated for by an increased outturn as many gardens are already behind in this respect. All round the prospect before tea companies looks very gloomy, and at a time like the present it is very necessary for managing agents and secretaries to exercise the greatest economy and to cut down expenses to the very lowest possible limit. A determined attempt ought to be made to reduce the brokers, charges here, which have always seemed to me enormous and utterly unjustifiable. Brokers charge gardens at present 1 per cent for selling their tea, and buyers have to pay them 1 per cent for buying the same tea, so that every chest of tea sold at public auction goes home burdened with a broker's charge amounting to 2 per cent. Is it to be wondered at therefore that much tea is now diverted from the Calcutta market and shipped direct home by the grower or on the garden's account ? In these days of competition and reduced profits merchants are willing to move goods or money from one side of the world to the other for a certain profit of 1 per cent, and I cannot see that any justification can be offered for the enormous brokerages paid here on tea and indigo which are certainly doing much to cripple the trade in both these articles.—*Pioneer Cor.*, Calcutta, Oct. 4th.

POTATO DISEASE.—It is a recognised fact, that high moulding will save a large percentage of Potatos even when the conditions seem very unpropitious. Sulphate of copper also has great power in checking the disease. PRILLIEUX, in his experiments, obtained 115 sound Patotos by the use of a six-per-cent. solution of sulphate of copper, while from an equal area side by side, but where the copper solution was not used, only fifty-three tubers were produced, 32 per cent. of which were diseased. In 1888, M. A. GIRARD conducted two sets of experiments on different farms, using a mixture in water of 2 kilogrammes of sulphate of copper and one of quick-lime per hectolitre. A single application, as a curative treatment, largely reduced the disease, while as a preventive treatment it was a complete success. The solution was applied through an ordinary sprinkler. The increase in healthy tubers on each farm, by the use of the copper sulphate, was :—

A.	B.
14·3 per cent.	..... per cent.
22·9 ,,	2·7 ,,
13·5 ,,	20·2 ,,
17·2 ,,	4·4 ,,

From all the figures presented it is concluded—1st. That the application as a curative treatment does not ensure absolute immunity. 2nd. However, in these cases, treatment diminished in a notable degree the number of diseased tubers, and at the same time increased the weights of the healthy tubers in a very different proportion according to the variety used. 3rd. That the varieties treated, in respect to their receptivity of the disease, differ widely. A 2 to 3 per cent. copper sulphate solution is recommended. It is mortifying to see no steps taken to combat the disease, while no means is neglected to ensure the propagation of the disease. The apathy is from no lack in the supply of information.—*Gardeners' Chronicle.*

THE DEVELOPMENT OF MADAGASCAR.

In a letter recently to hand from Antananarivo, the Editor of the *Madagascar News* says:—

"Madagascar by reason of the Anglo-French Treaty on African partition is now prominently before the world, and the course of events here will doubtless be of interest to your readers, especially as there is every reason to expect that the vast mineral resources of the country will very soon, if not immediately, be opened, either by the Malagasy or the French, for development. To push on the approaching development and to forward British interests here, I shall be much obliged if you will exchange papers regularly, and I would impress upon you that the so doing would materially promote British interests in other country by strengthening the only British newspaper published in the island.

Writing to us on Sept. 29th the Editor further says:—

"Many thanks for your notice. Shall be pleased to exchange with your regularly. It is expected here that the Hovas will cave in.' The feeling is, the sooner the better if they do not throw the country open. Missionaries as well as merchants are tired of waiting for progress. The country is growing poorer, the people becoming more downtrodden, when under a fair ruler both have great capacities for development. The Hovas have alienated their best friends by their misgovernment; and the feeling, as before said, is, the sooner something is done the better."

THE PREPARATION OF CACAO (COCOA).

In the Trinidad *Agricultural Record* has been published a series of elaborate essays on the fermentation of cacao beans and the other processes necessary to render them fit for despatch to the selling market. Those essays will be reprinted in the *Tropical Agriculturist*, and meantime we are able to present to our readers a review of their contents, by a planter entitled to speak with authority, in which the results of local experience are given in a most able and valuable form, such as must render it acceptable to all interested in the product, here and elsewhere:—

The Essays on Cacao Fermentation appearing in the *Agricultural Record* of Trinidad for March 1890 are exceedingly interesting; and although the methods described all differ much from that pursued by us, which we consider the best, it by no means follows that we have arrived at perfection, or that we have nothing to learn; indeed judging by the range of prices realized by different estates it seems that some of us have yet much to learn in this important matter of curing of cacao. Knowing little of chemistry I cannot fully follow the learned writer of the essay to which was awarded the first prize. I have no doubt that the various changes described as taking place during fermentation are all accurately recorded, and that to those who understand them they will prove most interesting and instructive. To the ordinary planter, however, the fact that during fermentation certain changes take place which suppress the bitter principle and develop the conditions and flavour necessary to render it fit for food and marketable, is all he cares to know; and to afford the desirable information as to which method is the best to gain this end is the object of the essayists. The various methods in vogue in Trinidad and Grenada are fully described, and preference seems to be given to that introduced by a Mr. Strickland. The writer of the first essay says that the Criolo cacao requires only 3 days' fermentation (we allow 5 to 7), and as Ceylon cacao is the Criolo or Caracas variety, it may in some degree perhaps account for the fact that the elaborate and lengthened fermentation, said to be necessary to the full development of the flavour and requisite colour of the forastero or Trinidad cacaos, has never been tried here. It is only within the last five years—after the scare caused by drought and *helopeltis*—that these hardier varieties have found favour with some, most still standing by the delicate criola as the best paying. Ceylon planters object to "dirt in the wrong place," and hence have never adopted the practice of drying cacao by mixing earth or any other substance with it. On one occasion an experiment was tried with a few lots by drying without washing, but the result every way was so unsatisfactory that it was never repeated. It is just possible that the curing of the forastero beans may not be such a simple matter as is that of Criolo, and someone or other of the best methods described by the essayists might be tried with a view to determining whether or not they are improvements upon ours.

I may here state that I have sold in the local market forastero cacao cured in the ordinary Ceylon fashion at from R1 to R2 per cwt. more than that realized by Criolo. Two lots of forastero fetched R55 and R51·50 per cwt., while Criolo sold at the same time brought only R54 and R49·50 per cwt. I have not yet tested the home market with it, but I believe that others have, and that prices equal to that obtained for the best criola have been realized. The plan of curing generally adopted by Ceylon planters is as follows, and is simple, expeditious and cleanly; as a rule no cisterns are built, though boxes or troughs are sometimes used, and there is no testing with a thermometer to ascertain the degree of heat in the mass. Pods are always gathered ripe and are brought and heaped on the nearest roadside; an hour or two before knock-off time they are broken with wooden mallets, the beans being scraped out by hand and put into baskets or sacks and carried by the men to the fermenting house. This may be a room or two with mud walls and thatched roof, a lean-to to the store, or the cisterns of an old coffee pulping-house. A wooden cistern is always attached for washing the beans after fermentation is completed. Upon a platform of reepers and coir matting raised a few feet from the ground, and which allows the free escape of the liquor brewed during sweating, the green beans are heaped two to three feet deep, and covered over with old sacks and coir mats. Fermentation is completed in from 5 to 7 days according to the state of the weather and the thickness of the heaps; the heaps being turned over with wooden shovels and recovered on alternate days. This is for Criolo cacao; forastero should have 24 hours less fermentation. The beans are now thoroughly washed in several waters to free them from all trace of the sour mucilagenous matter adhering to them, and if the weather is fine they are spread thinly on coir mats laid on barbecues to dry in the sun, to ensure even drying and to prevent blistering, they are turned frequently by hand, and in three days are dry enough for dispatching. Should the weather be wet the washed cacao is at once taken to the drying-house which is a long ceiled room with two or three lofts of reepers and coir matting; upon these it is spread, and hot air supplied from many iron tubes heated by a furnace outside is drawn over and through the cacao and out at the bottom at the other end by means of a Blackman's or other fan. Twenty-four hours in this drying-house—called a Clerihew—is sufficient to dry it thoroughly. Mr. Jackson's tea drier is highly spoken of as a cacao drier. Mr. R. S. Fraser of Wariyapola says: "Mr. Jackson's tea drier is a perfect cacao drier, both in the very large quantity it will get through in a very short space of time, and the way in which it does it." See vol. V., page 379, of the *Tropical Agriculturist*. The American fruit drier has also been used with success. When there is no drying-house or where the quantity to be cured is only from 3 to 5 cwt. at a time, it is dried on a reepered staging covered with coir matting raised about 3½ feet above the ground; under this fires of dry wood are lighted and kept burning for about 36 hours, the beans being constantly turned. To concentrate the heat the space within the staging is enclosed: when perfectly dry wood is used the colour of the husk is

hardly affected. Cacao fermented and dried as described above is on the outside in the Criolo of a rich brown, and in the forastero of a golden colour; while in both when sectioned, the colour is warm, dark, a ruby red, and the flavour agreeable. I have never seen any cured cacao in Ceylon having, when sectioned, the rich cinnamon colour said to result from fermentation carried out after Mr. Strickland's method. To meet the requirements of some Continental markets, where a lighter colour both inside and out is desiderated, I am told that cacao is fermented for three days only. Our prepared cacao having no substance on it to sour or damp in wet weather fungus does not readily grow upon it. The proof of the pudding is in the eating, and the proof of the value of an article is the price it commands in the market; and as Ceylon cacao generally fetches the highest prices, I think we may fairly claim that our system is a rational one, and, if not superior, is equal to the best that is carried out by our Trinidad brother planters.

CEYLON TEA IN RUSSIA.

THE NEW VICE-CONSUL AT ODESSA.

Lieut. A. P. Murray, of the 1st Battalion Gordon Highlanders, has just been appointed Vice-Consul at Odessa. This is a peculiarly fitting appointment, Mr. Murray's knowledge of the Russian language being so good. The young officer was much liked and esteemed while in Ceylon, and as everything connected with Russia and its trading ports at this time reminds Ceylon folk of the chance of getting their tea more freely taken up, may not this appointment be of some advantage? If Mr. Murray can say a good word, or use any influence, on behalf of Ceylon tea, we feel sure he will not refuse to do so.

"HOP TEA."

Maidstone is in a state of pleasant excitement because the hop-growers, who have been "grubbing up" hop-ground on account of German competition, have found a new market for the *Humulus lupulus*. All Kent is drinking hop tea, because in September all Kent lives almost literally on hops. Mr. Snelling, a well-known tea merchant of Eastcheap, conceived the idea of making hop tea, and bought tons of hops before even the machinery had been laid down for converting the herbaceous twining plant into a product which, before it is mingled with the ordinary tea of commerce, looks like a cross between Bristol bird's-eye tobacco and rough, strong Assam tea. Then Mr. Patrick Eugene Macgregor, who is one of the best known planters in Assam, was called in as expert. He is now making hop tea in a factory on the Medway. We visited the factory, of which I send a view. There Mr. Macgregor was busy at work with the machinery which he was accustomed to use in Assam. The tea-rolling machine represented in our view of the inside of the factory is exactly that which is being exported to Assam and Ceylon by the dozen; but it is the first tea-roller which has been used on English soil, and that is the first "Sirocco" drying machine (in which hops are being made into tea) which has ever been put into motion this side of Colombo. Now, more hop tea is ordered than the present machinery can turn out. The faculty has discovered that the lupulin of the hop counteracts the excessive tannin of the ordinary tea. Is it cheap to produce? No; it costs about twice the price of excellent tea from India or China sold by auction in Mincing-lane. But a proportion of hop tea added to the tea of commerce—the proportion is the secret of Mr. Snelling and Mr. Macgregor—will make a drink which will cheer and not inebriate General Booth and Sir Wilfrid Lawson, especially if they are dyspeptic persons, and cannot drink finest new Pekoe with impunity.—*P. M. Gazette.* [The illustrations represented "'India in Kent.' A Tea-House on the Medway,'" and "Inside the Factory: Roller and Drying Machines."—ED. *T. A.*]

COFFEE IN BRAZIL.

According to all accounts the blossoming is so abundant up country that the prospects are exceptionally good for an enormous coffee crop next year, both in the Rio and São Paulo districts. The season has thus far been most favourable, with just rain enough and a continuance of cool weather, to develop a strong and healthy blossom. With anything better than half a show, the crop is sure to be a large one.—*Rio News.*

NOTES FROM EASTERN ENGLAND.

(By an ex-Ceylon Planter.)

Sept. 25th.

The gap made amongst old friends at home since I came home has been heavy, and the end of all flesh has been busy too, amongst those I knew in Ceylon since I left. A death announced (of a European) in your columns when I first arrived in Ceylon was something to talk about; now unless personally known, little thought is given to it. A rev. friend came in lately. I had just laid the *Observer* down. "Oh!" he says: "a foreign paper, I suppose." "Yes," I said, and handed it to him. After turning over the pages. "Bless me," he says, "why it is quite interesting reading; it tells you something about the quinine, cinchona tree, coffee, tea, and many things which people know nothing of here." I was amused at hearing such remarks; it is strange what little is really known of our colonies in the eastern seas, in fact what interest is taken in them is confined to those who have friends or property there. But I must say *tea* is making the *name* of Ceylon more familiar now even in the remotest country villages, and many dodges are used by unprincipled parties in dubbing filthy stuff with the name of Ceylon tea, some advertised at 1s 4d per lb! and I saw a red handbill lately stuck into parcels of grocery, setting forth the goodness of the celebrated 'Mazawattee tea' at 2s per lb. I wish I had kept it to enclose to you. I can assure you that 'bluffing' is not confined to America, it may be of American growth, or raising—but it takes very kindly to commercial soil in England as if it was of indigenous growth. It has been said that the weather is a standing topic of conversation in this country, it may well be so with the present summer for an example. A fine summer day has been a rare experience since the end of May to the beginning of this month, but I am happy to say that the farmers have had on the whole a good harvest time, and more than average crops, but still they grumble there is something wrong somewhere. The ground game act and the duty off malt were to set all straight with this class, but I cannot learn that they are a cent the better for either. I have asked many questions of a variety of a people—from large and small occupiers to landlords and labourers—on the subject. Nothing but the rabbit gets a bad word, and he is not at all in the way on waste lands but affords sport which so many crave for. As to the hare, its fast disappearing is much deplored about here, it is getting quite scarce, horses seem to have forgotten what they are. They so rarely see one, for lately a farmer and his wife were driving down a lane, when a hare skipping across the road so frightened the horse that he bolted. Though overturned they fortunately escaped serious injury.—I am sorry to find that the climate has now two, at least, strong competitors in engrossing conversation, viz, drunkenness and the unrest of the labouring classes. The former is fearfully prevalent and an awful curse. I could not have believed half what I have seen of it, had I read of only; and the latter is an ominous dark cloud hanging threateningly over all, and I fear will end in much suffering to the labouring class. I am glad to hear Ceylon is so flourishing. Long may she continue!

NOTES ON PRODUCE AND FINANCE.

POOR CHINA! According to a telegram from New York the prospects of a through trade in tea between China and Europe over the Canadian Pacific line are not progressing favourably. This is short and sweet, at least to planters in India and Ceylon who wish to keep the supply of tea to European markets as much in their own hands as possible. If Ceylon planters conquer as many countries as they have laid siege to, the direct trade in Chiua tea will not be very large anywhere.

NO PRESUMPTION. "Is it presumption in an English man to say that he can teach the Chinese how to grow tea?" asks an evening paper. We should say not, indeed. The planters of Indiа and Ceylon could teach the Chinese not only how to grow tea but where to find the best market for it, but they would much rather not. It pays them better to grow tea themselves, and to beat the Chinaman out of the field.—*H. and C. Mail*, Oct 10th.

"TEA OR COFFEE" IN AMERICA.

[In order that you may know all that is going on as promptly as possible, I send the enclosed which will appear in the *Standard-Union* tomorrow. Copies of the paper containing it will follow by first mail. I am very sorry that in consequence of business engagements I failed to meet Mr. Grinlinton, but I have the best reason for believing that his visit here was pleasant to him and satisfactory in its result.—*New York Cor.*]

AN AMERICAN-CEYLON COMPANY SOON TO GO INTO ACTIVE OPERATION.

WHAT HON. MR. GRINLINTON THINKS OF AMERICA AND AMERICANS—REMARKABLE DECADENCE IN THE PRODUCTION OF COFFEE—GROWTH OF CEYLON TEA EXPORTATION.

The project, of which some account has already appeared in the *Standard-Union*, of handling the teas of Ceylon on a large scale in this market, is progressing favorably, and the enterprise will doubtless soon be in actual and successful operation. The Ceylon Tea Planters' Company (Limited) has been organized under the laws of the United States, and agencies will soon be opened in all the principal cities of the country. Mr. Pineo, formerly a Ceylon planter, and who has exerted himself with much success in making Ceylon teas known throughout the world, will be the general manager of the company with headquarters at New York. Hon. J. J. Grinlinton, of the Legislative Council of Ceylon and for many years a planter in that island, sailed the other day on his way home after a most satisfactory and encouraging visit to the United States in the interest of the proposed new departure in the tea traffic. Before his departure Mr. Grinlinton favored a representative of the *Standard-Union* with an interview, in which some highly interesting facts were disclosed.

"After a residence of over thirty years in Ceylon," said Mr. Grinlinton, "I have the coffee, tea and cinchona business at my fingers' ends. Some few years ago the annual export of coffee from the island of Ceylon was 1,000,000 hundredweight, last year it was only one-tenth as much. The coffee grows there at an altitude of from 1,700 to 5,000 feet above the sea. The chief reason for the decadence of coffee is that some few years ago a fungus parasite attacked the plant and is gradually killing it. Not only is this true of Ceylon, but it is also the case in Brazil and other coffee-producing countries. The consequence of this seems to be that people must learn to replace the use of coffee with that of tea. The price of coffee has been gradually ascending of late and will continue to do so, and the time is not far distant when the production will have been reduced to such an extent as to bring coffee beyond the reach of ordinary people. When this parasite attacked the coffee berry of Ceylon, the planters cast about for something else to replace the coffee plant. This they found in tea. Only a short time ago the exportation of tea from Ceylon amounted to but 50,000 pounds annually, while this year it will reach the enormous quantity of 40,000,000 pounds, the majority of the higher qualities being purchased in Mincing Lane, London, for the Russian and Irish markets, these being the countries which consume the finest qualities of teas and consequently, preferred that of Ceylon to all others. Our crop of Ceylon teas is increasing to such an extent that we have had to reach farther afield for other markets in order to prevent the supply from exceeding the demand. I trust the American public will appreciate the efforts we have made to place within their reach the superior qualities of teas produced on our island. Heretofore, the formation of such concerns has taken place in foreign countries, formed exclusively of foreigners, with agencies in the United States, thereby virtually asking the American public to lay out their money for the support of a foreign corporation; and we trust that when the fact is generally known that the Ceylon Planters' American Tea Company has been formed in the United States and composed of American, as well as English and Ceylon capitalists, every possible encouragement will be afforded it." Mr. Grinlinton, in speaking of other products of the island of Ceylon, said: "We export much cinchona, and I am glad to learn that your Senate has just decided not to take quinine off the free list. Colombo," said he, "is now the emporium of the East, with a population of 150,000 people, but, strange to say, of all this number but one is an American, and he the representative of the United States in the island of Ceylon. The European population is composed chiefly of Englishmen, and the natives are the most honest and respectful of all the natives of the East, and any lady would be perfectly safe in journeying alone from one end of the island to the other." It is not difficult to understand the reasons of Mr. Grinlinton's popularity in his island home, as a more bluff, hearty and genial English gentleman it would be difficult to find anywhere. In speaking of his trip through the United States he commenced by saying, in a quaint manner peculiar to himself: "Why, actually, upon stepping from the steamer to the dock in New York the customs officers insisted on examining all my luggage, which seemed rather strange, as no officer in Colombo would think of to examine my hand-bag; but of course, I submitted gracefully and must say that I found the examining officer the most courteous and polite of gentlemen, who explained that he was but doing what his position compelled him to do, and in all my journey through the country I met with universally courteous treatment, even upon one occasion where it was necessary in making connections to take a train in the middle of the night, and having neglected to secure beforehand a sleeping berth, I was compelled to take the only seat to be found, which was in the smoking car, which was otherwise filled with what appeared to me to be a rough-looking lot of people, an opinion which was quickly shown to be erroneous, as, in order to make me comfortable, some of them insisted upon doubling up, as you call it, in order to place two seats at my disposal; and I am now about to start on my 11,000-mile journey for home, with the kindest thoughts for all of you Americans and a regret that I cannot remain longer with you."

Evidence of the merit of the Ceylon teas is also found in the effort before the Senate to add to the tariff a discriminating duty of 10 per cent on teas grown or produced east of the Cape of Good Hope imported from countries west of the Cape. The claim is made that the section of the bill has been added at the instigation of a few interested tea dealers who wish to confine the importation of tea to those countries where it is the most difficult for the smaller dealer to send orders, and is in reality aimed at the London markets; that Great Britain, against which the section is directed, admit every product of the United States except spirits and tobacco free, and that, therefore, no principle of protection is

involved, and consequently no reason for discrimination against tea other than other products of the Orient, which are largely re-shipped from European countries that the teas imported from London are on a higher average quality than the direct imports and that more than nine-tenths of these teas are bought in London by American merchants before shipment; and finally that section has been enacted before and repealed during a Republican administration, and that its reappearance now is due to the initiative of about five interested persons, while the majority of the trade are opposed to it. The British authorities annually seize thousands of chests of Chinese and Japanese teas and destroy the same as being unfit for human food. A few unprincipled dealers in this country, ascertaining that this stuff could be safely landed here, eagerly grasped the opportunity of purchasing and importing large quantities. The impurity of China teas is further sustained by United States Consul Crowell at Amoy, China, in his letter of Feb. 4th, 1889, page 589, in which he speaks of China tea as "vile stuff," etc., for the American market. In speaking of Ceylon teas, Senator Evarts himself says: "They are the only pure teas in the world," and English enterprise has been struggling for the last two years to introduce them into this country, meeting with much opposition from those wholesale dealers who find there is more money in handling adulterated China teas than the pure ones of Ceylon.

The following official table, showing the annual consumption in pounds, gives the best idea of the progress of Ceylon tea in Great Britain:

		1885	1886	1887
Ceylon	...	3,218,000	6,245,220	9,911,860
China	...	113,514,000	104,229,313	90,581,753
		1888	1889	
			Jan. 1st to Oct. 1st	
Ceylon	...	18,553,054	25,350,000	
China	...	79,792,866	51,800,000	

The English are known to be connoisseurs in teas, and the American taste will doubtless ratify the choice of the mother country.—Brooklyn *Standard Union*.

INCINERATOR REFUSE.—As an experiment, 1 hundred bags of ash refuse from Mr. Harrington's incinerator in Circular Road Calcutta, have been sent up to a tea garden in Assam to tests its fertilizing powers and consequent value as a manure. —*Indian Engineer*.

UDAPUSSELLAWA.—The prospects of a good coffee crop next year are looked forward to from this district also, and several good blossoms have been out on all good coffee during the last month. Tea is flourishing but not flushing well just now, and some estates are busy pruning and cutting down the tea bushes. There have been a few days of rather strong puffs of wind lately, but not much rain, tho nights are getting colder, and signs of the north-east monsoon being near at hand.

THE SUCCESS of the Colonial College at Hollesley Bay for young men has suggested the establishment of a branch of the Forsyth Technical College, specially devoted to the training of women for colonial life. There being no capital available for the purpose, it will be necessary to raise a guarantee fund for working the experiment for three years, and the board have an immediate offer of 200*l*. for the initial outlay, provided the required total of 1,500*l*. can be raised. According to the Managing Director—Ethel Forsyth—"The training that is proposed will embrace dairy work, poultry and bee farming and horticulture, and the laundry. Cooking and housework of the establishment will be undertaken entirely by the students themselves, under competent supervision. One year's residence will be compulsory in order to gain the college certificate. A suitable house, with farm buildings and land attached, and near a market town, can be had on easy terms if taken at once, and there is no doubt that there is a great and increasing demand for such training as we propose to offer."—*E. Mail*.

COLD SEASON LIFE ON A CACHAR TEA GARDEN.

Delicious weather, morning air exhilarating as champagne, Italian skies, roads hard and dry—it is glorious to get on one's pony and have a rattling canter over ground which till the other day was a series of sloppy, sticky mud-puddles, interspersed with occasional quagmires. Choti haziri is no longer an unpleasant duty, and the daily cold bath is scarcely the luxury it was. A few weeks ago, on coming in from our muddy round of the garden works, we were inclined for nothing but a long chair, a cigar, and a peg. Nowadays he can tramp all over the country, or wade through bheels for hours after snipe, come home and set to a vegetable gardening (by the way I wish the Agri-Horticultural Society would send up our seeds), and never think of anything stronger than claret and soda.

One's enjoyment of the exquisite weather is, however, sadly dulled by the rapid manner in which the gardens seem to be shutting up. The bushes are assuming a regular cold weather appearance, and some sections look as though they intended giving but little more yield. And this is only September. The season has been a complete chapter of accidents, a chain of misfortune from first to last, and until lately, as unpleasant as unfortunate. I fear it is a black look out for many concerns and many managers. A number of gardens, behind in outturn as it was, are rapidly going from bad to worse.

Down below the bungalow teela the green expanse of tea-bush surface, stretching away into the distance, glistens and sparkles with the dew in the morning sun. It is studded and diversified with the white, red and multicoloured garments of the leaf-pluckers. I have just been pitching into the sirdars about some careless plucking, and the sirdars, are, in turn, giving it to the pickers. The women are an uninteresting lot, on the whole, with a few exceptions, notably our old acquaintances Rosy (Golabi), Sweet face (Sudamukhi) and Nectar (Amrita). The fresh lightness of the air has enlivened them, and they are in high spirits, laughing and joking. An interesting colloquy is taking place between the three young women and a sirdar, who, standing on the road in a hortatory attitude, is getting rather the worst of the argument, and beginning to lose his temper at the chaff. Each of his admonitions regarding leafplucking is repeated with the utmost gravity by the two trio in a chorus, and in tones of serious exhortation to one another. It sounds as though the sirdar were conducting a sort of agricultural Litany, and the three girls intoning the responses. It makes the sirdar very worth indeed. "Bohoot achcha, good old sirdar," concludes Golabi, "we will remember to pluck beautiful leaf for evermore. Oh, here's the Sahib, come along and show us how to pluck, Sahib." This young woman is in a chronic state of requiring my instruction. Her thirst for information would be most praiseworthy, but somehow my patient teaching invariably proves to be painfully devoid of result when her basket comes to be examined at leaf-weighing time. Sudamukhi has a pain in her finger, and wants me to look at it, and give her a holiday. Amrita would like her temperature taken with my little pocket clinical thermometer, as she thinks she has got strong fever. I tell her she does not look in the least feverish, and that if she really had a strong attack, she would not think so, but would be able to speak with full confidence on the subject.

Changsil and Fort Aijal are holding out pluckily. Captain Cole has sent a letter stating that there has been seven day's continuous fighting, but that the Lushais have retired somewhat. Three hundred and fifty of the 3rd Bengal Infantry have arrived, and the campaign will be a military affair. The detachment of frontier police from Debrughur take up the guards on the frontier. Captain Maxwell returns to Debro. I hope that Mr. McCabe will give the Lushais what the Irish style "taste of his quality."

I hear that the Manipuris have risen in revolt, occasioning the flight of the Raja, who, I believe, subsequently abdicated his throne. Two hundred men are

on their way from Kohima, to quell the disturbance. Altogether we are having quite a lively time, and it is likely to continue throughout the winter season. It is more cold weather than ever. The ground is becoming as hard as bricks, and I expect I shall have to reduce the hoeing tasks in order to get proper work. Five weeks ago the kodallis went up to the head into the soil, with their own weight.

The neem trees are looking dull and wintry. My commission on the season's working begins to look very distant, and I am afraid there is but little chance of the proprietors seeing their way to double my salary. —*Correspondent of the "Englishman."*

CEYLON UPCOUNTRY PLANTING REPORT.

PORCUPINES, CACAO BARK AND TEA SEED—ANOTHER ENEMY OF THE CACAO PLANTER—THE CACAO THIEF AND THE VILLAGE HEADMAN—A MYSTERY SOLVED.

Oct. 21st.

Men who know what havoc a porcupine can make in a cacao garden will be pleased to learn that dearly as that animal loves to tear the bark off the cacao tree, and destroy the pods, yet he is fonder of tea seed. An estate which was surrounded with scrub, infested with porcupines, and which suffered considerably from their ravages, has for some time now been wholly free of this plague. A field of tea has come up close by. The other night a porcupine was shot among the tea. The Sinhalese watcher had for some nights before been hearing a cracking sound among the tea trees, but could see nothing. Watching more carefully, he discovered a porcupine which he shot, and in the morning it became quite clear that it was the tea seed the brute had been after, and on which it had been freely feasting.

A worse enemy of the cacao planter is the Sinhalese rogue. The manager of a cacao garden told me the other day how about half-past six in the evening his watcher caught one of these fellows a little way from the boundary, with several measures of the fruit in his possession. An attempt was made to run the man in, the watcher offering his services to the extent of being prepared to swear that he caught the thief on the estate; but was told that he must stick to the truth. He did this, and the magistrate acquitted on the ground that there was no proof that the cacao had been stolen. The planter felt a little sore, and when his feelings were in this tender condition he had a visit from the local headman. This worthy had come to condole, which he did, adding as a reason for this miscarriage of justice, and perhaps too as a hint for future guidance: "Sir, how can you expect to get the thieves punished in the Police Court, unless you tell lies"! The planter says that the next man that is caught won't be taken before the magistrate, neither will any lies be told about him, but he will assuredly be punished!

There was a row in a cacao garden, owing to a number of branches having been broken. Careless gathering was supposed to be the reason, but yet it could not be satisfactorily brought home. After a bit, the watcher, out after squirrels, found the culprit and shot him. It was not a cooly, but a big scaly creature which had gone up the tree after red ants, and the weight of whose body had caused the damage mourned over. One lives and learns. PEPPERCORN.

THE LEAVES of the Duboisia Hopwoodii, an Australian shrub, are chewed by the blacks as a substitute for tobacco. They contain an alkaloid called piturine, which, according to some chemists, is identical with nicotine, or at least closely allied to it.—*Globe*, Oct. 10th.

NILGHERRY TEA DOING WELL.

We notice in Mr. W. G. and H. Thompson's Indian Tea Circular, of the 25th ultimo, that 107 chests Kodanaad Nilghorry tea sold at prices ranging up to 1s 7¾d the broken pekoe realising that high figure, whilst the pekoe souchong fetched 11¾d. These results, which surpass Ceylon and equal some of the best northern manufactures, should encourage Nilgherry planters. Climatic influences may affect the yield of Nilgherry estates, but when the manufacture is carried out with the best machinery, and in accordance with the most approved processes, the quality leaves nothing to be desired.—*M. Mail*, Oct. 20th.

HIGH AND LOW CINCHONA PRICES.

The now unusually high price of 1s per lb. was realised on Tuesday by a few lots of very fine bark—the first being two bales of renewed officinalis shavings from Ceylon, and the next 10 bales bold Ledgeriana stem chips from India. For one small case of renewed quilly Succirubra chips from Ceylon the unusually high figure of 8d per lb. was also paid. At the other end of the scale the lowest price realised at the auctions was that paid for 3 bales Succirubra twigs from Ceylon, which sold at ¾d per lb. Some years ago, when 2s 6d or 3s was a usual price for red chips, such twigs were thought cheap at 10d per lb. This week also 1¾d per lb. was the best offer that could be obtained for some damaged soft Colombian bark, imported as far back as May 1880. The broker was not at liberty to accept this bid, and bought in the parcel at 2½d per lb., plaintively observing that when he offered it the last time—ten years ago—he rejected an offer of 1s 9d per lb. for the same lot. The parcel was a small one, and the loss to the importers—apart from the cost of the warehousing of the bark—probably not over 200*l*. About a decade ago offers of 4s per lb. were more than once refused for a specially fine brand (Z O) of this same variety of cinchona, but the owners of these lots were comparatively fortunate, as they have since been able to clear them at about 8d per lb. The large quantity of Calisaya bark from the South American plantations formed a feature of the auctions. Nearly 90,000 lb., mostly of recent import via Liverpool or Hamburg, passed the hammer, and two-thirds of this was sold. It must not be forgotten that this bark is nearly twice as rich as the average Ceylon or Indian bark. Most of it is bought by the English quinine-makers.—*Chemist and Druggist*, Oct. 11th.

"THE CEYLON TEA COMPANY LIMITED."

As we fully anticipated the leading gentlemen connected with the local Tea Fund have seen the necessity for organizing a Limited Company to carry on after a commercial fashion the business created through the operations of the Fund's Agents. This was made very clear in the case of Russia the other day, when it seemed so great a pity not to pick up at once the interest and good-will created by M. Rogivue. We therefore highly approve of the new Company, into which we have no doubt, the Ceylon Tea Fund will eventually merge, and we are glad to see it is to be supported by leading planters and merchants. It is proposed to begin with the modest capital of R100,000 and the main object is to deal with the Continent of Europe as may be seen from the list of agencies appended. We quote as follows:—

The objects of the proposed Company are the sale of Pure Ceylon Tea, the pushing, advertising and generally making known Ceylon Tea throughout the world. To enable the question "where can we buy Pure Ceylon Tea" to be answered by and on behalf of Ceylon Tea growers. To supplement and support the action of the Ceylon Tea Fund" by attending to the execution of orders for Ceylon Tea, and the appointment of Agents,

It is believed that, apart from the general good to all Ceylon Tea Growers and to the whole Island that will result from the undertaking, dividends will be earned by the Company when fully established.

Agencies will be opened in various cities throughout the world as opportunity offers :—

London, Colombo, England, Scotland, Wales, Austria (Vienna), Belgium (Brussels), France (Paris), Germany (Berlin), Russia (Moscow), Turkey in Europe (Constantinople), Australia (Melbourne), New Zealand (Dunedin), Tasmania.

We do not see why every Teagrower in the country should not be a shareholder, for he might in this Company expect a fair dividend for his investment as well as the indirect benefit sure to result to the Ceylon Tea Trade at large.

CAN THE COLOURS OF CORAL BE PRESERVED.

Such is the tenour of a query addressed to us by a correspondent, and it is one to which we do not feel justified in giving a positively negative answer in view of all that is being accomplished in the present day. We believe that efforts have been made to secure permanence to the vivid colour which distinguishes corals when viewed in their native *habitat*, but we are unable to inform our querist as to the degree of success which has attended such efforts. It is suggested that as after much experimenting, it has been found possible to fix the fugitive colours both of grasses and flowers—and in this connection attention is directed to the marvellously preserved grasses, &c., with which many of the cases of stuffed birds in the Museum of Natural History at South Kensington are provided—it might be found possible by some methods akin to those by which that result has been attained, to accomplish what is now desired, namely, the rendering permanent the colours which are so resplendent among corals when viewed from a boat and during their natural growth. Were these colours natural to, and inherent in, the corals themselves, as they are in grasses and flowers, it would seem as if this suggestion might not be wholly wide of the mark; but we believe it to be the fact that the resplendency to be seen while corals are in growth *in situ* is due, not to any pigment contained in the formation of the corals, but to the animalculæ which encrust them. These die almost immediately on exposure to the air, and the vivid colouring which charms so greatly when viewed through the medium of sea water almost entirely disappears when the coral is raised to the surface.

This is, we believe, the fact as regards all the coral found growing in Indian waters. At the same time we are aware that the fishers of the Mediterranean constantly obtain specimens, both of pink, red, blue and yellow coral, which stand the test of exposure and form the material from which the very lovely ornaments, sold chiefly in Naples and its neighbourhood, are prepared. Can any of our readers inform us as to whether the corals so worked up are subjected to any treatment preservative of their natural colour? Our own impression is that they are not, and that the colouring pigment is inherent. If this impression be correct, it is difficult to conceive any reason why, among the many varieties of coral produced in Eastern waters, there should not be some at least possessed of this quality of natural permanence. No one who has once visited the lovely submarine gardens to be seen off the shores around the island of Rameswaram and in or near to Galle harbour can fail to retain recollection of them as "a thing of beauty and a joy for ever." We have no hesitation in declaring that a view of these is ample repayment for a journey expressly made to their locality, and we really believe that an excursion trip organized by one or other of our steam launch proprietors would receive patronage and the cost of it be productive of no disappointment to those sharing in it.

This, however, is but a secondary matter. The point just now is whether it might be possible to perpetuate the splendour of such submarine gardens. If this were possible, we are assured that the fringes of our shores would furnish a harvest certain of great remunerative appreciation at home. The much prized pink coral of the Mediterranean fetches, we are told, more than three times its weight in gold for the more sought-after shades of colour. Even supposing that, as mentioned above, the colours are due to living animalculæ rather than to the coral itself, the question naturally suggests itself whether it would be wholly impossible to preserve these coloured creatures upon the coral and so perpetuate the beauty—the extreme beauty—of its appearance. Of grass we are told by the Psalmist that "in the morning it flourisheth and groweth up: in the evening it is cut down and withereth." This, however, has been falsified in a sense, for the grasses at South Kensington above referred to, look as fresh and as lovely as if still growing upon their native soil. Is it looking forward too much, or placing too great faith in the scientists of this advancing age, to hope that some similar method of treatment might be as successfully applied to submarine as to super-terrannean gardens! Granted that the conditions of growth and the basis of formation are altogether different in the two cases; still in the one decay is but arrested, and such a principle does not seem to be wholly inapplicable to the other. We have seen fishes preserved by Mr. Haly with their natural brilliancy of colour retained. It would not, therefore, seem to be wholly irrational to hope that means similar to those employed in their instance might solve the query in reference to the corals which so freely surround us in this island. On the other hand we are bound to recall the fact that some time ago an Italian who was very eager to commence fishing off our coast for colored, if not pink coral, was discouraged by the then comparatively plentiful supply available in Europe. Has this been worked off and is the price really as high as has been indicated to us above,— are questions we should like to see answered authoritatively

COFFEE.—An anonymous correspondent in the *Jornal do Commercio* of the 28th ult. says;—"Trustworthy advices from the states of Rio, Minas and S. Paulo give the future crop (coffee) as without equal; the trees are so covered with blossoms that they appear to be sheets, and from the appearance of the buds a much heavier blossom is expected in the months of September and October."—*Rio News.*

A MAN here has applied for a patent to petrify clay walls and publishes the formula in the *Diario Official* of the 23rd. It is: in 100 litres of water dissolve 1 kilogramme of shell lime, 1 kilogramme of *jaggery* sugar and 1 kilogramme of *caths*, whatever that is. Mix your clay with the mixture and set up your walls. Perhaps some of our Ceylon friends will tell us what *caths* is?—*Rio News.* [The word is, of course a corruption *of kahata* astringent fruit,—ED. *T. A.*]

FORTUNE-SEEKING IN EAST AFRICA.

Mr. Henry Brown, the Ceylon Police Inspector and formerly coffee planter, who is also known by his book on "Sport in Ceylon," is on his way to East Africa, having obtained six months' leave from the Inspector-General of Police. Writing from Aden on Oct. 14th, he says:—"Here I am vegetating amongst the barren rocks of Aden, and a more wretched place I never saw. I leave here tomorrow by a vessel of the new German line called the German East African Line. The steamers of this line call at all the ports on the coast as far down as Mozambique, and from thence I shall get a Portuguese steamer to Quilimane. I see the Bombay, Madras and Calcutta newspapers, but none of them come up to the *Observer* for news and items of interest. * * * I had to leave Colombo with only four hours' notice, and—what do you think—missed my steamer for the African coast owing to having been put 24 hours in quarantine, which seems absurd, for the 'Navarino' was 24 hours in quarantine at Trincomalee, and brought the General and party round to Colombo, and obtained a clean bill of health from that port. Only myself suffered, however, and I was put on a wretched lights-hip all alone. There is no newspaper published in Aden, but there is much need of one, for the carrying on of some of the official and unofficial residents is scandalous, to say the least, especially as regards their observance of the Sunday."

HOP TEA.

To the Editor of the *Home and Colonial Mail.*

Sir,—I have read with great interest the two accounts of "Hop Tea" in your issue of Oct. 3rd, taken from the *Daily Telegraph* and *Pall Mall Gazette*. The former paper is very misleading, as the produce is sold in packets, all marked in large letters, "Indian and Ceylon tea, mixed with English hops." The word "adulteration," which is so freely used by the *Daily Telegraph*, is a very ugly one, and quite uncalled for. No man with a single spark of honour would be associated with a company that manufactured an article for adulteration. I am in no way connected with the Hop Tea Company, Limited, further than I received a fixed salary during the hop season, which ends this week. But for my own and the sake of others I state that there is not one iota of truth in the statement made by the correspondent of the *Daily Telegraph* as to adulteration. Further, his statement "that the buyers give the farmers 4d to 6½ per lb. for green hops, the margin of profit is obviously great," is misleading, and requires explanation. Your readers will easily make their own calculations from the fact that it takes four to five pounds of green hops to make one pound of dried hops; then add to this cost of English labour, machinery, and all manufacturing charges, &c. The tea planters of India and Ceylon are satisfied as long as it creates a demand for their teas and helps to push China out of the market, and they know that only a very small proportion of the precious hops can be used in their tea. There is no doubt that the mixture is a great improvement. The hop growers like it because it makes a new market for their hops, and some of them are of opinion that the "Sirocco" is likely to prove a successful rival to the old-fashioned way of drying hops. This only shows how many uses that valuable machine invented by Mr. A. C. Davidson, the popular Cachar planter, can be put to. The tea consumers like it, and repeat their orders, and those that could not drink tea before are obtaining the sanction of their medical advisers to use tea with hops in it. Grocers like it because it is liked by their customers. I know of one grocer in this town who has sold on an average over twenty chests per week. It is with the deepest interest I have read Messrs. Gow, Wilson, & Stanton's most interesting yearly statistics, showing how Indian and Ceylon teas are year by year superseding China teas, and now your fellow countrymen from the "Garden of England" join hands with those that have invested millions of British capital in India and Ceylon.—Yours truly,

Patrick E. Macgregor.

"Ye Ancient Bell Hotel," Maidstone, Kent.
Oct. 7th, 1890.

NUTMEGS.

An old planter writes:—

"I do not know much about nutmegs. The climate of Hanwella would I think do very well and the soil might be suitable and perhaps those portions with an easy slope might be got to grow them.

"This product wants great care for 4 years, the plants requiring side shade removed every six months. —— planted 800 plants near Kurunegala and had them shaded with cadjans, but their growth was very slow. It is now 7 years since he planted them, but I have not seen them for 4½ years. He planted also 300 cloves. I will write to the present owner and inquire how they are."

SOME CURIOSITIES OF THE TEA TRADE OF CANTON.

Mr. Alabaster's report on the trade of Canton for the past year contains references to some odd features of the export trade. Eighty thousand pounds of human hair, valued at £319, appear in the returns, and the Consul wishes it did not, for, as the greater part of it comes from the heads of beggars, criminals, and dead persons, it is not pleasant to think that it is worn by ladies at home, even though it goes through long processes of purification before it is made up into wigs, chignons, waterfalls, &c. The demand for what are called old silk embroideries is unabated; in fact, the majority of these garments are not old, but soiled, and the Chinese must look on the purchasers much as we should regard collectors of discarded teagowns or worn-out tennis suits. "It is true, much of the embroidery is very beautiful, but the association of ideas is not pleasant." The "scented tea" of Canton is the only branch of the China tea trade which the Indian cultivators cannot imitate.* The trade in matting is increasing; last year 228,929 rolls, valued at £123,957, were exported, chiefly to America, where it is largely used for carpets, and in a dry, hot climate nothing can be cooler, cleaner, or better; but it is not so suitable in damp weather, for it gets rapidly mouldy, and breeds fleas to an intolerable extent. An article of export which has come into prominence of late years is glass bangles, of which the value last year was £78,202. These bangles are exported chiefly to Bombay, "and it is strange that Canton should supply a British province with glassware." Brass buttons, 560,000lb. in weight, were exported. The manufacture was introduced by foreigners, but has now passed into native hands. "Buttons are the jewelry of China." The magnitude of the export of fans from Canton is shown by the fact that 11 ½ millions were sent through the Customs in the course of the year. The majority are simple palm-leaf fans, and go chiefly to America, where their lightness and cool appearance have brought them into great favour. For decorative purposes Canton fans cannot compete with Japanese, and for artistic beauty the Canton paper fans are surpassed by those of Foochow and Shanghai; but the feather fans made from the quills of the wild goose are strong, useful, and cheap. Preserved ginger, chowchow (a mixture of ginger, bamboo,

* We do not see why it could not be imitated if there were a sufficient demand for it. In the paper on tea which Mr. Brace contributed to our columns, there is a long list of plants, the blossoms of which could be used to flavour tea, and we have heard of a lawyer-planter in Ceylon treating his lady friend to tea perfumed with rose leaves.—Ed. *T. A.*

oranges, &c.), cumquots, or little oranges, were exported to the extent of over three million pounds, valued at £41 137. In the interest of little boys at home, the Consul thinks it could be wished the export were larger, for, although the ginger may not be as pungent as that of the West Indies, the preserves are wholesome, agreeable, cheap, and, as far as the leading firm of Chyloong is concerned, cleanly made. As to Chinese medicines, peppermint oil and rhubarb have established their fame abroad, and when better known Pu-êrh tea will probably take the place of senna, as it is equally effective and far more agreeable. Of general medicines 2,992,533 lb. were exported last year, exclusive of special drugs, and 2,088 cwt. of pills. Another Canton speciality is teapots enclosed in wadded rattan cases. "They are not particularly handsome, but for a traveller, who wants to take a warm cup of tea to solace him during a long railway journey, they are invaluable, as they keep the tea warm for a considerable time, and keep the teapot from upsetting or getting broken." Woollen blankets, as an article of import, are increasing; white blankets are naturally not greatly in demand in a country where soap and water are rarities, and blue, being suggestive of a funeral pall, are not in favour; but every passenger by night boats seems to have a red blanket. Otherwise woollens are used chiefly for uniforms and table and chair covers. Gloves are not in demand, for the long nails are endangered by them.—*Times Weekly Edition.*

RATS DRIVEN INTO COCONUT TREES BY MONGOOSES.

Under this heading the *Jamaica Gleaner* reports evidence taken which goes to prove that the mongoose, introduced to destroy the cane rats, has become almost as great a plague in Jamaica as the rabbit is in Australia. As a sample of the statements made, we quote as follows:—

The Commissioners met at Headquarter House yesterday at 11 o'clock. The first evidence taken was that of Inspector H. Thomas of St. Thomas:—He said that the mongoose had destroyed all the quails in the district, all the poultry, and had destroyed the boohy duck in the high mountains and blue dove. They killed the black crabs which were always to be found in the swampy lands. They had driven rats into the coconut trees, but he could not say if they were the cane piece rats. It was common to see the rats eating the coconuts. He has seen the mongoose climb trees like a cat. They were fond of fruit, especially the naseberry and mango. The small settlers were anxious to get rid of the mongoose. He had recent cause to believe they devoured their own species and had proved this by trying a dead one and watching and seeing a mongoose come for it and cut the cord to drag the dead one away. He believed they colonized, at one time you would see large numbers, and if persistent efforts were made to destroy them they would go away and come back again. He thought the male forraged while the female remained at home. He had been assured by penkeepers in Hanover that newly born calves had been attacked and killed. At Shettlewood Pen the overseer had told him that more than one newly born calf had been found with his throat cut and this was attributed to the mongoose. Pigs were destroyed in the same way. He never heard of them attacking infants. The peasantry could not preserve their poultry from them. He had 80 chickens destroyed in three weeks by the mongoose. He had known one to attack a rooster in the bush. The mongoose was averse to cross an open space. They bred in hollows of stone wall and penguin fences. Sharp dogs would keep them away. He knew a gentleman at Yallahs who caught 150 in a month. For a fair amount 1000 could be trapped in a month in his parish. He thought to get them trapped it would be better to give 1d per head or tail rather than only accepting them at that rate in exchange for taxes. He did not think people had more rats in their houses now than formerly, and had not noticed any diminution in the number of john-crows.

George Nethersole said: They did much mischief: He could not raise fowls. They drag cocoa from the grounds and eat the corn, breadfruit and red peas, green corn and plantains. Had never seen them eat canes. The rats were as numerous as ever. They eat coconuts. Had never heard of a mongoose attacking children. They had destroyed the snakes.

Mr. J. P. Walsh thought the ticks should be attributed to the mongoose as they had destroyed the blackbird, the great tick eater. He had seen mongoose among the crows on the beach eating fish offal but had never seen a black head crow—these were the young ones. Had seen john-crows eggs broken and thought it probable they had been eaten by mongoose. In a short time he believed there would be no crows left as scavengers. The poor people complained they could not pay their taxes because the mongoose ate their poultry. Fowls that used to be 4½d per lb. were so scarce that people had to pay now 9d to 1s.

Mr. E. S. Salmon said the mongoose destroyed poultry, climbed banana trees and ate ripe bananas and pines.

WYNAAD PLANTERS' ASSOCIATION.—At the general annual meeting held at Meppadi Reading-room; on 1st Oct. 1890, there were present, Messrs. Abbott, Atzenwiler, Hoekin, Jowitt, Lamb, Mackinlay Malcolm, Morres, Powell, Puedzieux, Taylor, E. Trollope and G. Romilly, Hon. Secy. Mr. J. R. Malcolm in the chair, and the Hon. Secretary read the annual report, from which we make extacts showing how the Wynaad planters complain of want of labour and how they deem their prospects not very bright:—

The great question of the year has been the want of labor. Many Mysore maistries and coolies have not come in, owing it was said to the prevalence of influenza in their villages. The same reason has been given for the desertion of the Tamils, but in this case it is without doubt the fact that many maistries under advance to planters in this District have taken their coolies wholesale to Coorg. They unfortunately realise that owing to the rulings of the High Court with regard to Act XIII. of 1859, they can do this with impunity. Unless the maistry can be caught before the expiration of the term of his contract, (which he takes good care to prevent) he escapes without any punishment. If he is caught, he is merely ordered to fulfil his contract and thus given another chance of escape. We have appointed a committee to inquire into the grievances of the district owing to this useless Act and we hope that by a combined representation on the subject from all planting associations, we shall get Government to acknowledge the disabilities under which we are working and to grant us redress. Last January we requested Government to send an expert to report on the great mortality of Cinchonas throughout the district. Mr. Lawson the Director of Government Cinchona plantations was at once sent. He has reported that there is no specific or infectious disease, but that in his opinion the mortality is due to starvation. Unfortunately the mortality continues even in well-manured fields. As to our prospects I fear that notwithstanding the present high prices, the outlook is not bright. A terrible attack of leaf-disease has succeeded a very short crop, and Cinchonas in many parts of the district are still dying wholesale. Notwithstanding the letters that periodically recur in the newspapers, everything that science can do to determine the character of the Hemilia Vastatrix and everything that science could suggest to arrest its progress, was tried years ago in Ceylon, and yet in the face of science the disease has practically driven coffee out of the island. Now for the first time we, here, are realizing the possibility of such a danger. In Ceylon they turned their abandoned coffee lands into tea and prosperity returned. Here though we have abundant proof that tea will thrive luxuriantly, where both coffee and cinchona fail, owing to an apathetic Government we cannot command the labor. We have not sufficient even for our coffee; and tea requires double the quantity. So that unless we can get legislation to assist us without delay in enforcing our labour contracts, the end will be that we shall have to relinquish the land, in which we have sunk many lacs of rupees into the hands of a short-sighted Government with diminished revenue.

HILLCOUNTRY PLANTING REPORT.

A SOUTH-WEST RAIN-STORM—FOREST AND RAINFALL AND GOVERNMENT RESTRICTIONS—A MORE LIBERAL POLICY REQUIRED—IMPROVED PREPARATION OF CEYLON TEA.

NANUOYA, Oct. 28th.

To revert to the question of forest and rainfall in mountain regions and the regulation prohibiting the sale of lands above 5,000 feet altitude, I take it for granted that the prohibition does not extend to the vast stretches of upland prairies, which are treeless or nearly so. And as regards forest land above 5,000 feet elevation, which all the remaining forest on the dividing ranges is, I strongly deprecate any hard-and-fast rule. Ever since my attention was attracted to the subject by a deputation from Kataragama when I was pioneering in Uva (half-a-century ago!) requesting me to spare the mountain forest for the sake of the sacred river, my opinion that, in mountain regions at least, the denudation of forest has not the slightest effect in diminishing rainfall has been but strengthened with the efflux of time and the results of reliable observations. I was sorry to see a man like Mr. Moir, in his report on the Walapane distress giving currency to the proposition that the clearing of forest by planters had lessened the supply of rain for the paddy fields. There are regions of recurring drought on the outskirts even of mountain regions, owing to the position of such localities with reference to the monsoon currents; and all the records available show that in all history Walapane has experienced the effects of being situated in such a region. Mountains are nature's great agencies for cooling moisture clouds and currents and compelling them to part with their contents. But there are in Ceylon as in India portions of mountain ranges beyond the reach of our greater monsoon, the south-west, and from which, by topographical features, even the currents of the north-east monsoon are either deflected or have been previously deprived of their moisture. On the rainfall in such regions the process of felling forest about 40 feet high and substituting cultured plants about 4 feet in height, within a good many cases, cultivated trees of taller growth (cinchonas and timber trees, for instance), cannot have, and we know from extended observation has not had, any diminishing effect. There is more to be said in favour of the statement that the denudation leads to floods and the deposit of silt. But any tendency in the direction of floods is very largely counteracted by the tillage which the soil receives on estates and which renders it specially absorbent of moisture. One of the greatest floods in the Kelani river in modern times took place in 1837, when only a few hundreds of acres had been felled of the vast tracts of forest at its sources and along its course. Silt in rivers and streams is speedily disposed of by scour, and in the rare cases where paddy-fields lie beneath European plantations (there are no such cases in the region whence I write) damage by silt to the former could easily be obviated by the cutting of a trench between the two. This might be rendered imperative on the planter, instead of the course now frequently pursued of refusing to entertain applications for forest land, the clearing of which may possibly lead to damage of rice lands by descending silt. By all means let us have forest and fuel reserves in reasonable proportion and within reach of railways or other means of communication. And let rice cultivation be duly protected and encouraged. But surely it is an unwise policy to restrict further extension at high altitudes of the one enterprise on which the Prosperity and progress of Ceylon so overwhelmingly depend. In the region around me as I write there are elevated ranges connected with such mountains as Pidurutalagala, Kirigalpotta, Totapala, &c., which ought not to be invaded by the clearing axe and with which no planter in his senses would tamper. But below these, at from 5,000 to 6,000 or 6,500 feet, are vast expanses of forested valleys, hollows and ravines specially suitable for tea culture and which cannot be utilized as reserved forest or fuel for the railway, owing to their distant and secluded position. If blocks in such valleys were laid out for sale, proportions of patana land being added for the growth of timber trees, there would be room for expansion of enterprise, culture and population; means of communication being provided under the operation of the Branch Roads Ordinance. To say absolutely that no land above 5,000 feet will be sold, is to say to progress in Ceylon "Hitherto shalt thou come and no further," and to divert capital and enterprise to lands which are our rivals in the production of tea. And this at a time when Ceylon tea is, above all others, finding favour in the markets of the world, and when its culture and preparation have come to be so much better understood than ever before. Apart from such details of manufacture as leaf-sorting,—first a light rolling of the leaf, succeeded by a heavier; the provision of "roll-breakers," and drawers for "fermentation";—planters now understand that the first flushes after pruning yield weak tea. Arrangements are, therefore, made for having fields of pruned and unpruned tea in due proportion, so that the leaf from each may be mingled. Then, at high elevations, it has been found that bushes can be plucked for two years in succession without being pruned, provided the previous pruning was low enough to prevent a tendency to blossom and leaf. In these directions and others knowledge has been obtained and improvements made calculated still further to add to the high quality of our tea and to the earnings of "poor but industrious planters."

DARJILING AND TERAI TEA SEASON.

Since the deluge, or more plainly speaking, since the heavy rains, there has been very little to record in favour of the tea prospect. The weather in the district has undoubtedly improved but beyond that the tea manufacture continues very much in the same groove that it did when things were in a perpetual state of mildew. As to the future it is very difficult to foreshadow the results of this season's working, but from recent accounts the hill gardens have considerably improved in quality of outturn. This is gathered from the last London market sales to hand, which show prices not only better than usual, but far exceeding those obtained last year for the same quality of tea. Although the hill gardens are favoured with what one might call tea-making weather just at present, the season is too far advanced for any material change to take place as far as quantity is concerned, and it is feared that many will close with a very short crop. There is, however, a chance of the season being late, with this wild weather. In that case it will be a considerable help to those who suffered the most from the effects of the spring drought.

The Terai gardens have had an unfortunate season all round. To commence with, they required moisture: this was followed by excessive rains in the hills flooding the rivers, and for two months many of the gardens in the plains were entirely under water. So, practically speaking, the factories have almost been closed for the latter half of the season. As soon as brighter weather favoured the place, it became enveloped in an overwhelming blight such as has never been known in the Terai, and there is very little chance of matters improving at present.

One or two of the gardens have done better than others, but on the whole the season will be a deplorable one to proprietors: some say that many of the small estates will close at the end of the season for want of financing. It is very difficult for small factories to exist in a place like the Torai. The climate is such that few proprietors would care to settle down in it, and the price now obtained is not sufficient to secure good management; consequently those places started in better days, have not a very bright future, unless amalgamated with each other to ensure good management at a minimum expenditure. It is estimated that the crop is twenty-five per cent. less than usual, some of the factories being as much as fifty per cent short of the outturn. Several changes in the managements are pending, both in the Terai and in the Hills. This is poor satisfaction to the proprietors, but it seems to suit some people to be in a constant state of change.—*Correspondent of Calcutta "Englishman."*

AFFAIRS IN MADAGASCAR.

Writing to the editor of the *Tropical Agriculturist*, the editor of the *Madagascar News*, in a letter somewhat similar to one from which we published an extract some time ago, says :—

"Madagascar is on the eve of a great development of her vast pastoral, agricultural, and mineral resources, and that the course of events here during the next few years will doubtless be of interest to you, especially as the resources of this island are very similar to those of yours. Beyond that, however, there is the French policy here to follow, the result of which were those directly associated with the Government cannot today forecast. Her Majesty the Queen, the Prime Minister, and the Court have been in the forest country ever since the Anglo-Franco Convention began to be negotiated, and the few people remaining in town are embodied with the Government; the town, however, desires peace at any price."

COCONUTS AND CINNAMON.

Kadirana, Oct. 30th.

It is a trite saying that all things come to those who wait; and to us at last has come the long delay, and therefore all the more welcome rain. Since the 26th it has rained every day with only short breaks of rest, but the rain till last night was so gentle that not a drop ran off the ground; during last night, however, the rain was very heavy, and the gauge measured 3·30 inches. The total for four days is 6·81 inches. There is a marked absence of electric disturbance. Gladness is in all hearts, but as for thankfulness that can come from only the Christian or the theist. The Buddhist can feel none, for to him there is no one to be thankful to except perhaps to himself; for must it not be due to his own good deeds—Karma—in some previous birth that the rain has come when it did! It strikes me that there must have been a good many whose merit is pretty equal to bring down the rain almost everywhere just at the same time! How would the Buddhist account for its falling equally upon the bad?—A bud is showing on the cinnamon, and will be well out in a few more days.

TEA IN FOOCHOW.—The news of the large settlements of tea during the last month have produced some sensation in the principal districts in the country, but owing to the lower range of prices offering they prefer to leave the leaf to grow old instead of picking it. It is believed by growers that a clean picking off of the leaf every year does harm to the plants, and that the short picking of last year has greatly added to the strength of this season's tea in the cup; for this reason, coupled with the low prices, they almost unanimously refuse to pick any further quantity, so the supply for the season may now be computed at no larger amount than 370,000 chests.—*Hongkong Daily Press*, Oct. 14th.

PLANTING AND NEWS REPORT FROM PANWILA DISTRICTS.

EXCELLENT TEA AND CACAO PROSPECTS—CARDAMOMS, PEPPER AND VANILLA—ABUNDANT LABOUR—ROADS.

WATTEGAMA, 30th Oct.—I am glad to say we are not in the same position as "Eldorado" having all our cacao trees dying out, but, on the contrary, we shall all have an excellent crop this year and our trees look very healthy and fit to bear better crops as they get older.

We can safely rely on our 400 lb. per acre made tea from all estates which are properly cultivated in our district.

Cardamoms, pepper, and vanilla, are doing well. Labour abundant and cheap. Our District Engineer is giving his full attention to the roads, but the *shaving* system at present in use though good while there were lots of old metal 9 to 12 inches thick on the road will soon show the mud. There are several patches now on the road from Katugastota towards Galagedara where the cart wheels turn up the red soil. We now require a thick layer of good metal put on our roads, as the island can afford it and not wait till the last metal is shaved off. We also require better metal. Metal heaped on our roadsides (not by our present engineer) grows weeds and grass freely, thus showing the earth mixed with the stones and softness of latter.

THE CEYLON "AMERICAN" TEA COMPANY.

The following extract from a letter under date New York, Oct. 3rd, to the Hon. J. J. Grinlinton from Messrs. Wattson & Farr, gives a most encouraging account of the start made by the new Company :—

"The new Company began operations this week, and we already have had most encouraging success in obtaining a most excellent agent in Boston, and it is probable he will take the agency of the whole new England States, in return for which he will, of course, take a considerable number of shares. He is active, energetic, very well connected, and we are most fortunate in having gotten his co-operation. Several other promising agents are considering the business. We send you under separate cover copies of the first advertisements, which are quite striking, as you will see. We enclose herewith copy of the byelaws of the Company. The State Trust Company whose President, Mr. Willis Paine, you called upon, has voluntarily asked us to make them our transfer agents, which brings the Company another strong endorsement. We feel more and more that the Company is necessary to the prosperity of the planters, and we again ask your best efforts to secure for the Company the hearty co-operation of the planters in Ceylon."

THE ODOROUS EUCALYPTUS.—No worm or insect is ever found upon the eucalyptus tree, or in the earth where the roots penetrate. A row of trees planted through an orchard or vineyard will cause insects, worms, and caterpillars to vacate that region. Two branches of the eucalyptus used in the room or windows, or as decorations in dwelling rooms, will cause mosquitoes, moths, fleas and flies to leave the premises.—*Indian Agriculturist*, Oct. 11th.

A CEYLON PLANTER IN SOUTH AFRICA.—The movement of the British South Africa Company's expeditionary force should be watched with considerable interest upcountry, inasmuch as the Company counts amongst its members a Ceylon planter well-known in Dikoya and Haputale—Mr. L. L. B. Dykes, who went home more than a year ago. Mr. Dykes was one who liked an adventurous life, and he seized the opportunity when at home of offering his services to the organizers of the expedition and was gratified to find them accepted.

PADDY CULTIVATION IN THE EASTERN PROVINCE.

IMPORTANT EXPERIMENTS AND PROFITS UP TO R26 PER ACRE, OR 130 PER CENT.

Colonial Secretary's Office, Colombo, 31st Oct. 1890.

The Editor of the "Ceylon Observer."

SIR,—I am desired to transmit for your information the annexed copy of a letter addressed to the Director of Public Instruction showing the results of the agricultural experiments conducted in the Batticaloa district, under the supervision of Mr. E. Elliott, the Government Agent.—I am, sir, your obedient servant,

H. L. CRAWFORD,
for Colonial Secretary.

EXPERIMENTAL PADDY CULTIVATION.

Batticaloa Kachcheri, 13th October 1890.

Director of Public Instruction, Colombo.

Sir,—In continuation of previous reports as to experimental paddy cultivation under the supervision of instructors furnished by you, I have the honour to state that during the past eight months I have carried on cultivation on a somewhat extensive scale, with a view of discovering what is the real cost of raising paddy with hired labour on land, the water supply of which is in ordinary years fairly assured, and working with *unborrowed* money.

2. For several reasons, I decided to work in three localities and accordingly secured 35 acres at Nintavur in Batticaloa South, 26 acres at Ampilanturai in Batticaloa centre, and 23 acres (in two parcels) at Eravur in Batticaloa North, making a total of 84 acres. The cultivation was supervised by three different instructors, who worked perfectly independent of one another. The year has been a most trying one owing to the very short rainfall of the north-east monsoon and the long subsequent drought which is almost unparalleled in the annals of the district. The consequence is our cultivations suffered in common with those of our neighbours, but even in our failures we have learnt useful practical lessons and established that the improved mode of cultivation possesses a distinct advantage even in periods of drought. At Nintavur alone was there a fair water supply and the results are satisfactory, though we should certainly have had a bigger crop of the season had been an ordinary one. At Ampilanturai the water supply ran out early and at Eravur the irrigation available for one parcel was very short, and failed almost altogether in the other case.

3. As Nintavur is the only part of the extent which has had any fair play, I give in the annexed statement full details of the expenditure and may add this has been carefully audited for me by Mr. Morphew. It is, I believe, prepared on strictly accurate principles of accounting and includes 20 per cent depreciation. on the improved ploughs (iron) besides cost of new shares (which only last one cultivation it is found). The total outlay was R702·09 for the 35 acres (inclusive of Government tax and headman's fee) and the crop was 152½ avanams (or 1140 bushels) of *well cleaned* paddy. Half the crop was sold at public auction in my presence for R10·75 per avanam, and purchased by an outsider. (The rest was retained for agricultural purposes). The whole crop was consequently worth R16·16 or R1·42 per bushel. This is higher than paddy usually sells for in the locality, but it was excellent grain well cleaned and the actual sum realized is hardly above what the crop would have brought in an ordinary year and at ordinary prices. (We got 44 bushels per acre last year off 7 acres of this field, against under 33 this year.) So I think we are justified in taking the actual amount realized as a measure of success, not out of the usual run; the higher price only compensating for the shorter crop due to an unfavourable season.

4. The cost of production was 17½ rupees per acre or under 54 cents per bushel of crop, and Government tax &c. was 8 cents per bushel more, making a total of 62 cents per bushel *in an unfavourable year* when paddy is selling at R1.50 per bushel in the same locality at *harvest time*. The net profit was R26 an acre or R914 against an expenditure of R702 in eight months or 130 per cent on that outlay. The rent agreed to with the landlord was R220 or about 11 per cent on the present selling price of the land, leaving the cultivator R694 profit on an expenditure of R702 or nearly 100 per cent. If the proprietor and cultivator were the same person his profit would be over 32 per cent on a capital of R2,800, which represents the selling price of this land plus the capital necessary to work it.

5. From enquiries made on the spot I am informed most of the lands in the tract gave only a crop of 15 to 18 bushels per acre, but some 70 acres gave 22½ bushels and 30 acres lying lower and considered the best in the vaddai gave 26 bushels. The improved tillage can consequently be credited with 10 bushels worth R14.

6. This is really the only experiment which advances our knowledge of the subject, but that equal publicity may be given to the less favourable results due to the untowardness of the season. I give the figures for the other stations, which are as follows:—

Station.	Extent cultivated. Acres.	Total crop. Bushels.	Total Expenditure. R.	Total Income. R.
Ampilanturai	26	187½	302	225
Eravur Munmari	16	262	306	320
Do Kalavellanmai	7	64	131	99
	49	513½	739	644
Add Nintavur	35	1,140	702	1,616
Total ...	84	1,653½	1,441	2,260

From this table it will be seen the net profit on all 4 transactions was R819 on an outlay of R1,441. The cost of production including Government tax and headman's fees is 87 cents per bushel of paddy at a time it is selling for R1·50. This is about as crucial a test as could be applied to the industry. It is said that these experiments have no value, as they are undertaken under circumstances very different from those attending the ordinary cultivation of paddy. To this I would reply that they are important in the first place in arriving at the actual cost of production, and so being a check on the fanciful estimates which appear in the public prints, and even at times in State papers such as the appendices to the recently published report of the Grain Tax Committee. Undoubtedly no private cultivator in the island expends anything like the amount the instructors have done per acre, nor I suppose do they get an equal return. I doubt if any one spends more than R10 per acre and for this he obtains in a fair land a return of 25 to 30 bushels of paddy worth generally as many rupees. In poorer lands loss is spent, but the return is as a rule in proportion in ordinary years, where irrigation is available. Of course where this is absent the industry is liable to greater fluctuations according to the rainfall and its distribution. I would in this connection call attention to the remark made in my report of last year.

7. There are some collateral points of interest brought out by these cultivations which deserve to be recorded. The advantages of transplanting were specially marked at Eravur where the water supply was very short, the transplanted portion having yielded 13¾ bushels per acre against 8½ of the broadcast, while the additional cost of the process is under R1 per acre. If we had only transplanted the whole 7 acres in this portion we would have made profit! On the other land at Nintavur where the water supply was fair, the difference was very small; but the outlay on the transplanted area was slightly less than on the broads cast owing to the saving in *seed* paddy and the difference is only about R1 per acre in favour of transplantings.

8. At Ampilanturai though we only got 7½ bushels per acre, the adjoining land owners only got 4¾ and at Eravur we got nearly 16 bushels per acre against 11 secured in the neighbouring fields.

9. At Nintavur, a small quantity of lime (40 bushels costing R4) was scattered over the land with the seed; and owing to this, the Agricultural Instructor thinks it probable the crop was exempt from the

ravages of caterpillars which infested the rest of the tract.

10. The iron ploughs used were some I got from Messrs. Massey & Co. of Madras, which cost R8 and R6 in Madras and about R1 more to bring over by native vessel. The cheaper plough (known as the Ryots) did very fair work, and is well suited for the light cattle of the country, but wants strengthening in the elbow; the shares are detachable and a new one cost 75 cents.

11. As I was on the last occasion charged with omitting to make provision for watching and feucing, I think it well to explain that at Niutavur there were five permanent labourers (*i.e.* one for every 7 acres) engaged for the whole cultivation, who did all the watching and fencing as well as the ploughing, ridging, irrigating and sowing, in addition to helping in the reaping at a cost of R266·50. Additional labour was taken as required for reaping, threshing, stacking, etc., which was paid for in money. Similar arrangements were made at the other localities.

In conclusion I have to intimate that I propose again undertaking cultivation of the same extent during the coming season.—I am &c.,

(Signed) E. ELLIOTT, Govt. Agent.

Actual outlay in the cultivation of 35 acres of paddy land at Nintavur in the Batticaloa district under supervision of Mr. Chelliah, Agricultural Instructor.

IMPLEMENTS.

	R	c.
5 English ploughs, cost of renewing shares at 75 cts.	3	75
Depreciation on cost of ploughs at 20 per ct...	6	00
4 Native ploughs do do do at do ...	1	00
Mamotics (provided by labourers and included in their hire), baskets and bags	4	59
	R15	25

SEED PADDY.

For 30 acres, broadcast	80	85
5 „ transplanted	1	40
	R82	25
Ploughing, ridging, irrigating, fencing, watching, sowing, etc., all executed by hired labour at cost of	255	30
Buffalo and bullock hire	117	00
	R372	30
Transplanting 5 acres, cooly hire	13	04
Manure lime	4	00
Reaping, stacking and threshing		
Hired labour	117	00
Buffalo hire	9	00
	R126	00
Total cost of actual cultivation...	R612	84

MISCELLANEOUS CHARGES.

Vaddai Vidhan's hire	9	25
Government tax	80	00
	R89	25
Total expenditure...	R702	09

NUTMEG CULTIVATION.

(*From a Correspondent.*)

"Old Planter" is quite right—nutmegs will thrive all along Hanwella on both sides of the river's banks, and do thrive splendidly, judging by the specimens I have seen in a headman's garden in a village just opposite the 15th milepost on the Hanwella road, on the other side of the river and close to its banks. I have also seen nutmegs grow luxuriantly along the banks of the lake at Bolgoda. There is no doubt that nutmeg plants must be well shaded and tended (watered during the dry season) for at least about 3 years after planting, after which it is all right. I believe that mangosteens will also thrive in the Howagam Korale, and would suggest to the present Mudaliyar the advisability of applying to Government for 100 plants to be distributed in his korale. The present young Mudaliyar of Siyane Korale West has with his usual generosity distributed a good many mangosteen and other valuable fruit plants throughout his district to all such landowners as he deems deserving, irrespective of caste and creed; and not only this, it is well-known that valuable breeding bulls were generously lent by this young gentleman to those in his district who needed them, and this good example may well be copied by his brother Mudaliyars. Nutmegs are said to thrive wonderfully well at Weke, where this Mudaliyar has a good many trees to show in his superb coconut estate which is the admiration of all who see it.

PLANTING IN MAURITIUS.

(From the *Merchants and Planters' Gazette*, Oct. 11th.)

SUGAR: THE WEATHER AND THE CROP.—Manipulation is being carried on with great activity on all the estates of the island. The yield is sufficiently satisfactory although inferior to that of last year in certain quarters. According to the results obtained up to this day, the total production will be inferior to that of last year.

VANILLA.—The market is entirely bare of fine qualities. The products of the new crop will not appear on the market before the end of this month. We entirely confirm our last valuation as regards the total outturn of the coming crop which does not exceed 14,000 kilos.

The following quotations are nominal:

	per kilog.
Vanilla 1st quality	R18 to R20
do. 2nd „	16 to 18
Vanilloes	8 to 10

ALOE FIBRE.—100 bales of good quality have been taken for Australia at R250 per ton. There would be takers at the same price for Europe but the fibre is scarce, holders ask for higher prices.

FREIGHTS.—The following are the quotations of the day:

London...27/6 to 30 and 5 o/o N.

THE FINANCIAL POSITION.—It appears from a financial statement placed on the table of Council on Sept. 23rd that the receipts since the 1st January amounted up to the 30th July 1890 to R4,030,488·41, the expenditure during the same period to R3,389,378·75, leaving a balance of R641,109·66 in favour of the Treasury.

COFFEE.—Since our last, arrivals having succeeded, prices for both Good Ceylon and Réunion have decreased and are selling at R59 to R60 and R60 to R61 per 50 kilos, respectively. We quote mixed "triage" qualities from R35 to R50 per 50 kilos, according to quality.

GEMMING IN RAKWANA.—We learn that there is very considerable activity shown in sinking gem pits in the vicinity of Aberfoyle estate. In one case a shaft has been sunk for 100 feet and the "illan" has been struck so freely that profitable results are anticipated. This is a pit carried on under European auspices, Mr. Siedle being Colombo agent and Mr. W. Home, the pit manager. Close by there is an equally deep pit belonging to Mr. Fernando and another to an enterprising Moorman. The efforts of some of the practised native gemmers to mystify the Europeans as to the "illan" are described as very constant and persevering. Such native experts hope that their European superiors not finding the long-expected illan at 40, 60, 80 or 100 feet may abandon the pit and go to work elsewhere, when the abandoned shaft would be very speedily taken up and worked out by a native confederacy.—We are told that the value of £1,000 put on a week's findings of stones at Rangwellatenne is an exaggeration; at any rate that the Company would be very glad to accept that amount for the gems they have so far secured.

LIBERIAN COFFEE.

AN ADDRESS BY HEER H. J. WIGMAN TO THE BATAVIAN ASSOCIATION OF AGRICULTURE, AT A MEETING HELD AT BUITENZORG ON THE 23RD JULY 1890.

(Translated for the "Tropical Agriculturist" from Dr. H. J. Wigman's Address, by John Dent Young.)

It cannot be too strongly urged, that in colonies such as Java the prosperity of the natives and colonists depends in a great measure on the cultivation of the soil. Should the prosperity of agriculture diminish—whatever may be the cause—the evil results are immediately felt throughout the length and breadth of the land. In countries where commerce and manufacture have reached a high stage the inhabitants may have made themselves less dependent on the soil; here we have not yet attained that point. A few years ago agriculture underwent a fearful crisis, from the effects of which we have not yet quite recovered. Such circumstances are not strange in the history of agriculture in most countries; generally it emerges from them with renewed vigour. It then becomes the question whether by a better system of working, and by more rigid economy, it be possible to continue the competition with other countries, or whether it be inevitably necessary to abandon the existing kinds of cultivation and to seek for others. An example of this last we find in Central Europe, at the time when America flooded the European markets with her colossal importation of corn, causing the prices to fall to such an extent that in some countries, notwithstanding the most strenuous efforts, the corn growers found it impossible to continue the competition. Especial duties were levied on imported grain for protecting native industry, but in spite of all efforts to sustain a kind of factitious prosperity, it was only in very favorable circumstances that such cultivation could be carried on.

Many looked round in search of other products to cultivate. In lands suitable for cattle breeding, this industry was extended. England chiefly led the way in cattle breeding; elsewhere so-called *minor products* were tried. A large portion of former corn fields are now planted with beet-root for sugar making, and it is this cultivation that wages a life and death struggle with the tropical sugarcane. Another of our staple products is more directly threatened by America: the enormous quantity of coffee exported thence caused a considerable fall in price a few years back, and although at present the article has recovered a satisfactory value, still the position of the produce here is attended with anxiety, all the more on account of the leaf-disease and the "jamur upas" which persevere in their work of destruction.

It causes no wonder that agriculturists and those who are interested in cultivation use their utmost endeavours to bring about a better state of affairs. That matters are now very much better than they were a couple of years ago cannot be doubted. Of one of the branches of culture which was introduced during the disastrous epoch alluded to, which has every chance of being greatly extended, I now purpose more fully to speak, it is the Liberian coffee.

Here I must unavoidably refer to what I have already written in the "Teysmannia" under the head of "Notes on Agriculture."

As the name indicates, this kind of coffee has its origin in Liberia, a negro republic, founded by an American philanthropic society, which purchased the freedom of seventy thousand slaves, and sent them from America to the coast of Upper Guinea.

The Republic now counts 215,000 inhabitants; it does not yet go well with them, and that their condition is in a great measure the fault of the liberated slaves, appears amongst other proofs from the wasting neglect of the splendid kind of coffee which is there indigenous.

It is only in the uttermost need, so tell us travellers who have visited Liberia, that the negro goes into the forest, there gathers ripe and unripe coffee just as it comes to hand, and dries it in the most careless manner. Such coffee used to be taken to London in small lots, and as it had (not without justice) earned a bad reputation, it was generally disposed of at very low prices. Latterly, more care has been bestowed on the preparation of the Liberian coffee, and its exported of good quality.

In a recently published work by J. Büttikofer, Conservator of the National Zoological Museum at Leiden, entitled "*Reisebilder aus Liberia*,"—Brill 1890, I find some particulars respecting the soil and climate which I now communicate. In the second volume of this work, which has not yet appeared, the cultivated plants are to be treated of, and I hope later on to furnish you with full information on them.

The soil of Liberia consist for the most part of red clay ground containing a great deal of iron.

The only months free from rain are January and February—and even towards the end of the latter month the clouds begin to gather, thunder is heard rolling in the distance, till at length a tornado bursts with storm and rain. From this time to the end of March frequent storms occur; and still more often in April, when they happen almost daily. Vegetation had been in a state of summer sleep during January and February, when many of the trees and shrubs lose their leaves, is now wakened up by the powerful influence of the superabundant rains, and again assumes its magnificent attire, with the glories peculiar to the tropics alone.

This is the most favourable season for planting and sowing the fields; during the first two months of the year the labor of felling and burning off are performed, and in the first place rice and Indian corn are sown, which quickly germinate and spring up. In May the storms and squalls subside, and the regular rainy season sets in. The sky is constantly covered with dense clouds and rain falls almost without intermission; hardly a day passes without rain. About the middle of July the weather moderates and there is an interval of fine weather, and the harvest season begins, the rice and Indian corn are got in and dried as quickly as possible, as the second half of the rainy season quickly approaches and would render such work impossible.

All too soon the few fine days, the number thereof varying much in different years, come to an end and the rains pour down with redoubled violence. Indeed it can hardly be called rain; the water streams down from the atmosphere, day and night, at times for weeks together. The rills become great streams, whole tracts of land are laid under water, and most of the roads or ways become impracticable. Day after day the negro is as it were shut up in his hut, and forced to idleness he lives on the rice and maize which he has been able to store up under cover. Thus go by the months of August and September with almost continuous rain. In October the tornadoes begin again, in November the rains become less frequent, and during December they generally take up altogether.

The thermometer shows a mean temperature of 25° Celsius at 6 a.m., 30° at noon, and 29° at 6 p.m., at nights the thermometer seldom falls below 24°, and at the warmest weather it rarely rises above 31° in 1 p.m. When the magnificent species of Liberian coffee became better known, Dr. Scheffer, the then director of the National Botanical Garden here, made strenuous efforts to introduce it into this country. The Liberian coffee was introduced somewhat earlier into Ceylon than it was into Java; the well-known firm of William Bull, in London, obtained seed from Liberia and succeeded in getting it to germinate in their hothouse, and the plants thus raised were planted in Ceylon in 1873. In July 1874, the first Liberian coffee seed was brought to the National Botanical Garden by the intermediation of the Ministry for Colonies. I well remember the surprise which was excited here on the appearance of the fine large coffee beans when they were first shown here. The largest of these seeds in the parchment measured in length not less than 22 millimetres, and 12 in breadth. This seed was packed in two cases, one in dry sand and the other in charcoal; but in spite of all the care that could be taken in bringing them over, not one of the seeds germinated to the great disappointment of all concerned. Towards

the latter part of the following year (1875), we at last received two wardian cases containing 118 plants, which were landed here in the best possible condition.

These plants had first made the voyage from Liberia *via* the Cape of Good Hope to Netherlands; they were unpacked at the Leyden Hortus, and when they had somewhat recovered from the effects of their voyage they were replaced in wardian cases and sent by the steamer "Conrad" of the Maatschappy Nederland to Java.

The commander of the steamship was requested by the Government in Netherlands to bestow the utmost care on his valuable freight. I was in the roads when the "Conrad" arrived, and on the same day the plants were safely placed in the National Gardens at Buitenzorg.

These were the first live Liberian coffee plants imported here, and although we cannot now declare that all the Liberian coffee at present growing in Java derive its origin from those same plants, for since that time private persons have brought over further supplies, still such is the case to a great extent. In the early part of the year 1876, these plants were put out. As we knew little of this cultivation, the distance between the plants was fixed as usual at 6 feet. It soon appeared that the plants were much too close together, and the distance apart was brought to 10 ft., and even this space was afterwards found to be insufficient. The Liberian is now generally planted 12 feet apart, and yet it is found that the entire ground is so fully taken up by the roots, that it would be better to give them more room.

In the beginning of 1877 the first blossom began to show itself; it was then feared that the new sort of coffee would produce very little, as only a single blossom showed itself at each joint of the branch. Happily it was soon found that such fear was groundless, as an abundant show of spike speedily developed itself on every joint. The first crop of any importance was gathered in the Experimental Garden between the middle of June and the middle of August 1878. It is a curious fact that when this first crop was gathered, the trees grown under shade yielded 2½ pikuls per bouw, whilst those fully exposed to the sun produced 3½ pikuls.

The culture of the Liberian coffee is still new to us. We have yet to a great extent to learn it; there is much that we do not know, but of one thing we may rest assured, that is, that this kind of coffee has a great future in store for many. It suits itself in a wonderful manner to all kinds of circumstances. I have seen fine plantations on abandoned coffee lands, as well as in tea plantations under cultivation. This last fact, gentlemen, is worthy of remark, for it is well known that the roots of the tea plant permeate the soil in all directions like a net-work, so that there is literally not an inch of soil left free from their interlacing. Thus only a very strong plant can flourish in such a position.

I have seen thriving plantations of Liberian coffee at an elevation of a few hundred feet above the sea-level as well as at 2,000.

In 1875 researches were instituted in Liberia at the instance of the English Government for the purpose of obtaining information from the natives regarding the various circumstances in which this kind of coffee grew best. The particulars thus obtained were as follows:—

Liberian coffee grows as well in the immediate neighbourhood of the sea as in the interior, and it is cultivated at heights above sea-level varying from 10 feet to 550 feet. The variety which produces small berries bears fruit in 18 months. The large sort is preferred because the coffee it yields is of better quality and more abundant, although the first crop is not gathered until the third year, and in the more elevated districts the fruit is less in size.

Under shade the tree does not come on well, though the ground should be well covered by planting the trees close together, or by covering the ground with dry leaves, grass, &c. This is especially necessary for young plants. The distance of the plants from each other varies from 6 to 12 feet. Full-grown trees bear from 20 to 24 pounds of (dried?) fruit.

Until we shall be in possession of the second volume of Büttikofer's work, we are unable to say how far the above information can be relied on. The writer just named passed two years in Liberia, and is in every sense of the term an observer who may be depended on.

As regards shade it is an established fact that Liberian coffee here requires shade. As I have previously stated in the "Teysmannia," the first plants were divided into two lots, one of which was put out in the open and the other under shade of the *Albizzia moluccana*. They were in all other respects similarly circumstanced. Those that were exposed to the full force of the sunshine at first did better, they grew more quickly, threw out branches lower done, and when three years old yielded one pikul per bouw more than the others. Then they began to shew signs of weakness, especially after a second good crop; they deteriorated perceptibly, became sickly, and the "jamur upas" and leaf-disease commenced their devastations, and if the necessary shade was not speedily supplied, certain decay soon followed.

Why it is that Liberian coffee succeeds so well in its original habitat without any shade, whilst here we learn from experience that shade is indispensable, has not yet been explained. For in other countries, Singapore for instance, and elsewhere in the Straits, no shade is planted on coffee estates.

Besides the experiments made in the State's Gardens at Tjikeumeuh, many planters have learned from experience that shade is essential. Although it is an established fact that here we must have shade, the best kind of tree for the purpose has not yet been ascertained. As had been proved in the State's Experimental Garden shade is not necessary for the young plants, for they are stronger when grown exposed to the direct action of the sun's rays; therefore a shade tree of quick growth is made use of and the coffee and its shade can be put into the ground at the same time. The trees most in use are *Albizzia moluccana* and *Erythrina* (dadap), and which of these is to be preferred depends on local circumstances. There are places where the dadap grows badly; another localities the *Albizzia* has much to suffer from strong winds. Upon a large estate in a neighbouring residency the dadap did not grow well, and it was decided to plant the *Albizzia* here and there; this kept the ground cooler and the dadap was then planted with success. The latter must be lopped for the purpose of forcing it to shoot up to the required height.

Other trees besides these named are planted for the sake of the shade they afford,—the *Caesalpinia dasyrhachys*, with which good results have been obtained, amongst other places at Dramaga.

These *Caesalpinias* which were discovered by the late Mr. Teysmann during a journey through the Lampong districts, and thence introduced into the National Experimental Garden, attracted the attention of the late Heer Zeper at Aardenburg (Soekaboemie). This latter gentleman published an account of the properties of these trees in the Journal of Agriculture and Industry (*het Tjidschrift voor Landbouw en Nijverheid van N. Indie*). The publication had for result that applications were made by a great many people for seeds for the purpose of experiments. The limited quantity of seed produced by the two trees of the kind in the gardens did not furnish sufficient to satisfy all the demands.

The native name of this tree in the Lampong districts is *Petah-Petah*, Petar or Pepetar. The Resident of the Districts named supplied some of the seed. The tree affords fine shade not too dense, and is stronger than the *Alb. mol.*, but its growth is by no means so rapid.

As regards the height above sea-level at which Liberian coffee can be profitably grown, as far as we have seen, it succeeds well up to the height of two thousand feet; but we are not in a position to say whether we can safely go higher than that. There certainly are here and there trees that thrive admirably up to 3,000 feet, and likewise yield a satisfactory quantity of fruit. And a planter in the Preanger Regencies informed me that he had determined on forming a plantation at that height guided by the luxuriant

appearance of some trees on the spot. But I would not venture to recommend planting at so great a height, as I have seen Liberian coffee growing at 3,400 feet above the sea, which I must say left much to be desired in developement, as well as in bearing.

Buitenzorg and its neighbourhood seem to offer a favorable climate for this kind of coffee. If you ask me, gentlemen, how Liberian coffee would fare in the often dry lower lands of East and Central Java, I must tell you that as is well known and as is stated in Büttikofer's work, the climate of Liberia is very wet, and although in this respect it resembles West Java, it is questionable whether it could hold out against a drought of six months and at times of longer duration. In the year 1877 there occurred an unusually long drought; even at Buitenzorg there was no rain for months; although the young Liberian coffee plants grew but little during that dry period, they suffered but slightly from its effects.

Great care is called for in the working of the soil. Generally speaking we are in the lower lying lands less favourably placed than in the mountain forest; lands, rich in humus, which has such a beneficial influence on coffee, and which is wanting with us. It is evident that we must supply its place by good tillage, drainage, and manuring; without these factors we shall not arrive at much. More than one Liberian coffee plantation has failed, because no sufficient allowance was made for the difference of soil.

In such matters it is impossible to lay down hard and fast rules; all depends on local circumstances. On level ground many will prefer having the whole surface dug up before planting, others content themselves with having holes dug for the plants, a method which may answer very well, provided that it be not neglected to turn over the ground well round the holes afterwards, or at least to loosen the soil to some depth, should the subsoil be inferior to that of the surface.

Drains are indispensable, and in deciding the distance between the drains the formation of the ground has to be considered, as the nature of the drainage required depends on that. Stiff soil naturally necessitates closer drains than does light soil. The manuring of the ground in like manner must be regulated by the nature and formation of the surface; above all, heavy compact soil, such as is generally met with in the lower lying lands, must be enriched with humus, for which purpose green crops, stable manure and compost are the most suitable materials.

Must Liberian coffee be pruned, and how is it to be done? These are questions often put to me. As far as my own experience goes, I must answer no. At first I was of opinion that such operation was necessary, or at least that the tree should be limited to a single stem; but I am now by no means so sure on that point. I have seen a great number of magnificent trees, growing in two, three and even four stems fully as well as those confined to a single stem. The advantage in allowing a plurality of stems to grow appears in case of any attack on one of them by the "jamur upas"; as the injured stem can be removed easily and the tree remains in good condition.

I need hardly say that every stem or branch attacked by the "jamur upas" and thus cut off should be burnt immediately; although every one must be aware of the necessity of this burning of the diseased parts, it is not sufficiently attended to.

Some of the plants have a disposition to throw out suckers; these must naturally be removed in time.

I cannot recommend the topping of this kind of coffee. The trees are of too vigorous growth; they become too high, so that it is impossible to keep them to a limited height. Should it be attempted to do so, the production of an impenetrable mass of branches would be the consequence, which would interfere with the setting of the fruit and end in injury to the plant. It is true that we have numberless trees here of between 20 and 30 feet high, loaded from top to bottom with fruit, and that ladders are indispensable for gathering the berries. There is no help for this, and it is well worth while to employ them.

How high or how old the tree can become here is not yet known; our oldest plants have reached 15 years, and some have arrived at the height of 25 feet, without showing the smallest sign of age, and go on flourishing and blossoming.

Like every cultured plant the Liberian coffee has its diseases to fight with. I have just mentioned the "jamur upas," besides which the leaf-disease attacks the Liberian coffee. As regards this latter, I need only refer to Dr. Burck's work on the coffee leaf-disease. There are other complaints which coffee here suffers from, but none of a nature to cause any doubt as to the successful future in Java of Liberian coffee under a rational system of cultivation.

And now as to the produce. I regret to say that this is not in keeping with the appearance of the plant. When we look at a tree of 25 feet high, from top to bottom laden with the fine large berries, under the weight of which the branches threaten to give way, we feel inclined to hope for a fabulous quantity of crop. But much of the substance is lost, the pulp and skin are very thick; according to trustworthy data during the East monsoon about 125 gantongs of cherry give 1 pikul of clean coffee, the proportion being 12·5 to 1 in pikuls. In the West monsoon the proportion is more favourable then; from 10·3 gantongs of cherry, 1 is attained of clean coffee, being 10·3 to 1.

Trees of 8 to 9 years old, which yield from 5½ to 8 gantongs of fruit are not unfrequent. But the mean yield of a large plantation is another matter. Besides the data furnished from the Experimental Garden at Tjikeumeuh, I have by the kindness of den Heer P. C. van Motman, obtained data of the produce of a plantation 8 years old with 8 bouws in extent.

The trees were planted in 1882 and gave in 1886, 50 pikuls; in 1887, 96 pikuls; in 1888, 80 pikuls; and in 1889, 88 pikuls. The harvest of 1890 is not all in yet. The harvest is thus respectively 6¼, 12, 10 and 11 pikuls per bouw. The proprietor of this plantation is of opinion that the mean produce of the last three years, viz., 11 pikuls per bouw, would be too much to expect regularly from a large extent of ground.

The price of Liberian coffee is now very good, and the fact is sufficiently established that well-prepared Liberian coffee is fully worth the price of ordinary Java coffee. Two weeks ago a planter showed me accounts from which it appeared that his Liberian coffee of 1st, 2nd and 3rd sorts had averaged after reduction of all expenses for transport &c. had yielded him at the rate of 60·8 guilders per pikul.

All kinds of difficulties and vexations must be expected in the way of "new products;" the preparation was by no means the least of these difficulties in the case of Liberian coffee. On some plantations, the pulper of Walker & Co. of Colombo is in use, which answers pretty well, although it has its peculiar defects. The chief trouble is caused by the remarkable irregularity in the size of the berries of the Liberian coffee. When the pulper is adjusted to suit the large berries which are the most numerous, all below a certain size pass through unpulped, and have to be separated from the pulp and put through a more closely-set pulper in like manner should the pulper be set so as to suit the smaller-sized berries, the larger do not pass through in both cases, much time and labour are lost.

For the purpose of overcoming this defect, Messrs. Walker & Co., at the instance of Heer P. C. van Motman, have constructed a new pulper, which will soon be in use on Dramaga (Buitenzorg). The principle of this pulper is somewhat more complicated than that first mentioned, but in my opinion very practical. The cherry coffee is first brought by water to the pulper, which is set for the larger berries; the pulp falls into a gutter and is carried away by the steam of water flowing through with it, whilst the larger fruit being freed of its pulp, and the smaller unpulped fall into a sieve. The pulped beans pass through the sieve, whilst those that are not pulped fall over the sieve into a trough and are taken up by an elevator and placed in a more closely set pulper, by which the smallest berry is pulped. The whole machine is worked by water power, and is on a scale sufficiently large to prepare the produce of a large plantation. For the purpose of securing the desired yellow colour, the coffee on the abovenamed plantation is subjected to the following process. After the plucking

the fruit is allowed to lie in moderately deep layers for two days before being pulped; after pulping the coffee is kept four days in fermenting cisterns; it is then well washed and cleaned, and allowed to dry for a day; it is then heaped up, and allowed to remain four days more, for the so-called "after fermentation," after which it is perfectly dried in the sun.

Over de smaak valt niet te twisten (There is no disputing on matters of taste) has often been said, but I assure you that coffee prepared in the above-described manner, when properly roasted and made, can compete with the finest produce of Moka.

There is something peculiar in the harvest times. They generally happen in two periods: the former lasts from the beginning of December to the half of March, and occurs thus in the driest time of the year in Liberia, the second crop is gathered in the months of July, August and September. According to Buttkofer July is generally a rather dry month, but from the beginning of the latter half of August to the end of September is reckoned the wettest time of the year.

When the separate plants of Liberian coffee in a plantation are carefully examined, a considerable difference can be observed among them, as well in the leaf as in the fruit, and the due selection of plants from which to take seed for propagation is a matter of much importance. It is not sufficient to choose out the largest berries from a great quantity of fruit, but the trees the most suitable should be first selected and the largest berries of these selected trees should be chosen for sowing in the nursery. In this way alone is it possible to improve (veredelen=to ennoble) the Liberian coffee here.

Besides the ordinary varieties, I saw on the plantation Tjomas (Buitenzorg) a coffee plant amongst the Liberian coffee which had much the appearance of a hybrid between the ordinary coffee and the Liberia variety. The plant had some peculiarities of both. In luxuriance it rivalled the strongest Liberian coffee, the leaves though as large as those of the lastnamed possessed a softer texture, and the form of those of Java coffee, but the most remarkable particular is that the pulp had not the coarse and disagreeable taste of the Liberian coffee, but was soft and sweet like that of Java coffee; the size of the berry being the medium size of the Liberian coffee.

At Tjikeumeuh (chikeumeuh) there are some hybrids which are the result of an artificial fructification between Liberia and Menado-coffee.

The young plants of which the mother plant Liberian coffee is fertilized with the pollen (stuifmeel) of Menado coffee, up to the present take after the latter variety, whilst with the contrary (treatment), when the Menado coffee is fertilized with the pollen of the Liberian kind, the resulting plants resemble the Liberian plant. In both cases they resemble at first the male progenitor.

Thus is the Liberian coffee cultivation prosecuted and extended throughout this country with great energy. To my knowledge there is already an extent of over 3,000 bouws of Liberian coffee planted in the subdivision of Buitenzorg, and there are vast tracts of land in the lower lying districts, now waste, that with due cultivation and manuring can be turned into flourishing coffee estates. [*Note by Translator.*—10 katties=1 gantong; 10 gantongs=1 pikul 133⅓lb.]

A MERCHANT of Campinas, S. Paulo, has been fined by the authorities for mixing roasted maize with his ground coffee. And this in the very heart of the S. Paulo coffee district! Some people have no regard for appearances and this merchant should have been hung.—*Rio News.*

COCONUTS.—It is a pity that in Bengal the planting of the coconut is not more largely followed in the Sunderbuns and on the seaboard of Cuttack, where they would probably, under proper cultivation, yield as plentifully as in Ceylon.—*Indian Agriculturist*, Oct. 11th.

CEYLON TEA IN AMERICA!

GOOD NEWS FOR CEYLON PLANTERS.

GUARANTEE GIVEN FOR SALE OF PURE CEYLON TEA ONLY.

The following is an extract from a letter of Messrs. Wattson & Farr to the Hon. W. W. Mitchell, under date New York, 26th September:—"We are now actively at work preparing to push the interests of the new Company and feel quite confident that we shall make it a success and create a large and growing demand for your teas in this country."

We have also received a copy of the prospectus of the new Company with a capital of a million dollars. Besides the names already given as Directors in New York, we have all the Ceylon Directors on as a Board of Management while the following extracts show the object of the Company:—

The object for which this Company is formed is that pure Ceylon tea may be introduced into the United States of America and Canada, or elsewhere, as may be found desirable and that its sale may be widely extended. The present consumption of tea in America amounts to about ninety million pounds per annum, of which about eighty-two millions are from China and Japan, but it is hoped that, if once Ceylon tea get a footing in America, its excellence will create a taste for such tea, and lead to its ultimately taking the place of many of the teas of rival producing countries, in the same way as has been the case in Great Britain. The services of Mr. R. E. Pineo (formerly a planter of long experience in Ceylon) have been secured by the Company, as Manager and Secretary in America, and from his long connection with Ceylon and America, it may be reasonably hoped that the results will justify the selection of Mr. Pineo for this appointment. A Central Tea Emporium has now been in successful operation for nearly a year, at Broadway and 22nd Street, New York City, and a large amount of tea has already been sold and distributed with excellent results. It is intended, as soon as possible, to open further emporiums in all the large cities and to appoints agents throughout the country. The welfare and future prosperity of Ceylon are largely dependent on the success of this enterprise, and the cordial co-operation of all interested in the Island is confidently looked for.

All this shows how entirely honourable and above-board has been the action of Messrs. Wattson & Farr, and considering how much they have already done without a cent of remuneration, and considering also the fact that they are to bear the large expense of advertising and other preliminary expenses, out of the shares allotted to them, we think that they in every way deserve well of Ceylon Tea planters. Mr. Grinlinton's personal report will place this in a clear light.

A TIDAL SUPPLY OF ELECTRICITY.—A French engineer, M. Decœur, proposes to supply electric power to Paris. He would generate the required electricity by utilising the tides. For this purpose he intends to construct, near Havre, two large basins joined to each other, into one of which the sea at flood tide flows over a dam, while during ebb it flows out of the other into the sea again. At the inlet and outlet will be erected a number of powerful turbines for transmitting the energy of the water. The mechanical energy produced for transmission to Paris is estimated by M. Decœur at 42,000 horse-power. Perhaps the calculations have not been correctly made, as it costs something to build such works, and the result cannot be much.—*English Mechanic.*

MR. JOHN HUGHES AND ANALYSES OF CEYLON TEA LAND—THE BARREN SOILS OF CEYLON—MR. D. MORRIS AND BOTANICAL STATIONS IN THE WEST INDIES—COCONUT BUTTER.

Meeting Mr. J. Hughes this week he told me that he had received a letter from your Planters' Association asking him to mention the terms upon which he would undertake the analyses, after the system lately diseussed in the *Observer*, of 80 or 100 samples of teas. Mr. Hughes said he should answer that letter by this present mail, and we hope, therefore, that his services may soon be made available in a direction in which, as it seems to us here, they may be most beneficially employed.

During the course of conversation, Mr. Hughes remarked to me that he had read with much interest your editorial in the *Tropical Agriculturist* last received here on the barren soils of Ceylon. He told me that with all that was advanced in that article he very fully agreed, and that it was in aceordance with experiments made by himself upon samples of Queensland soils which had been sent home to him some years back by the late Mr. Daintree, who was—to the best of my recollection—formerly the Colonial Secretary of Queensland. These samples represented soils upon which virgin forests grew; others which had relapsed from cultivation others which produced scrub only; and some upon which no vegetation at all could be grown. Mr. Hughes did not enter upon full details, but he told me that he found that all the soils which would not produce a tree growth were singularly deficient in potash. He believed, therefore, that the last eonstituent is a necessity for the cultivation of timber or fruit trees, and that this can never be successful unless potash is either naturally present or is artificially supplied. He remarked further that there was great difficulty in laying down any invariable rules for the fertilization of soils, thus—he mentioned to me an instance lately under his notice in Cornwall where the farmers are in the habit of covering their fields beforo the cultivation season with six inches of seasand—obtaining the best results. Seeing such results follow the practice, farmers in other localities had tried the process, but with most unhappy effect. Inquiring into the eause of difference, Mr. Hughes said that he found the whole of the sea-sand around Bude—where the practice mostly prevailed—to be composed of finely comminuted shells. The dressing was, therefore almost of pure lime. But in the districts where the experiment failed so signally the sea-sand had an altogether different charactor: It was of comminuted rocks only, and this was hardly likely to possess fertilizing constituents. Mr. Hughes' deduetion from this and from other instances in his experience is that no invariable rule ean be laid down as to measures likely either to restore lost fertility or to increase that existent. Both soil and fertilizer must be closely examined in every case, and the combination of their several ingrodients considered. Nevertheless he believed that the suggestion made in your article as to aerating long disused soils must be ever of good effect, as these, when exposed, would naturally take up from the atmosphere what their condition demanded, and would reject assimilation of those which it did not require.

We see that Mr. D. Morris of Kew is going out shortly to the West Indies to advise the authorities of the Windward and Leeward Islands with respect to botanical stations. He will take out with him several wardian cases containing gambier plants, it being believed that this may prove to be a profitable cultivation.

My reference to Kew reminds me as to a subject treated of in the latest issue of the *Kew Bulletin*, in which you are sure to feel a great interest. This is the manufacture of butter from coconuts. I lately asked you in these letters if you had heard anything of this new substance, having seen some casual reference to it, but was not prepared to learn, as we have now done from the details published by the kew authorities, how important a manufacture coconut butter is likely to become. Quoting the British Vice-Consul at Berlin, the *Bulletin* inform us that the process of extracting edible fat from coconut "marrow" was discovered about five years ago by a Dr. Schlink, and that it has been worked since 1888 by a firm in Mannheim. The appreciation of this butter has so extended that factories of it are now in course of ereetion in Pau and at Amsterdam. The Vice-Consul tells us that the substance has already an almost unlimited sale, the trade being chiefly with Germany and Switzerland. He declares it to be gradually but quickly ousting from publie favour oleo-margarine and all other butter preparation from animal fats. The present factory, he further tells us, can only supply about 50 ewt. daily, while the demand is frequently up to twice that amount. The *Bulletin* informs us further that the price at which this butter is sold is from 6½d to 7½d per lb. the nuts being procured from the South Sea Islands and the African and South American coasts. The butter product consists of 60 to 70 per cent of fat and 23 to 25 per cent of organie matter, of which matter 9 to 10 per cent is albumen. The product is of a clear white colour and hardens at 66 degrees Fahr. It is said to be very suitable for cooking purposes and has no disagreeable taste or smell. Altogether we seem justified in the expectation that coconut butter will ere long becomel a large artiele of consumption in every household. No housewife, however much she may justly turn up her nose at oleo-margarine and doubt its origin of manufacture, would do so at the outcome of th e pure coeonut; and as we can't buy cooking butter under 1s 2d to 1s 4d per lb. here, the alternative would be sure to be welcomed, and you in Ceylon should be on the look-out for sharing in the supply of its "raw material," the demand for whieh will prohably increase highly. I can't say, the cooking with coconut oil, however freshly this may have been expressed, was ever quite to my palate. Probably the offending cause, whatever it may be, is removed under this new process.—London *Cor.*

THE CEYLON AMERICAN TEA CO., LD.

The following is an extract from a London letter to the local agents:—

"The new Tea Co. seems to be making encouraging progress, and I think Wattson & Farr will be successful in getting all the agents they require; if so I consider that success is secured. Grinlinton will tell you all about the meeting of the Tea Committee of the Ceylon Association here. Mr. Davidson, who came from America primed with the accusations and charges made by an anonymous individual in New York, laid all these before the Tea Committee last week. On Mr. Grinliuton's being informed of it he expressod a wish to meet him before the Committee, and this was arranged for the 15th ins't Mr. Davidson was shut up practically by Grinlintons. first answer, and opened not his mouth again Grinlinton's statement was well received."

From the *New York Journal of Commerce*, we quote as follows:—

"The Ceylon Planters' Tea Company has beeu incorporated with a capital of $1,000,000 to take over the

business of the Ceylon Planters' American Tea Company, Limited, of Ceylon. Agents are appointed to carry on the business of the company, each of whom is financially interested in the welfare and success of the company. This is in accordance with the scheme favoured by Ex-Mayor Howitt at the meeting of the Iron and Steel Institute. He said: 'It should be a matter of congratulation that the formation of trades unions contemporaneously with the rapid growth of large corporations whose stock is divided into such small shares as to admit of easy distribution clears the way for the new era when every self-respecting workman will insist upon being an owner, and every well-managed corporation will see that its workmen are directly interested in the result of the business. To effect this desirable end no compulsory legislation and no additions to the powers of corporations are needed."

And the advertisement displayed on a big scale in the paper is as follows:—

"The Ceylon Planters' Tea Company, trading under the auspiees of the Planters' Association of Ceylon, want representatives everywhere on the co-operative plan. Responsibility and good standing required. Address: 4 East 22nd Street, New York."

BARK AND DRUG REPORT.

(From the *Chemist and Druggist.*)

LONDON, Oct. 9th.

CINCHONA.—The supply offered at Tuesday's auctions was somewhat in excess of the average of recent sales. It consisted of:—

	Packages		Packages	
Ceylon bark	1,561	of which	1,458	were sold
East Indian bark	403	do	385	do
Java bark	62	do	62	do
S. American bark	970	do	503	do
W. C. African bark	1	do	1	do
Total	2,997	do	2,409	do

It was believed in some quarters that the sales, in sympathy with those held in Amsterdam last week, would exhibit a dull tone with an easier tendency, but such was by no means the case. From the outset the competition was strong, and as the sales proceeded the demand improved, and the equivalent of the preceding sale's rates was willingly paid. The unit is generally placed at 1⅞d to 1¾d per lb, a few parcels even reaeting the twopenny unit. There was a very considerable supply of Succirubra bark from Ceylon, and a few lots of fine renewed chips and shavings realised extreme values. Ledger barks were poorly represented; but there was a very good show of Officinalis chips from India and Ceylon. Cultivated South American Calisaya, too, was unusually well represented, over 25 tons of it being sold at steady rates. Altogether the extraordinary proportion of 92 per cent of the supply offered was sold.

ESSENTIAL OILS.—For Citronella ⅞d per oz. is required but perhaps ¾d would not be refused.

LONDON, Oct. 16th.

ARECA NUTS remain very scarce and dear. Ten bags of good sound seeds were shown today, and bought in at 45s per ewt. The owner, we believe, would take 39s per ewt.

COCA LEAVES.—The recently reported arrival of 110 packages "cocoa leaves" appears to have been entered in mistake at the Customs, and does not seem to exist. At today's auctions, 20 cases Java coca leaves, which have been offered several times previously, were bought in at 6d per lb. nominally. An offer of 1½d per lb. was made for the whole parcel, which consisted of ordinary dark crushed leaves, but it could not be accepted. For 3 bales South American leaves, fair but rather broken palish green, good flavour, the price is 1s 1d to 1s 2d per lb.

CROTON SEEDS.—Of a parcel of 30 bags from Colombo, advertised for sale, no samples were shown.

ESSENTIAL OILS.—Citronella oil quiet, but steady. We call the nearest spot quotation ¾d per oz. while for arrival, fair native oil offers at 11¾d per lb. c.i.f. terms. A sale of 100 cases Lemongrass oil is reported at 1½d c.i.f. per oz for arrival, the nearest spot price being 1⅞d per oz at which the article is very firm.

QUININE.—The shilling limit has again been touched this week, 20,000 oz. second-hand German bulk having changed hands at that limit, but since then 12½d and 12¾d has been paid on the spot, and the market closes steadier, with buyers at the latter figure. A sale of 10,000 oz. January-March at 12¾d to 13d (second hand) is also reported.

MEETING OF THE SUB-COMMITTEE OF THE C. T. ASSOCIATION.

MESSRS. GRINLINTON AND ROGIVUE GIVE ACCOUNTS OF THEIR MISSIONS.

(*From Our London Correspondent.*)

LONDON, Oct. 17th.

On Wednesday last a meeting of the members of the Sub Committee on tea, and others, was held at the rooms of the Ceylon Association in London to consider further steps in regard to the weighing of tea, and to hear reports by Messrs. Grinlinton and Rogivue on their respective missions to the United States and Russia. The following were present:—Mr. J. L. Shand in the chair, and Messrs. H. K. Rutherford, C. Shand, A. Brooke, T. Dickson, J. Stretch, T. Gray, L. Davidson, A. S. Pagden, C. C. S., J. Anderson, A. Ross, J J. Grinlinton, C. Rogivue, Esdaile, representatives of Messrs. Geo. White & Co., Messrs. Gow, Wilson and Stanton, Messrs. J. and H. Thompson & Co., Mr. J. Capper.

The Chairman reminded the members of the Tea Committee of the appointment of a Sub-Committee to confer with the members of the Indian Tea Association in reference to the recent Customs Order as to the weighing of tea, and its suspension. After conferring together, members had arrived at the conclusion that it would be more advisable to address themselves on this subject to the Lords of the Treasury than to the Customs authorities, and if this were approved by the General Committee the course would be adopted. A resolution to this effect having been carried, the Chairman said that they would now pass to the next subject before them, the pushing of Ceylon Tea in America; and, as Mr. Grinlinton was present, they would be happy to listen to what he had to tell them in regard to his proceedings whilst in the United States as the representative of the Ceylon American Tea Company.

Mr. Grinlinton then addressed the meeting on the subject of his mission to America, in terms and in substance pretty much as I have related in my previous letter. He reminded them that he had gone thither in the first place on private affairs connected with his family, and took the opportunity, whilst there, of arranging for the final settlement of the negotiations between the Ceylon American Tea Company and Messrs. Watson and Farr of New York. He was happy in being able to assure those present that his efforts to place matters between the parties on a satisfactory footing had been completely successful, and he had not the slightest doubt that the arrangement would be cordially approved by friends in Ceylon. He might mention that, before he left New York, orders for Tea had been sent by the Company, whose prospectus he laid on the table, to the Colombo Agents for an amount of £3,000, accompanied by bills for the amount, and he had since learnt that a further remittance and order had been made to the extent of £2,500, so that a substantial commencement had been made. Letters he had recently received from the Company informed him of most gratifying development of their business. In conclusion, he said he should be happy to reply to any question that might be put to him regarding this matter by those present.

Mr. Davidson, of Gikiyanakanda, who has also recently returned from the United States, enquired whether it was not a fact that, although the Company was established in New York and had its place of business there, it had nevertheless been registered in the State of New Jersey? What was the reason for this arrangement?

The reply was that the fees for registration were much lower in New Jersey than in New York, and the yearly fee payable by trading companies was also much more moderate in the former State.

In reply to a further question by Mr. Davidson, as to the Company having gone to allotment and as to the amount of capital paid up, Mr. Grinlinton said that, of course, allotment had taken place, but he had no certain information as to the capital paid up. He believed the whole had been guaranteed much in the same manner as capital is underwritten in this country by promoters.

Mr. Thos. Dickson suggested that as a matter of fact the American Company was at present no more than a Syndicate, as we term it in England, and that the actual Company was now being floated by that body. Mr. Grinlinton remarked that Syndicates according to the English methods were not known in America; but he fancied the first installation of the body was in reality of that nature. The extra shares to be given to the Company's Agents on their subscribing and paying for others came from the promoters' 20,000 shares, for which they had stipulated. Of course, if the shares of the Company were not eventually subscribed for, it could not be floated, and all expenses for advertising, &c., which would be considerable, would be borne by Messrs. Wattson & Farr.

A desultory conversation followed a vote of thanks to Mr. Grinlinton, during which a remark was made not at all complimentary to Mr. Pineo, upon which Mr. Grinlinton took up his defence, declaring that the gentleman in question had done everything in his power to forward the interests of Ceylon Tea, and that he deserved well of Ceylon planters.

Mons. Rogivue having been requested to state his work and views in connection with Ceylon Tea in Russia handed to the Chairman a written Report, a copy of which will, no doubt, be sent to Ceylon by this mail. He said that he had been favored by his London Agents, Messrs. Malcolm, Kearton & Co., and others, with excellent introductions and had everywhere been received with much consideration, but he had not had the advantages possessed by Mr. Grinliuton of addressing himself to dealers speaking his own language, and he (Mr. R.) had also to encounter far stronger prejudices than are met with in America. He had interviewed many of the best wholesale firms in Moscow, St. Petersburgh, and Nijni, but one and all declared there was no demand for Ceylon Tea, and that what was now imported was obliged to be disposed of by blending. But when he came to interview retailers and consumers, he was told quite a different story—that the tea was excellent and moderate in price—and a number of persons had requested him to sell them quantities of 20 and 30 lb. for trial. It was evident that time would be required to bring it before the consuming public, and therefore money. He should consult with the Committee, after they had read and considered his report, and it would be then needful to determine what course should be pursued in the future. In Russia, as in this country, complaints as to the falling-off in the quality of China were loud and general, and he believed the present time was favourable for pushing the teas of Ceylon in that country. He had tasted the tea prepared by the Russian people and it was so utterly flavorless that he could not understand how they could be induced to drink it: while the leaves, poor as they were, had to stand four or five successive waters!

From the above statements it is evident that in Russia, as in America, it is the wholesale trade who oppose the introduction and sale of your teas on their own merits, as they can make for more money by blending than by selling them pure as they reach them.

Mr. Grinlinton left London this day for Brussels, proceeding *via* Metz, Venice, Florence and Rome to embark at Naples on the 25th on the P. & O. steamer "Khedive."
—Local "Times." J. C.

INDIA TEA NOTES.

DEHRA DUN, Oct. 14th.—We are still making tea, but the flushes are stunted owing to the cold nights.

SELENG, Oct. 12th.—So far lots of leaf about, and the little rain just fallen may help us on to end of month. Cold weather is setting in fast.

NORTH LAKIMPORE, Oct. 6th.—The end of Sept. was very dry and hot; rain has, however, come at last—1·20 having fallen during the last three days; from the look of the sky, we may expect more, and which should give us a good start for Oct. Mosquito still out all over the district. Rainfall to date 144 18.

DOOARS, DAM DIM, Oct. 17th.—This season came in with a ruinously hot dry spring, but is finishing up with a miserably cold, wet Autumn. For the past four days and nights, it has rained incessantly, and the weather has been so cold that coolies could do little for no work.—*Indian Planters' Gazette*, Oct. 21st.

A NEW KIND OF "TEA."

We recently noticed the industry which has lately sprung up in Germany of manufacturing the leaves of the strawberry into a substitute for tea, but the people of Kent are going in for hops as a substitute. They are of opinion that as hops make such capital beer the plant will make equally excellent tea, and they are hard at work elaborating a process for converting hops into fresh tea leaves. The object of this, they state, is not merely to get a new tea, but to furnish an article which will alter both the flavour and the quality of the teas now in use. The fresh infusion obtained from the dried flowers of the hop, in which fermentation plays no part, is an excellent drink quite free from alcohol. This beverage contains all the tonic, soothing and nutritive properties of the hop without any objectionable admixture; but the flavour would not be acceptable to the palates of the unsophisticated. However they may be led to appreciate it gradually in the same way as beer or stout. The taste of the infusion could also easily be modified by the addition of sugar and cream. The hop growers of Kent also intend to use hops as a qualifier and improver of the common Indian and Chinese teas. Works have been started at Maidstone for drying and rolling the leaves so as to reduce them to the appearance of ordinary teas which are to be mixed with them. The leaves are also to be powdered and mixed with coffee or cocoa.—*Madras Mail*, Oct. 25th.

CACAO STEALING ON ASGIRIA ESTATE.

IN THE POLICE COURT OF MATALE.

No. 5,603. F. G. Jokim of the Asgiria estate, complainant, *vs.* Sangen of Asgiria estate, defendant.

In this case the accused who was employed as a night watcher on the Asgiria estate was charged with stealing a quantity of cacao pods by the complainant, who is the day watcher.

It transpired in evidence that when complainant went to relieve the accused early in the morning of the 26th instant he missed him, but soon after heard a noise in the cacao field saying "Don't fear, no one will come here." Complainant went in that direction with another man and seized the accused in the act of stealing cacao pods, when two others whom he was unable to identify ran away from the cacao bushes. Complainant reported the facts to Mr. Booth, the superintendent, who directed the prosecution. The evidence called for the prosecution fully supported the charge, and the accused was found guilty and sentenced to six months' rigorous imprisonment.

This same accused was a short time ago charged with causing hurt to a watchman who was ordered to watch in his stead by Rengasami kanakapulle on a certain night as the accused had failed to attend to his duty. In defence he urged that the substitute was stealing coffee for the kanakapullo and that he struck him as the former threatened to injure him. The Magistrate then considered him to be an injured innocent and let him off with a nominal fine. It is now evident that he calculated too much on the favorable impression he had made on the Magistrate in the former case.

A HOBBY FOR COUNTRY SCHOOLMASTERS.—On Saturday afternoon, 27th ult., Mr. T. W. Ogilvie, Demonstrator of Natural History, Aberdeen University, delivered a lecture to the members of the Aberdeen branch of the Eudcational Institute of Scotland, on "The Fertilisation of Plants." Mr. Ogilvie, in opening his lecture, said, country teachers had an excellent opportunity of working out the flora and fauna of their respective districts, but he had observed with regret the extreme infrequency with which those opportunities were embraced, and he had chosen the subject of his lecture in the hope that he might induce some to take up such an interesting study as an antidoto to the *ennui* with which country teachers who and not a hobby, must be afflicted.—*Gardeners' Chronicle.*

TEA-PLANTING IN NATAL.

The *Witness* has interviewed Mr. L. H. Neall, formerly manager of the Jorehaut Tea Company of Assam. Mr. Neall said he had come to Natal with a view to promote a company for tea cultivation on the coast. He has paid a visit to all suitable lands along the coast, from the Lower Tugela to the Lower Umzimkulu. With regard to the latter district, Mr. Neall says it is eminently adopted for tea plantations, and the lands are rich in every property necessary for healthy and vigorous development of the plant. Tea-planting can be made in some cases much more successful in Natal than in India. The plants here enjoy absolute immunity from several diseases commen to them elsewhere. Recent failures he ascribes to insufficient capital and want of knowledge of after-treatment and various processes of manufacture. He condemns the class of coolies at present imported, and is certain that the conduct of labour negotiations through proper sources in Calcutta, would procure efficient tea workers; £20,000 in £1 shares is the capital deemed necessary for the proper starting of a company and the initial expenditure for a year's rent of 2,000 acres, survey, buildings, stock plant, tea seed, &c., is estimated at over £1,200. Mr. Neall expresses the conviction that there is a greater opening for tea industry in this colony than many imagine, and that it only requires experienced men and careful management to render in the most paying of all colonial undertakings.—*Natal Mercury*, Sept. 17th.

PLANTING IN THE INTERIOR OF MADAGASCAR.

The following is from a contribution to the *Madagascar News* describing the interior of the island :—

Leaving Andrangoloaka and climbing on up the hill the forest is entered. Away down in the depths of the forest are some fine trees. For three hours Mr. Jukes was journeying through the forest, then the mountains abruptly terminate and a sudden descent is made into the beautiful and fertile valley of Lohasaha. On each side of the valley rise lofty mountains over whose slopes are spread waves of verdure indescribable of tint and inconceivable in grandeur. In the valley very fine tobacco is grown, and, it is said, His Excellency the Prime Minister has a tea-plantation there. The soil is most suitable for agricultural purposes, being a rich alluvial deposit, but the valley shut in by mountains on three sides is a *cul de sac*, and, consequently "as the summer breezes cannot waft readily through, is extremely unhealthy, so much so that it is only with the utmost difficulty that the natives of Antananarivo can be induced to go down there during the fever season. The valley is very extensive and contains a great number of small hamlets, consisting of about five houses each. The tribe inhabiting the valley is the Bezanozano. This race is becoming crushed in spirit and slothful under the weight of an oppressive *fanompoana* (forced service). So broken down are they under that hurtful and hateful system that they are unable to profit by the bountifulness of the soil upon which they dwell. Knowing that whatever crop they might produce would be pounced upon by some harpy of an official, the Bezanozano make no effort and pass their lives in squalour and want, living in the merest hovels. Undoubtedly! 'the time has come and the hour has struck for civilization to enter' Madagascar, and 'to create roads into the fastnesses of cruelty and ignorance.' There are five churches and schools in the valley in charge of native evangelists and teachers who are mostly Hova. How is it that these Hova evangelists and teachers do not raise their collective voice against the oppression of officials who, despite their fervent Sunday professions and impassioned weekday prayer, are every whit as bad and intolerable as "the Arab kidnapper and man destroyer" of Africa. Is it because that sonorous and solemn 1885 Notification to the Provincial Governors was issued for the perusal of the Christian Powers rather than for that of the Provincial officials? Otherwise how is it that "people who are guilty of nothing are threatened and ruined" and the Queen's kingdom is not preserved but damaged by her provincial officials monstrously abusing the power with which they have unfortunately been entrusted, or permitted to usurp *unchecked?*

NORTH BORNEO NOTES:—GENERAL.

His Excellency the Governor accompanied by Mrs. Creagh and family left Sandakan for Labuan in the British North Borneo Cruiser "Petrel" on Saturday September 6th last. The Serang of the steam launch "Kimanis" was in charge of the "Petrel."

Captain R. D. Beeston visited the Suanlamba Estate on September 6th, in company with Mr. A. E. Turner of Messrs. Mansfield Bogaardt and Company, and transferred the Obinese and Javanese Coolies to different estates to work out their contracts. The whole of the coolies were perfectly willing to sign their agreements and acknowledged their debts accruing from advances they had to work off. Most of the coolies have been transferred to the Batu Puteh Estate on the Kinabatangan of which Mr. Breigtag is Manager.

On Saturday September 13th, Captain Beeston visited the Segaliud Estate, managed by Mr. T. Johnston. Mr. H. St. J. Hughes as agent for the Company having asked Captain Beeston to accompany him. The estate proved well worthy of inspection the tobacco being of capital quality and likely to go some seven piculs per field. Cutting had commenced some few days before and at the date of the visit some 150,000 plants seen were hanging in the drying sheds. The tobacco plants had been cut and were very high averaging some six feet each, and in the fields it was difficult to see the coolies cutting, so high was the tobacco. A capital crop is expected from this estate as also from Mr. Kalfsterman's which is close by and is aids to contain an equally good crop.

We are sorry to have to chronicle an accident that might have had serious results, which befell Baron de Lissa on Monday evening September 8th last. On that day a heavy thunderstorm swept over Sandakan, the rain coming down in torrents, and rushing down the main street like a water course. Baron de Lissa had mounted his horse and was leaving the Court House entrance. His horse placed his fore foot on the plank of a culvert, which was rotten. The horse fell and rolled over, his rider receiving a severe strain. We regret to say that the Baron has had a very painful time of it, but thanks to the care of Doctor Walker he is now recovered.

We are happy to say that all reports from the various tobacco estates on the East Coast, namely in Darvel Bay, the Kinabatangan river, Sandakan Bay, the Sugut and Labuk rivers show a state of affairs at once most promising and flourishing. The present year so far seems determined to make amends for the unusual and phenomenal year of rain and floods of 1889. On all sides we have news of good crops of first-class tobacco. We trust to see the best of results for the planting interest when the prices of the 1890 crop are known.—*North Borneo Herald*, Oct. 1st.

"THE AMERICAN GIRL'S latest restorative (says the *L. & C. Express*) is quinine. She carries it in the form of pills in an ornamental cut-glass bottle with a gold stopper. It has quite superseded morphia and strychnine lozenges. If she is tired she takes two pills; if in a draught, one; if hungry, four or five; and if her feet get wet, ten are the correct number. Each pill contains two grains. Six are a cure for indigestion. The quinine bottle is produced on all occasions and in all sorts of place" There is great exageration here: 20 grains of quinine constitute a truly heroic does.

PROSPECTS OF THE TEA INDUSTRY.

There has been a good deal of correspondence on the depressod state of the Calcutta tea market, and the impending crisis so likely to cripple the tea industry seriously. Some correspondents advocato combination amongst proprietors, &c., or suggest somo artificial "propping up" of tho market during the present uncertain period. But though these vague hints aro thrown out, no real plan likely to moet with success has been promulgated. The Calcutta market reflects the English market pretty truly, allowing for commissions, and the profits which tho middle-man *i.e.*, the Calcutta buyer, comes out here for the purpose of making. I cannot see that the local market is affecting the price of our produco this season more than it has done in any previous year. Wo are suffering from the rise in exchange, and that only; and so, as to carry on our business we spend the majority of our rupees in this country, where they havo the same purchasing power as before the alteration in exchange, we are in a way double sufferers by the inflation of silver.

Prices in London aro entirely governed by supply and demand, and "cornering," or artificial interferenco with supplies, will and can only have the temporary effect it has had in the caso of so many other products, with a probable eventual collapse, putting producers in a far worse position than they are in at present.

As far as planters are concorned, they can only do as your correspondent "Spectator" suggested; reduce the price of production; that locally is now cut down as low as it safely can be, with the exception of freight charges, which possibly though improbably, tho Associations, by representation, might induce the United Steam Companies to lower. This is hardly the place to discuss the rival merits of high and low cultivations, but retrogression in these days seldom pays and high cultivation carefully adopted and superintended doubtless repays itself many times over. Tho cost of labour is a question on which there can be no two opinions, and the remedy lies with the proprietor, shareholders, and agents, more than with the planter. Agents' charges would also bear careful scrutiny at a time when all others interested in the entorprise are sufferers. But all these remedies and suggestions amount to littlo as long as prices romain at tho present rate.

Combination amongst owners, shareholders, and debenture-holders, lcould secure the abolition of the Calcutta weekly auctions. What a saving that in itself would be—the buying and selling commissions, brokerage, &c.! And it would obtain for the producer the profit the Calcutta buyer does—must, secure. Did he not—and he invariably states it is a losing game—how could he afford to come to India annually, live at the best hotels, enjoy himself, return to England at the end of the season? On the face of it, this profit would go into the proprietor's pocket.

Should the local demand for India be sufficient and the financial condition of certain concerns necessitate quick realisation of proceeds, a monthly Calcutta sale would quite satisfactorily supply the requirement.

Again, overproduction, or rather, say, too rapid increase in production, has been the chief cause of the low prices prevalent the last few years. If those financially interested would combine for one year, and agree not to open out any new extensions during season 1891, but create a strong Syndicate and spend, say, 50 per cent. of what they would have spent in extending the area of the plant, to its own detriment, in opening out new markets in the Australian and Cape Colonies, Canada, and the United States of America, hitherto practically undeveloped—I believe the real solution of the present difficulty is found.

By push resolution, and the purity and superiority of our produce, we have outstod China tea from its first place in the London market. With capital, the same resolution, and continued superiority of our article, without too rapid production, we can, and will have, to do the same elsewhere.—H. in the *Englishman*.

THE CEYLON PLANTERS' AMERICAN TEA COMPONY LTD.

REPORT OF THE DIRECTORS WITH STATEMENT OF ACCOUNTSFOR HALF-YEAR ENDING 30TH JUNE, 1890.

The Statement of Accounts to June 30th, 1890, shews a debit balance of R29,096·95.

The profit on Salos has amounted R2,521·34, but the heavy initial expenditure, together with the cost of pushing the business in America, have absorbed a large amount of tho limited capital of the Company,

In May, proposals were made by Messrs. Wattson and Farr, New York, for the taking over by a new Company there of the business of the Company formed in Ceylon, undor which, each Shareholdor in the latter would receive for each of his paid-up shares, two shares in tho new Company.

An Extraordinary General Meeting of Shareholders was held on July 11th, at which the torms were accepted, and tho Hon'ble J. J. Grinlinton, who proceeded to New York with powers to ratify the arrangement, has telegraphed that it has been given effect to, and that the necessary documents have been signed.

The limited number of shares taken in tho local Company rendered it improbable that its operations could have been carried on very much longer, and it is hoped that the ample amount of capital necessary, and which will be provided under the new scheme that has been inaugurated, will ensure the carrying out effectually of the objects for the Ceylon Planters' American Tea Company was formed.

By Order of the Board of Directors,

For the Ceylon Planters' American Tea Co., Ltd.,
DARLEY, BUTLER & Co.,
Agents and Secretaries.

Colombo, 22nd October 1890.

CAPITAL AND LIABILITIES.

			R	c.
Capital :—			57,850	00
Total amount received as under :—				
persons	shares			
7 holding	27	paid R45 per share	1,215	00
299 ,,	1,503	paid R35 ,, ,,	52,605	00
31 ,,	140	paid R25 ,, ,,	3,500	00
10 ,,	23	paid R15 ,, ,,	345	00
9 ,,	37	paid R 5 ,, ,,	185	00
356 ,,	1,730	shares.		
Particulars of Arrears will be found annexed.				
Debts and Liabilities :—			9,581	20
Amount deposited by Shareholdes in anticipation of Calls			210	00
Amount due to Wattson & Farr, New York Agents			9,371	20
			R67,431	20

PROPERTY AND ASSETS.

			R	c.
Property held by the Company :—			16,707	43
Movable Property :—				
Furniture and Fixtures at New York		...	3,136	23
Stock-in-Trade :—				
Tea at New York Stores, lb. 21,700...		...	11,082	80
Coffee ,, ,, ,, 1,345...		...	917	17
Curios ,, ,, ,, ...		..	1,571	23
			12,220	84
Debts owing to the Company :—				
By Amount advanced on a consignment to New York			269	59
,, R. E. Pineo			207	78
,, Divers Debtors				
Amount considered good at New York		...	11,743	47
			9,405	98
Cash :—				
At the Chartered Mercantile Bank of India, London and China			9,400	86
In hand			5	12
Profit and Loss :—				
Balance of this account			29,096	95
			R67,431	20

E. & O. E.

The above Balance Sheet, to the best of our belief, contains a true account of the Capital and Liabilities, and of the Property and Assets of the Company.
S. T. RICHMOND, DARLEY, BUTLER & Co.,
Auditor. Agents and Secretaries
Colombo, 22nd October, 1890.

T. North Christie, H. Whitham, C. S. Armstrong, W. W. Mitchell, V. A. Julius.—Directors.

THE CEYLON PLANTERS' AMERICAN TEA COMPANY, LIMITED.

Statement of Profit and Loss made up to 30th June, 1890.

Dr.	R.	c.
To Rent of Premises at New York	5,886	00
Salaries:—Assistants do	1,090	00
Native Servants do	1,984	64
Manager do	3,010	88
Managing Director and the Agents and Secretaries	2,291	67
	8,377	19
Director' Fees	1,800	00
Advertisement Charges at New York ...	3,099	47
Printing and Stationary do and Colombo ...	1,789	44
Stamps and Telegrams do and Colombo ...	427	87
Charges (including passage money and travelling expenses, Hotel bills, &c, Mr. Pinco and native servants)	5,757	47
Preliminary expenses	936	37
A. Philip (for his services)	861	64
Miscellaneous payments at New York	2,488	16
Exchange	212	92
Total...	31,636	53

Cr.	R.	c.
By transfer fees	10	00
Interest	8	24
Profit on Tea sold	2,469	29
,, on Coffee sold	52	05
Balance	29,096	95
Total...	31,636	53

E. & O. E. Colombo, 22nd October, 1890.

Examined and found correct. S. T. RICHMOND, Auditor. DARLEY, BUTLER & Co., Agents & Secretaries. Directors:—T. North Christie, H. Whitham, C. S. Armstrong, W. W. Mitchell and V. A. Julius.

HIGH PRICES FOR CEYLON AND INDIAN TEAS.

"Peripatetic Planter" writing to the *Indian Planters' Gazette* refers to the sale of the Hethersett golden tips at 30s 6d as follows:—

Query, how many hundred pounds of decent Broken Orange Pekoe were reduced in appearance several pence per lb. by the abstraction of these 15 lb of their "glory?' Hethersett is a garden of 232 acres under Tea, near Kandapola, in Ceylon, managed by Mr. H. Macandrew, for Mr. J. Macandrew, the Agents being Messrs. Whittall & Co., Colombo. This price is the highest by far, which has been known in recent years, and personally I have no recollection of its ever having been approached by any British Grown Tea. Of course such Tea can only be made at a very great sacrifice; and is probably really only beneficial as an advertisement to get an estate's name talked about and known; which is no small advantage; especially when original estate-packed packets are on sale in England, as in the case of many Ceylon estates now-a-days.

The next feature for comment is the extraordinary invoice from the Panitola Estate of the Jokai (Assam) Tea Company, Limited, items from which invoice appear above. Four lines above 2s per lb is good enough in these times; but to be able to decline a bid of 2s 7½d is an additional feature in Mr. Madden's cap—and to realize 1s 4d per lb for his Pekoe Souchong! when some are getting 8½d to 10d a lb for their Broken Pekoe and even Broken Orange Pekoe, after such prices too, for his better qualities which prove that he is not "under marking," is phenomenal, simply. The Chairman of the Company told me with glee yesterday, that he had not seen such an array of prices for five years! It is worth adding, in accordance with what I said last week, that Panitola has Blackman Fans; not that I wish to imply for one moment, that these prices are due to that fact—but this much is safe to infer. they *haven't injured* Mr. Madden's splendid Tea. This invoice, unlike the Hethersett bid for "glory," is *Business* with *Honour*, to paraphrase B. D. Earl of B. As regards the market of the week, the above prices are all the more remarkable, in that the market has shown a down grade tendency in some respects, and is decidedly weaker in the case of ordinary and inferior Pekoe Souchongs, which have declined ¼d to ½d per lb and sell from 7¼d to 8½d. There was a decent ordinary demand, which would have done justice to more limited offerings, but the market was flooded, and there was also an excessive number of Breaks which rather exceeded the physical powers of the Brokers to sample properly thereby leading to irregularity in prices.—*Indian Planters' Gazette*, Oct. 21st.

PLANTING SCIENTIFIC NOTES.

The urns of all these plants enclose, before the opening of the operculum or cover, a limpid liquid slightly acid. When the opercelum opens the liquid seems to putrefy, and the vestiges of insects are found in it. M. Dubois found that if the liquid was drawn from the still closed urn by means of a sterilised pipette, it continued limpid for several months and when first drawn had no effect on coagulated albumen, even if heated to a temperature of 35deg. or 40deg. C. When filtered at the end of several hours it contained no peptones. Nor were any microorganisms found in the pure liquid of the closed urns, or any trace of putrefaction. Only a *Torula*, similar to the yeast of beer, was noticed at times, but its presence and purpose there has not yet been fully examined.

On the other hand, when the liquid was drawn from urns which had been open some little time, and was still clear, it rapidly attacked the albumen (little tubes of white of egg) which became transparent and gelatinous, and lost its angles. In some cases the liquid became putrefied. It was found to swarm with diverse microorganisms, and after filtration gave some of the reactions of the peptones. Many of the open urns contained insects, but in process of putrefaction, not of digestion. Fresh fibrine was not used in these experiments because it dissolves in certain liquids without there being a true digestion, and because it would have been cooked during the sterilisation. Nor was cartilage used, because it would have been partially transformed into gelatine.

M. Dubois concludes from his researches that the liquid of the *Nepenthes* does not contain a digestive ingredient like pepsine, and that they are not carnivorous plants. The phenomenom of false digestion observed by Hooker was, without doubt, caused by microorganisms which had entered the urn from without, and were not secreted by the plant.

Vegetation appears to be retreating on the high Alps. Mr. David Martin, a geological surveyor, has observed that the rhododendron is not found above a height of 2,000 metres, whereas 20 years ago it flourished at 2,350 metres. Birch, pines, &c., disappear at an altitude of 1,800 metres, except in certain parts exposed to the moist winds of the north, where they reach 2,300 metres. Lower down, the vine, which formerly grew at Valgourdemar, an altitude of 1,050 metres, is only seen to-day at a height of 850 metres. Poplars are nearly all dead upon the crest of the hills.

This retrogression of vegetation has also been observed in Siberia, and, among other places in Savoy and at the Grande Chartreuse. Mr. Martin thinks that owing to the disappearance of glaciers the trees suffer from drought in summer, and extreme cold in winter, against which they are not sufficiently protected by the snow.

The new explosive "carbonite" is giving satisfaction to coal miners. At a recent meeting of the South Wales Institute of Engineers, Mr. W. Stewart

stated that within his experience a ton of the material had been used without a sign of flame or sparking. It is a stable compound, and can be stored without deterioration for any length of time. It is rendered comparatively safe by the fact that a detonator is required to explode it. If struck with a hammer or stone no danger need to be apprehended.

Cardonite is lighter than dynamite, is of a brownish colour, and contains 28 per cent. of nitroglycerine. Certain sulphuretted hydrocarbons are added to moderate the susceptibility of the nitroglycerine.

Some years ago the late Sir William Siemens obtained some interesting results by growing vegetables and fruit under the continued influence of the electric light. In the botanic department at Cornell University some further experiments have been made in the same direction. The rays of powerful electric lamps were allowed to fall on the plants day and night, and the seedlings fairly shot up. In a few weeks they were several times taller than others growing in the natural way. So far as foliage went there seemed a decided advantage in the luminous forcing but in the matter of fruit, the plants which had grown as usual were more prolific than those which had been forced.

PROSPECTS OF CINCHONA.

It will be remembered that some time ago an Amsterdam cinchona broker alleged in our columns that the cause of the depression in the price of quinine was the action of some of the manufacturers who had made contracts with the Java planters direct to buy their bark upon the basis of the cinchona unit upon its arrival. This same broker now returns to the charge in the *Indian Mercury*, with special reference to the last bark sales in Amsterdam. The sales of October 2nd he says, were exceedingly disappointing. Some of the large buyers only brought very moderately, and the Brunswick works took practically nothing at all. He alleges that the decline thus caused was due directly to the action of some of these buyers. Shortly before the auctions, he writes, the quinine market was firm although quiet, but on October 1st the Brunswick works suddenly offered quinine at a considerable decline. The steamer which recently arrived in Holand from Java, and others now on the way have brought considerable quantities of bark, all consigned directly to the works by the planters. The planters will be paid for that bark upon the basis of the cinchona unit prevailing when it arrives at the works; consequently the buyers have a direct interest in depressing the quinine market, apart from the fact that they may simultaneously use the occasion to buy cheaply in the market in order to fill previous contracts made by them. Until this state of affairs is altered, the broker declares, it will be impossible to look for any improvement in quinine or in cinchona.—*Chemist and Druggist*, Oct. 16th.

THE AMSTERDAM CINCHONA AUCTIONS.

AMSTERDAM, Oct. 22nd.

CINCHONA.—The sales in Amsterdam on Nov. 6th, will consist of 4,699 bales and 450 cases, or about 392 tons, viz.:—Java bark from Government plant, 418 bales 47 cases, about 39·5 tons; from private plant, 4,281 bales 403 cases, about 352·5 tons; British Indian bark, 45 bales, about 3·5 tons. These are divided as follows:—*Druggist's bark*: Succirubra quills, 428 cases; broken quills and chips, 351 bales; root, 89 bales, Officinalis quills, 13 cases; broken quills and chips 114 bales; root, 58 bales. Ledgeriana broken quills. 3,169 bales; root, 744 bales. Hybrides quills, 69 bales; broken quills and chips, 85 bales; root, 20 bales. C. Schuhkrafft quills, 8 cases; broken quills and chips 1 case. Total, 4,699 bales 450 cases. All the analyses are not yet published.—*Chemist and Druggist*.

THE LINNEAN.—A meeting of this Society was held on June 19th, Prof. Charles Stewart, President, in the chair. Messrs. W. H. Beeby and Mr. H. E. Milner were admitted, and Messrs. W. Cross and S. Schouland were elected Fellows of the Society. Mr. W. H. Beeby exhibited a specimen of Rumex propinquus, new to Britain, and procured in Shetland. Mr. Thomas Christy exhibited, and made remarks upon a specimen of Callistemon rigidum. Mr. E. M. Holmes exhibited some marine Algæ new to Britain, including Ascocyclus reptans, Halothrix lumbricalis, Harveyella mirabilis, Sorocarpus uvæformis, and Vaucheria litorea; also specimens of Rhodymenia palmata with antheridia, and Punctaria tenuissima in fructification; the last two not having been previously recorded to occur in this state in Great Britain. The following papers were then read:—"Observations on the Protection of Buds in the Tropics," by M. C. Potter; "On the Distribution of the South American Bell-birds belonging to the genus Chasmarhynchus," by J. E. Hartney; "On the Vertical Distribution of Plants in the Caucasus," by Dr. Gustav Raddes; and "Notes on the Forficulistæ, with descriptions of new genera and species," by W. F. Kirby. This meeting terminated the session of 1889-90.—*Gardeners' Chronicle*.

PISCICULTURE IN CEYLON.—There arrived at Colombo by the B. I. S. S. "Goorkha" yesterday morning, consigned by Dr. Thurston at Madras to Mr. C. J. R. LeMesurier, four young specimens of the fish Gourami which were first brought from Mauritius, but are now to be found at both Calcutta and Madras, and grow to 12 lb. or 15 lb. One of the four was found to be newly dead and justified the reputation of its kind shortly after by making a savoury dish; and the others were alive and well. A fifth had died a day or two before. Those to hand are intended for the ponds at Kandy, viz; one at Lady Horton's walk and two in the Pavilion grounds which Mr. LeMesurier is stocking and also using for breeding grounds. When he returned from Madras at the begining of the year he brought some Gouramis and also specimens of the Labeo and both are believed to be doing well. Fishes of several other kinds too, arrived in July last, and have all been placed in the Kandy ponds. Mr. LeMesurier has only carp and trout in the Nuwara Eliya streams. In the budget now before Council there is a vote for R2,000 for this good work, which in time we hope will realise the plan of the principal promoter, which is to supply many villages with their little fish ponds and stocks of edible fish.—Local "Independent."

THE "ONE-COCONUT-PER-TREE-PER-ANNUM" TAX.—We forgot to refer to the actual incidence of this tax. The usual number of palm trees to the acre is about 75 and the incidence of the single-nut tax would therefore be on an average, we suppose, about R2 per acre per annum. Now, we have in our possession a letter from the late Dr. Sortain who knew as much about coconuts as anyone of his day, most seriously alleging that a direct tax of 2s 6d (old currency) or R1·25 per acre on coconuts would suffice to ensure the abandonment of a large extent of cultivation under the auspices of foreign capital. He alleged that the margin of return was so narrow beyond actual outlay year by year, that there could be no other result. We suppose Dr. Sortain had then in view a coconut land-tax in addition to the grain levies. How he would view the matter if both grain taxes were simultaneously abolished, we are not prepared to say; but his opinion is of value as showing that of the "milk in the coconut," very little often falls to the absent proprietor—in other words that while coconut properties in some cases—in the Western and North-Western Provinces undoubtedly—are very often valuable; in other instances, they scarcely pay their way. Nevertheless, that coconuts, with every other form of cultivation in the island, pay their share of existing taxation—both through grain and salt,—is undoubted.

CEYLON TEA IN RUSSIA.

We call attention to the interesting, not to say piquant, Report furnished by M. Rogivue to the Ceylon Tea Fund Committee of his operations and their results in Russia. Returning as M. Rogivue is to that country with a fresh supply of "the sinews of war" we may fully expect a large amount of actual business in Ceylon teas through his agency; while the recent official recognition of our product and the well-known active interest of the Russian Consul (M. de Frisch) at this port afford a further guarantee that we are on the eve of a regular tea business with Russia. Curiously enough, last evening we received a letter direct from St. Petersburg, from the gentleman to whom M. Rogivue refers, whom we first met at Vichy in France three years ago, Mr. W. Barnes-Stevani who is the correspondent of an influential English journal in Russia. Before we met him, he had interested himself in the mission of Sir G. H. D. Elphinstone to St. Petersburg and Moscow, when "Logie" went over to introduce our teas into Russia. Our friend has special influence it will be observed, and although he supposed that he, if any one had a special claim on the Ceylon Tea Agency, he very cheerfully accepts the situation and promises his cordial support to M. Rogivue in his attempt to convert the Russian people to a full appreciation of the merits of Ceylon tea. For this assurance of co-operation, Mr. Barnes-Stevani will deserve a cordial vote of thanks from the tea planters of Ceylon. We quote as follows from his letter:—

St. Petersburg, Sept. 30th (Oct. 12th).

I received your very welcome letter a few days ago on my return from a long journey in the Caucasus on the confines of Asia.

I travelled in the State train of the Minister of Finance with one of the minister's old friends, so you can understand I had a grand time of it. Now I am again here in the capital of the frozen north, thousands of miles away from the sun, the wind and the beautiful scenery of the Caucasus.

AND NOW ABOUT CEYLON TEA,—

I was sorry to hear that the planters had already appointed an agent, especially as I had made such sacrifices in Moscow to introduce the tea in that centre of conservatism and superstition and was the first Englishman here who foresaw the great future this tea has in Russia. It is now about 5 years ago since I first found the tea at Mr. Henikey's in London and resolved to introduce it in this country. It has, however, been reserved for another to take my work and reap where I have sown. I not only believe that Ceylon tea will make its way into the Russian markets; but that this tea and tea grown on the Himalayan mountains might be transported into Russia direct through Afghanistan at a great saving of time and money, if we could only come to some agreement with Russia about the Eastern Question. I have friends, Russian engineers, who have built thousands of miles of railway, who would build a railway through Afghanistan "like a shot," if the Governments could only come to a "modus vivendi." I am pretty convinced that Russia does not want India. She has in Central Asia, Siberia and the Caucasus more wealth and more land than she can develop in the next hundred years. She is however, wishing to get to the sea either through Constantinople or Persia. The Russian Empire is entirely self-supporting. It has everything within itself, and all that she requires to do for the next 50 years is to plough, dig and build. If her statesmen are all as sensible as M. Vishnigradsky and the Tsar, they will do it; but should they die we know not what may happen. In my last journey I travelled day and night for five days without coming to the end of Russia. Another friend who has just returned from a journey of 10,000 miles in Russia and Turkestan states that he is simply astounded at the wealth, power and resources of this country, still in its first youth.

I shall be very glad to assist Mr. Rogivue in this work as far as my duties as Correspondent will permit. He seems to be still very unused to the ways of the Scythians or in Shakespearian English, a little "green." For all that, I believe the planters have hit upon a first-rate man, energetic and honest. One cannot know Russia in a day and what knowledge I possess of the country I shall be glad to place at his disposal if he requires assistance. I believe I can help him in many ways, but principally in getting the Russian press to direct public opinion to the new tea and to write favorably about it. This I can do, being personally acquainted with the press men on most of the papers in Petersburg and Moscow. This is very important. The "Press" in the country can make or mar this business if they choose. I know more than one business they have ruined by their attacks at its very commencement.

CEYLON TEA IN RUSSIA.

Kandy, Nov. 5th.

To the Editor, *Ceylon Observer*.

SIR,—I beg to enclose letter received from Mr. Wm. Martin Leake, Secretary, the Ceylon Association in London, transmitting Mr. M. Rogivue's Report on the subject of making known and pushing the sale of Ceylon Tea in Russia. I also enclose copy letter from Mr. Rogivue.—Yours faithfully,

A. PHILIP, Secretary.

London, Oct. 16th.

A. Philip, Esq., Secretary of the Ceylon Planters' Association, Kandy.

Dear Sir,—This is to inform you that Mr. Wm. Martin Leake, the Secretary of the London Association is posting by today's mail to your care my general report upon my mission in Russia on behalf of the Ceylon Tea Fund which I trust will meet with the approval of your Committee.

At a well-attended meeting of this Association held yesterday, I gave the gentlemen present an illustration of the work done by me in Russia during the past two months and of what remains to be done in order to introduce Ceylon tea into the country.

I came to London with the intention of making arrangements with some friends to open depôts and retail places in Moscow and St. Petersburg for the sale of Ceylon tea and I am very hopeful to be successful in my undertakings, so to enable me to return to Russia with the shortest delay.

Thanking your Committee for the grant of funds voted recently to be placed at my disposition for the continuation of my mission, I remain, dear sir, yours faithfully, (Signed) M. ROGIVUE.

Ceylon Association in London, 4 Mincing Lane,
E. C. London, 17th Oct. 1890,

A. Philip, Esq., Ceylon Planters' Association, Kandy.

Dear Sir,—Since I wrote to you on the 26th ultimo I have had the pleasure of receiving your letter of 15th ultimo forwarding copy of resolution of the Standing Committee of the Tea Fund under which R5,000* are placed at the disposal of Mr. M. Rogivue for further prosecuting the sale of Ceylon tea in Russia.

This liberal vote has given very general satisfaction here and to no one more than to Mr. Rogivue, who has just arrived in London in excellent health and spirits.

He has handed me a very interesting report of his proceedings of which I enclose a copy for publication in Ceylon.

He is doing his best to make all possible arrangements for strengthening his position for renewing the campaign. And he proposes to return to Russia very shortly.

On Wednesday last both he and Mr. Grinlinton attended a meeting of our Tea Committee here and told us, each the tale of his travels.—I am, yours faithfully, (Signed) WM. MARTIN LEAKE.

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* *Sic*; but M. Rogivue speaks of £150?—ED. *T. A.*

HOW TO INTRODUCE CEYLON TEA IN RUSSIA?

GENERAL REPORT ON M. ROGIVUE'S MISSION TO RUSSIA.

The Ceylon Planters' Association "Tea Fund" having, in several of their meetings, discussed the very important question of finding the best mode, to be adopted for introducing Ceylon tea in Russia in view of the securing new markets for their ever-increasing production, had once contemplated to send a Commissioner to China with the idea of his interviewing there the Russian buyers' agents by way of showing them samples of pure Ceylon tea and persuading them to devote more attention, when passing through Colombo, upon this interesting product, which offers so great advantages over the tea grown in the dominion of the Celestial Empire, viz. of being pure, of *greater aroma, stronger* and therefore *more economical* and *cheaper*. This idea, although perhaps good in principle, was however soon abandoned for some reason or other, but chiefly on account of the great criticism started against the scheme by the Colombo press, the *Ceylon Observer* especially. Seeing this, and at the eve of my departure for a holiday trip to Europe, I offered the Ceylon Planters' Association to take the "bull by the horns" and to go to Russia—the great tea-drinking country—there to advertise and push pure Ceylon tea, by trying to persuade her inhabitants to drink it and to appreciate it for its own merits.

My offer was accepted and a grant of £100 *cash* for my expenditure and £30 for value of tea samples to be taken to Russia for distribution, was voted by the Committee of the Ceylon "Tea Fund."

I left Colombo on the 13th of May 1890, via Italy and Switzerland, and arrived in London on the 22nd June, where I spent about a fortnight in collecting information about Russia, visiting merchants and brokers connected with the tea trade, tasting teas likely to suit the Russian market and making myself ready for the campaign, well-provided with numerous letters of introduction for Russia.

Very little indeed seems to be known in London about Russia, her tea trade and the way of making and drinking tea there. I was told that the sorts most likely preferred to suit best the taste of the people in general would be teas of a *light mild liquor* and *very light-coloured infusion* and therefore, with the aid of the London brokers, selected my samples accordingly and, as near as possible, to represent this description, taking with me 4 chests and 6 half-chests of the following teas:—

Labukelle	... ...	Broken Pekoe
Do	... ...	
Aberdeen	... ...	Pekoe
Mahousa	... ...	
Patiagamma	... ...	
Perudale	... ...	
Gleugariffe	... ...	
Rahatungoda	... ...	
Labukello	... ...	Pekoe Souchong
Kuruwitte	... ...	

In all 671 pounds nett of tea, and well-equipped as abovementioned, I arrived in St. Petersburg on the 23rd July and lost no time in visiting the people for which I had letters of introduction. I may here mention that I have been very well received by all, the class of men to which these friends belong being indeed very civil, courteous and obliging, and not speaking of the dangers and bothers of all sorts shown to me in expectation by many, before leaving England, I found my way very easily everywhere and without the slightest trouble. Mr. D. Haverlands, the agent in St. Petersburg of a large London Export-house, to whom I was also introduced by a kind friend in London, after having heard me, for more than two hours, on the subject of Ceylon tea, told me that, previous to my visit, he very often received samples of Ceylon teas, with offers from Firms abroad for inducement of business; which samples, on account of his being always quite unable to interest anyone in the article, so very little known in Russia, he had to lay aside as an unsaleable produce, but, since he had heard from me more about its qualities, the way it is manufactured, its purity, flavour, cheapness, &c., he now believed it to be the article *of the future*, called to supplant Chinese tea against the quality of which so many complaints have been raised lately, and he was very pleased to accept my proposal to act as my general agent in St. Petersburg.

It took me some long time—fully six days—before I could clear, at the Custom-house, my samples landed per S. S. "Viatka," the Custom authorities in Russia being very slow in their work and great *paper-wasters*, not speaking of Government recognized holidays so numerous in the country and as inconvenient to a business man.

Duty on tea in Russia is *21* gold roubles per pound of 40 Russian pounds, of which 124 equal to 112 English pounds, or one hundredweight.

Exchange on gold varies from 30 to 40 per cent at present and is regulated by the value of the "Demi-Impériale" which at par is worth "*five*" *silver roubles* (100 gold roubles equal *now* about 136 silver roubles.) Exchange on English money has fluctuated during the last two months

from roubles 8·40 kop = about 6·90 gold per demand £
to " 7·90 " = " 6·50 " "

The present mode of passing a tea invoice at a Russian customhouse is to *produce* the invoice which may be passed *as it is*, or verified by the Customs authorities taking about 10 cases out of 100 to verify the tares of which the weight is accepted as the average for the whole invoice. Duty is paid on this average nett weight without any addition of 3 per cent as it was done formerly; it is therefore most important that the very exact weights are given in the invoices and that the packages, cases or chests, are, as much as possible, of a uniform weight for the tare.

After having cleared my samples, I stored them in a local rented by me for the purpose, got them packed as per pattern herewith, in $\frac{1}{8}$, $\frac{1}{4}$ and $\frac{1}{2}$ lb. packets, and, with Mr. Haverlands, began my work of excursion around the place, visiting all the principal wholesale tea-houses, such as A. W. Rothermandt & Co., Elissajeff Brothers, Barchard Gruening, Otto Dittborn, Raftal Brothers, Wm. Strauss, Schlaisser & Co., and others. My samples were tasted by all and, generally speaking declared good, wanting however more colour but everyone told me that, although there was no doubt that these teas were of very good quality and pure, it would be very difficult, if not impossible, to introduce them in the country; their taste being quite different to that of Chinese teas would never be appreciated by the Russian public; some pretended that their very peculiar "raspberry" taste was caused by the sweetness of the Neva's water (I was told that a well-known St. Petersburg tea dealer, when going to Moscow and/or Nijni to purchase teas always takes with him a supply of the Neva water in order to taste teas with it); many called Ceylon tea "flower" or "medicinal" tea and some others upheld the opinion that its aroma and flavour are given artificially. I found out that about 1000 chests of the best Ceylon Pekoe are yearly finding their way into St. Petersburg for mixing purposes with inferior Chinese teas wanting strength, aroma and flavour, quite unsaleable as they are. A Firm (Dittborn & Co.) has promised me an order of some importance but, after further consideration, for some reason or other expressed their regret of not being able to do so at present. However, for all this, I did not lose courage I had only heard the opinion of the wholesale trade, I wanted to be quite convinced about the matter and knowing that the small traders, retailers and the Russian public had never had before the opportunity of seeing, selling, buying or drinking *pure* Ceylon tea, never offered before *as such* on any Russian market, I decided to see them and to have their *direct* opinion regarding the *genuine article*. I therefore, with samples and circulars about me and accompanied by an interpreter, started on a regular expedition —a crusade—visiting daily, in almost every quarter and street of the town, small tea dealers, retailers, shops, hotels, "Tractires" (Russian tea drinking places), restaurants, public bars, &c.

To the *dealers* I said:—"Give me for my mouey a pouud of pure Ceylonsky Tsohai"; the reply was of course "Sorry nono" everywhore. I then handed them samples asking them to get the same article for tho next time I would call, and sent afterwards some friends to ask them the same thing.

In the Restaurants, *Tractires* and public bars I asked for a glass of tea which, on being served and after having tasted it, I rejected indignantly complaining of its bad taste and asking for the only good and genuine "Pure Ceylon Tea" of which a sample packet was most graciously presented to the owner of the establishment. A well-patronized and largely frequented "Tractire" has served, for more than a week, to its clients the pure Ceylou tea without anyone knowiug it and anyone complaining about the quality!

Hotels, friends and new acquaintances were also presented with a $\frac{1}{8}$ or $\frac{1}{4}$ lb. packet, and very numerous are those who told me, the next timo we met, "Your tea is very good, excellent, economical and cheap, where can I buy it, givo me another small packet for my friend so-and-so." I did this for about a month in St. Petersburg, which place I left for Moscow on tho 24th of August, well convinced tbat Ceylon tea will, before long, be drunk *pure* and largely by many people there, aud leaving samples to some friends with the task to continue, in the above manner, the work commenced by me; more was for me impossible to do, tbe wholesale trade refusing peremptorily to bite at business.

With about 200 lb. samples of tea, I arrived on the 25th August in Moscow which is no doubt the large central place in Russia for tea business, but there I met with the same objections from tho part of the wholesale trade, viz, that Ceylon tea do not suit the taste of Russians and can only be used for mixing with inferior Chinese teas—about 3,000 chests of Ceylon tea are now used yearly in Moscow for this purpose, and this in the best qualities of pekoe and pekoe souchong, such marks as Labukelle, Chapelton, Rahatungoda, Bogawantalawa, etc.—My best eloquence was useless and could not convince them, and when I suggested to some of them that they would certainly find it a paying business to introduce Ceylon Tea by way of *retail*, in order to give the Russian pnblic the opportunity to buy it and drink it pure, their unanimous reply and argument was: "The taste is against it and moreover why should we now help the introduction of this Tea to prejudice the sale of other marks and qualities we have taken the trouble to introdnce and which are now selling well and readily on this market; it would be against our owu interest, we would simply spoil our bnsiness and stand the risk to keep in stock perhaps for some long time and at a loss for us an unsaleable article." One firm, however, well-known in Loudon, who has, quite recently, started in Moscow a semi-retail Chinese Tea business, on hearing tbat it was my intention to open such a business for Ceylon Teas, meutioned to me their willingness to take np the matter in hand and to order through me, *direct from Ceylon*, a ycarly *unlimited quantity* of tea, provided they were alone to import these teas, have a sort of monopoly for the article, and that I would bind myself towards them, not to do any business with any other firm in Moscow and not to open myself any store or shop of any kind for the sale in *retail* or *otherwise* of these teas. Such a thing, I was of course unable to guarantee, as it is quite impossible to prevent other Firms to import Ceylon teas and being myself nnwilling to be cut of some scheme which I am contemplating to arrange. Seeing all this, I began in Moscow the same campaign that I had done in St. Petersburg, distributing samples and circulars to almost all hotels, tractires, restaurants and public bars of the town, also to the nnmerous friends and acquaintances I made there. The resnlt were the samo as above, and after a four days visit in Nijni Novgorod where I was at about the end of the fair and my samples were also tasted by many people—Russians, Tartars, Siberians, Armenians, etc., I feel now sincerely convinced that Ceylon tea *can be* and *will be* drunk *pure* in Moscow as well as in St. Petersburg, or any other place in Russia, as soon as it is placed within *direct* reach of the public—the consumers. A few months time and some "réclame" are only wanted to establish there a good and profitable bnsiness, and here I will take reference to Mr. Wm. Barnes Stevani's—St. Petersburg correspondent for the *Daily Chronicle*—letter, published in the *Overland Ceylon Observer* of the 21st August last when he writes:—"And that Russians will drink Ceylon tea I am convinced," etc., and further of his advocating the opening of a shop or shops, as being the best plan to be adopted for its introduction in Russia; this would soon compel the wholesale merchants to come to the front with their ordors. The idea has long been mine, and having, for the present, no need to remain any longer in Russia—leaving the remainder of my samples to the care of a trustworthy and competent man who, during my absence, will continue my work of "réclame" and advertising, I left Moscow on tho 29th Sept., via St. Petersburg on my way to London where, upon the suggestion of some friends, I intend trying to interest some capitalists in a scheme of this kind.

When passing St. Petersburg, the other day, I was agreeably surprised to be asked by many: When and where Ceylon tea would be sold in retail; and I am sure that there and in Moscow had I had a stock at my disposal, I would have been able to sell more than a thousand pounds without any trouble at all to friends and acquaintances only.

In Moscow, I had the pleasure of the visit of Mr. Geo. Seton, an Assam tea planter, who, introduced to me by Mr. Martin Leake, was visiting Russia on behalf of *Indian* teas; we visited together most of the largest wholesale tea houses and after having heard all tbat they they had to say *pro* and *con* Ceylon and Indian teas, we both agree to the same conclusion, viz.:—That their introduction into the country was only feasible by way of depôts and retail shops aided at tbe beginning with some well-conducted and judicious réclame by pamphlets, circulars and advertisements or articles in the press. Mr. Seton went so far in suggesting the opening of Ceylon Tea-drinking places on the tractires style, and a friend of mine suggested the "automatic" machines. An exhibition for French products is to be held in Moscow abont June next, and although other nations' products will not be allowed to be exhibited I have ascertained that a spaee, outside the exhibition, could be obtained for the building of a Kiosk and the sale in cups and in packets of Ceylon tea.

I may mention that Indian teas have very little chance of success in Russia, they are found too strong with an indifferent flavour and aroma remindiug the smell of fermented hay and so different to Ceylon and China teas. Chinese teas are sold in Russia from Rouble one to Roubles 3·50 per Russian pound, as to quality, those below Roubles 1·50 being very bad—samples herewith—and with better qualities and cheaper prices Ceylon teas are bound to have preference. The qualities I would recommend as being most likely to suit the markets and sell well, are tho following:—*Finest*, even made, leafy Orange and Brok n Pekoe, *without tips*, of superior *rich* but *smooth* liquor, fine Moning flavour, mild taste, not too strong, not pungent or bitter, dark-red infusion, to sell, duty paid at about Roubles 3 per Russian lb.

Finest Pekoe	of above description	Roubles 2 50 per Russian lb.
Fine Do		do 2 do.
Good Do		do 1·75 do.
Good ordinary ordinary and common to sell about, duty paid, Roubles 1·50, 1 35, aud 1·20 per lb. respectively	Pekoes and/or Pekoe Souchongs, leafy, smooth flavour and good liquor, rather strong but not pungent, Moning taste, dark liquor.	

Also *common Pekoe Souchong* of a dark colour iufusion, rather strong bnt not pungent, to sell duty paid at about Roubles 1, 1·5, 1·10 and 1·15 per lb. or lower if possible. I have seen in St. Petersburg whole leaf China tea costing in London 4d a pound (English) f. o. b., and sold in

retail at 90 kopecks per Russian pound. Tippy teas are to be avoided, not being at all appreciated in Russia, but leaf, colour of infusion, and smoothness of liquor are the most important points to be taken into consideration.

Mr. Vladimiroff, of the large firm of Alex. Joubkin, héritiers A. Kanouatzoff & Co. the largest teahouse (wholesale) in Moscow, whom I have seen in Nijui-Novgorod, in giving me the accompanying complete collection of Chinese "Monings," told me that if Ceylon planters could only give to their tea the appearance, taste, flavour and perfume of these teas—which qualities and character are, I suppose, due to the difference of soil—he would be prepared to guarantee that before long time had elapsed, no other tea would be drunk in Russia; he is already of opinion that Ceylon teas, which he himself declared to be of very good quality, have a great and near future in the country on account of the evermore decreasing quality of Chinese teas in general of which everybody is bitterly complaining at present.

I have been showed some awfully bad qualities of a stuff that I certainly cannot call tea—"caravan or Overland Tea"—sample produced—sold at one rouble per pound, and I was astonished to hear that such drug was allowed to be sold and not stopped by the Police authorities as being infectious, and I really cannot understand the nonsense of the Russians as regards their so-called *taste* for tea, when they can drink such a filth, and drink it as they do, so weak and almost tasteless by dozens of glasses in a day, very seldom with sugar or a slice of lemon and almost never with milk or cream.

Caravan teas have greatly fallen off in importance for the last five years and the import into Russia by Overland route has been considerably reduced; good teas arrive now all by steamers direct to Odessa by Volunteer Fleet steamers, or with transhipment at Port Said by other steamers, and from London to Odessa, Riga, Revel and or St. Petersburg.

Green Ceylon or Indian teas will never do for Russia, their colour and taste being not suitable for the market.

The Russian "Samovar" or "Selfboiler" is a capital invention, it resembles the old-fashioned English tea urn still in use in some English country households. It is heated by a charcoal fire let into a tube in its centre, just in the same way in which the urn used to be heated by means of a red-hot bar, the charcoal fire keeps smouldering for hours, and the water in the urn is thus kept at boiling-point for the whole of tea-time. The mechanism of the Samovar is extremely simple. A cover, to which is adapted a safety steam-valve to prevent the bursting of the machine, recovers the urn which is filled up with water from the top, another small cover on the top of the tube serves in regulating the fire, the hot water is let out by a tap fixed at the bottom of the urn and two handles—one at each side of the Samovar—serve to carry the whole apparatus, which is considered an indispensible adjunct to the Russian tea or breakfast table.

Tea is made in the following manner:—the required quantity of tea (leaf) is placed in a beforehand heated tea-pot which is filled up slowly and gradually at intervals, with boiling water from the Samovar, and then placed on the top of the tube for about five minutes when it is supposed that the tea is ready and fit to be drank, glasses are then filled half-full with it, with an addition of hot water, the tea-pot is again refilled on the same leaf for a second infusion and this goes on for three to even four times without addition of any new leaf. This explains how the Russians drink so weak tea and why they require it of a strong colour, to keep up as dark as possible, up to the third or fourth infusion.

Regarding the packing of Ceylon tea, I have already written on the subject to the Secretary of the Ceylon Planters' Association, and I think, in view of further and larger business with Russia, some steps ought to be adopted for the adoption of better packages, better made, with a nicer appearance, and of even *sizes*, containing about 60 to 65 pounds nett of tea. The weight of the packages for *tare* should be *uniform*, so near as possible, in order to facilitate the Customs entries, and these very exactly given in the weight notes and or invoices.

Living and travelling, etc., in Russia is rather expensive. I have spent during these three months travelling—on account of my tea mission only—and up to the day of my return in London (on the 14th Oct.) the sum £190—inclusive duty and charges on tea samples—against which I have received £145 only from the Ceylon "Tea Fund," for which expenditures I am prepared to furnish detailed account. I am very thankful to the Committee of the "Tea Fund" for their further grant of £150 advised to me by Mr. Leake and in conclusion of this report, I again strongly advocate the opening in Moscow and or St. Petersburg of Ceylon Tea Depôts and retail shops for the establishment of which I am prepared to subject all the necessary information, and I sincerely trust that men with capital, members of the Ceylon and London Associations, will kindly help me for the realization of my scheme, which I can guarantee as being a good one, not only financially speaking, but also in the interest of the Ceylon tea industry.

I am ready to return to Russia within the shortest time.

(Signed) M. ROGIVUE.

London, the 15th October 1890.

CEYLON TEA FOR THE CONTINENT OF EUROPE:

THE NEED OF SUPPORTING THE COLOMBO MARKET.

(*From a Colombo Tea Buyer.*)

Our Continental correspondents write as follows:—"If there were only a larger selection on your market we might probably have done a larger business together by this time." In another part of the same letter they say: "We must have a little to go on with, as we have introduced this class of tea into some parts."

FRUIT FROM JAMAICA.—In this article on the awakening of Jamaica, in the latest *Nineteenth Century*, Sir Henry Blake mentions that within the past ten years the value of fruit annually exported from that island has increased from £40,000 to £337,000. The fruit is principally bananas, and the demand is likely to continue. "The value of the banana as food for working men has been recognised in the United States, and it is found peculiarly sustaining for those engaged in heavy labour in warm situations, such as blacksmiths and iron-founders. The operatives in cotton factories also use it largely. In England it is but little known, but Jamaica bananas are now being exported to Hamburg *via* New York." Sir Henry thinks this fruit trade is only in its infancy, and no doubt he is right.

THE WORD SUGAR.—Webster defines "sugar" as "a sweet, crystaline substance." In ordinary use the word refers more to cane sugar than to any other kind. The oldest form of the word is found in the Sanskrit, *çarkara*, candied sugar. In Persian it is *shakar*, and in the Arabic *ookkar*. It is not a little curious to find this word in the Old Testament under the form of Issachar, meaning wages, sweetness. "Leah said, God hath given me my hire, and she called his name Issachar," sweetness. Though known and used in Asiatic countries from time immemorial, it was little known or used in England, except as an apothecary's drug, until within a few centuries past. There is no modern word that takes the place of that of the early ages. In Chinese the word is *che*, and as the character expressing it is original, it is claimed that sugar cane is indigenous in China.—*Sugar-Bowl and Farm Journal*.

PROGRESS IN OLD KADUGANNAWA: COFFEE AND TEA.

We hear very favourable reports of the young tea plantations in the old Kadugannawa districts. Mr. Akbar's 200 acres in tea at "The Farm" are described by a competent authority as very fine. On the other side, the young estates of Messrs. Thomas and Shelton Agar are promising; also one belonging to Mrs. Burt; while close by a spirited native gentleman is opening land with Arabian coffee as well as tea. May success crown his enterprise in both products.

CACAO PODS DISAPPEARING!

(*The Enemies of a Cacao Planter.*)

Nov. 6th.

I have been smothered with work lately: uneasy lies the head that thinks of cacao pods, as there is now a regular industry in stolen cacao. Which of the Colombo firms are the final 'receivers'?

The Census Commissioner might, while revelling in figures, add a column to his lists for the cacao districts for the headmen to fill up, showing the number of villages owning no property and doing no work! This would help to explain why half of our crop never reaches the drying-house.

DR. VOELCKER.

SIMLA, Oct. 28th.—Dr. Voelcker leaves Simla about the 21st of Nov. and proceeds to Poona, and sails from Calcutta en route for London on the 18th of Dec.—Thursday's "*Observer*."

Dr. Voelcker, we learn, is due in Colombo on the 23rd Dec. and will be the guest of Mr. T. Watson Hall for three or four weeks, during which time he intends taking a trip through the planting districts. We are very pleased to have this intelligence. The Planters' Association should arrange to show some special attention to this great agricultural and chemical authority.

PADDY CULTIVATION IN THE EASTERN PROVINCE.—We call attention to the very important Report furnished by Mr. Elliott on the careful experiments carried on under his direction by Agricultural Schoolmen with paddy culture in the Batticaloa district. The full details given are most interesting and certainly give us a new idea of the scope that exists for improvement in local grain cultivation by the people and of the really handsome profits per acre that may be realized. Of course no one will say that careful experiments on selected fields can be equalled over a wide area; but Mr. Elliott shows that the land taken up was only of an average description and that the bad season affected his experiments very considerably. So that we are forced to the conclusion that over the extensive paddy-growing fields of such exceptionally favoured districts as Batticoloa and Matara and no doubt over a great part of the Colombo and Negombo districts of the Western Province, not to speak of Madampe, Chilaw, and some other divisions of the island,—a clear profit of from R15 to R25 per acre in paddy-growing would not be difficult of realization if attention were given to such means of improved cultivation as are well within the cultivators' reach. It would be well if other Government Agents followed Mr. Elliott's example in carrying on careful experiments after the pattern he has set.

CEYLON UPCONTRY PLANTING REPORT.

PEPPER CULTIVATION—CACAO PODS AS FOOD FOR CATTLE—CACAO PROSPECTS AND PRICES—COFFEE AND COOLIES—DECLINE OF THE CINCHONA MARKET—WEATHER—LABOUR.

Nov. 6th.

The *Pepper* spurt, which about a year ago was very much in evidence, seems to have exhausted itself. You never hear anything of this spice by any chance, and when you do see it, and ask as to its ways and doings, the record is not an encouraging one. I begin to fancy that to grow it successfully a very rich soil is necessary; and when it has not got this it struggles along in a half-marked kind of way, vigorous enough just to keep hope alive but not to contribute anything reasonable to the exchequer. Now and then you fall on a vine that does gladden, with an exuberance of fruit; but this is the exception not the rule. I wonder how many who have gone in for it in Ceylon are satisfied with the present or the future outlook? Precious few, I fancy. We would all, however, willingly see an extension of its cultivation, as there would be a chance of making something off cuttings! With a flow of coin and a hopeful spirit abroad it is wonderful how bright life can become and how the potentialities of even Pepper culture would swell out.

Has anyone ever tried Feeding Cattle on cacao pods? Cattle take to it very kindly, and as far as I have seen without any evil effects, and it may be that what really is a valuable cattle food is allowed to run to waste at present for lack of knowledge. In a matter of this kind, however, the natural feeling is, that you would prefer another fellow to try in case of accidents! The piles of broken pods which accumulate in every cacao garden, need not be wholly wasted, as they can be and are returned to the soil as manure; but if it were proved that they were a good fodder, those gardens which had a cattle establishment would score.

The *Cacao* crop is coming in fast now, and it would seem as if in some places at least it will be quite as good, if not better than last year. This, however, is not to be the rule everywhere, as I understand that Dumbara is not going to do so well owing to the drought in the early part of the year. The grand prices ruling at home are very encouraging, and make up for a lot of former disappointment and worrying work in bringing the gardens into bearing.

The little *Coffee* we have on this side is looking fairly well for coffee, but it is very little. It, too, is ripening, but there will be no great rush over the gathering of it. It is strange how so many keep in touch with the old king; for there are few estates which have not got some trees about. A clump under a jak, or by the lines, or in the bungalow garden, is evidence of the past universal order. Then the cooly is not willing to let the memory of coffee die out wholly, for you find them referring to tea, as coffee; and they will speak of a line of tea as a "coffee nirré." I have noticed them even using the word coffee to cacao. I suppose this is language in the act of being made: and that by-and-bye the Tamil people in the hill districts of Ceylon will use the word coffee as a general instead of a particular term. It may puzzle some future philologist to account for this, but if he digs but deep enough he will discover what other students have often noted, that a single word may contain the compressed history of a great crisis.

What is to be made of this wretched *Cinchona* market? I don't know how many years ago it is now, since we all confidently looked for a

recovery of prices, and the rate is as poor as ever The whole thing is simply disgraceful, and I am convinced that even Job himself, if he had been growing cinchona, or had held any for a rise, would long ere this have cursed and died rather than go on with it. When the price of the unit advances an eighth, there is consternation among the manufacturers, and the sellers of bark grow jubilant. I suppose it is the most sensitive market in the world, and that is why it makes so much fuss over so little. Anyhow an industry whose hopes have been bounded for years by about 1¼d on the one side and 1⅝d in the other, leaves precious little room for a fortune to the growers of the article, or for speculation either.

The Weather is very favourable for *tea* flushing, and the leaf comes on in a cheery way.

Coolies are plentiful, and are preparing for a lavish outlay at the "Tivali." The quantity of coin drawn from the banks about this time to pay wages on the estates must amount almost to a run on them. He will be a fortunate man who can afford a day to his labourers for holiday-making and stand the strain of the absentees later on. Few object to the holiday,—it is the after effects, and the time it takes some of our coolies to work it off. PEPPERCORN.

THE RUBY MINES OF BURMA.

As a gem-producing country Ceylon is interested in the following not very encouraging notice of the Burma ruby mines, evidently by Sir Lepel Griffin from the unworthy but perfectly characteristic attack he makes, in a part we do not quote, on the American missionaries and their Karen converts:—

The country leased to the Ruby Mines Company begins in the neighbourhood of Kyatpyin, but it is of great extent some 800 square miles in area, and is unsurveyed or very imperfectly surveyed. It includes the whole country in which precious stones are known to be found, except one or two outlying mines like Saygin on the Irrawaddy not now worked. The operations of the company have been delayed by the great difficulties of transport and labour and the impossibility of conveying heavy machinery across mountain roads in any but the finest weather. A large amount however, has now reached the headquarters, and is being put up; the stream running through the valley is being diverted, and mining operations on an extended scale are being begun. The labour question however, is one of difficulty. The best labourers are the Mainthas, who come from Chinese territory, and who are strong men and desperate gamblers, so much so that if any attempt is made to stop their unceasing gambling out of work hours they threw up their engagements and leave the place. These men hardly arrive in Mogok before January, and in April they are anxious to return to their homes to sow their fields before the rainy season. The labour procured from Mandalay or Lower Burmah is unsatisfactory and very expensive. Another difficulty the English Company has to face is the jungle fever, which is very trying to new comers, but it may be hoped that with better food and better conditions of living, and as the *employés* become acclimatized, this inconvenience will each year be less severely felt. Kyatpyin is the machinery headquarters of the company, its principal settlement being 12 miles further on, at Mogok, a large and flourishing town in a wide and beautiful valley, through which runs a stream of abundant water. The town is picturesque in the extreme, with groups of temples and pagodas. The houses, all constructed of wood and built on stilts in the fashion of the country, are substantial and commodious, and the inhabitants, all of whom live by the ruby trade, appear to be a most flourishing community, the women being covered with jewels, some of great size and beauty. We visited the weekly fair at Mogok, in company with Sir Charles Crosthwaite and his staff, and the sight was a striking and picturesque one, for men and women from distant villages in the Shan and Chinese hills, strange in appearance, especially the Kachyens flocked in from all directions, and their curiosity and astonishment at the sight of an English lady, who was followed by great crowds through the bazaar, was most amusing. Mogok is fast becoming an English settlement of some importance; it is the headquarters of the district, with a resident magistrate, and of the divisional military police, who are mostly Sikhs from the Punjab, while the offices and numerous wooden chalets of the officers of the Ruby Mines Company dot the hills surrounding the town. The great alluvial plain through which the river runs is excavated in many places by the shafts of the native miners, who have been allowed to work for rubies through many generations, and that they have found the occupation a profitable one is evident in their appearance and manner of living, but their system of digging shallow holes from which the water and mud is painfully taken out by baskets and buckets is not one which would be profitable to a scientifically working company, whose method would be more elaborate and more in accordance with the principles adopted in diamond mining in South Africa. It has not been found politic to oust the miners in the alluvial soil of the valley from their holdings, although, under the native Government, they held these as tenants at will for until Upper Burmah is permanently tranquil, it is unwise to take any action which would render hostile to the company those whose co-operation might be to its advantage. They have consequently been allowed to continue mining, paying for each person employed a poll-tax of 20 rupees. As about 600 miners are engaged in the work this brings in an annual revenue, of about a lakh and a quarter of rupees, while a useless embargo on smuggling having been removed, the miners more readily bring to the company's officers for purchase such of the good rubies as they find. This plan, which has been experimentally adopted, will be modified if its results are not satisfactory. In the hills about Mogok and Kyatpyin native miners with much larger rights of occupancy work open cuttings in the sides of the ravines, and it is to this work by hydraulic power that the company's operations will be chiefly directed. What may be the ultimate result of the company's labours it is impossible to pronounce, but much activity is now being shown, and, with the arrival of sufficient and effective machinery, the real operations of the company, too long delayed, will practically begin.

Two thousand feet above Mogok, by an exceedingly difficult mountain path, is the military station of Bernardmyo, some eight miles distant, and ordinarily reached by a military road joining the main line above Kyatpyin. It was hoped that the elevation of this cantonment above the sea, quite as great as those in the Himalayas, would have insured the troops against jungle fever: but this was not the case, and the great sickness almost caused the abandonment of the place. The health of the troops stationed there has, however, much improved of late, and, like all Burmese stations, the peculiar climatic conditions require a European resident to be somewhat acclimatized before he finds them healthy.—*Times Weekly Edition.*

It will be observed that the chief difficulties specified in the case of the Burma Company—scarcity of labour and difficulties of transport—do not in the least apply to the gemming country of Ceylon. Clearly British capital should have come here before it went to Burma.

ARTIFICIAL MUSK.—The comparative scarcity of musk, and its considerable use in pharmacy make the discovery of a substitute of some importance. Mr. A. Bour has succeeded in preparing a substance which, though not identical in composition with natural musk, yet is possessed of its peculiar smell. It is formed by nitrating isobutyltoluene with a mixture of the strongest nitric acid and fuming sulphuric acid. It is not poisonous, and is now being produced on a manufacturing scale in Germany.—*Industries.*

COCONUT BUTTER:

A NEW FIELD FOR EXPORT FROM CEYLON.

For some little time past we have been hearing rumours as to the successful extraction from cocoanuts of a butter which it has been asserted might eventually take the place to a very great extent, of the genuine article. Information, however, respecting this new process has hitherto been of a very limited character, and from all that could be learned on the subject the experiments made seemed to have been of a tentative character only. It is, therefore, with considerable surprise that we have read the account given in the latest *Kew Bulletin* and which was summarized in our London Letter by last mail. To judge from what we have thus learned, the process has not only passed out of the region of bare experiment, but its success commercially has already been established, and a very great demand, far beyond the present means or meeting it, has sprung up.

To an island like Ceylon, which not only now produces an enormous yield of coconuts, but in which the cultivation of the palm bearing it is possible of still farther extension, the news now reaching us is of very material importance. But we deem it to be probable that local interest in the matter must to a considerable extent await the fuller development of the methods employed. Unless it be found impracticable hereafter to work the manufacture locally and with profit, the probability is that our own interest in it must be dependent upon the discovery of a method by which the extract may be obtained from the copra, the name by which the dried kernel of the nut is known. So long as the power of extracting the butter is limited to the fresh nuts, it is scarcely possible, we should say, that Ceylon, despite all its capacity for production, can compete in the supply of them to European countries, with sources which lie nearer home. For, after all, the question of the cost of transportation is a serious one in regard to the nut itself. The unbroken nut, even when stripped of its husky covering, occupies much space relatively to the weight of kernel it contains, and this fact must, of course, increase the freightage greatly. Two courses, therefore, await experiment before this island can hope to share very largely in the supply for the actively increased demand which this new discovery is likely to cause. The most important of these would be the discovery of a method whereby the butter may be extracted from the dried kernels, while the second one would be the adoption of the process of manufacture locally.

The method of the latter process is unknown to us, nor does the *Kew Bulletin* afford us any intelligence with reference to it. The probability is, we should say, that it is—for the present at all events—a trade secret, and there can be little doubt that if it be so, the endeavour will be made to preserve to it that character as long as may be possible. The local prospect, therefore, of sharing in the advantages to be expected from this new invention must, it would seem, be dependent on means being found for the substitution of the dried for the fresh kernel. As to this, everything must depend as regards ourselves upon whether the drying which converts the juicy nut into a hard substance is inimical to the preservation of the constituents from which the butter is derived. This is, of course, a point upon which we are unable to express an opinion, but it is one which may well engage the attention of scientific chemists, and would even be of importance enough to our island interest to warrant our Government in seeking information from home. According to the *Kew Bulletin*, the new extract has a fair prospect of largely superseding the butterines, such as oleomargarine, &c., which are extractions from animal fats. Indeed we are told that it has already largely done so, and that the present demand ranges as high as 100 hundredweights *per diem*, while the existing means of production limit the outturn to 50 hundredweights only.

We may be sure that the official organ of the Great British Botanical Gardens would not have committed itself to the reproduction of these figures, had not its directors been possessed of good warranty for so doing, and we may therefore accept them as fully reliable. It is not difficult of belief that people would prefer a pure and healthy vegetable extract to one, the sources of which are open to taint and much suspicion. As regards these last we have even heard it hinted at that the soapy scum which rises to the surface of the Thames at the points of sewage discharge into them is collected partly with the object of the manufacture from it of oleomargarine! Although we greatly doubt this, it is quite certain that many very base and disagreeable substances may be, and probably are, the foundation of much of the oleo-margarine sold. We have never practised the experiment ourselves of tasting this compound, but there is ample evidence of its very extensive manufacture and of its large and legally-practised sale. There is every likelihood that this substance will be largely displaced by the pure extract from the coconut if all that we have been told about the latter be correct. In that case we shall do wisely to keep "our eyes about us" in the hope that our native industries may largely benefit by this new departure.

BIG RETURN OF TEA.

Ruwanwella division of the Kelani Valley is in a fair way to take the palm with a return of tea per acre last month that beats anything yet recorded —300 lb. made tea per acre over about 30 acres flat, with the prospect of being repeated in the current month, are the figures given to us. Has this been beaten?

UVA BEATING JAVA IN THE RICHNESS OF ITS CINCHONA BARK.

Our Java friends are fond of boasting of the superiority of their cinchona bark to any grown in Ceylon; but we should like to know of any single shipment from Batavia equal in weight, exceeding the analysis of the one we have just got particulars about. Last week a parcel of cinchona bark from the Messrs. Macfarlane's Canavarella estate, Badulla, of 28,000 lb. analysed in Colombo 5·10 per cent sulphate of quinine—so it will be seen that the Jave people—as our informant says—have not yet got the matter entirely in their own hands. This is the highest analysis for a large quantity of bark ever obtained in Ceylon we think.

CEYLON TEA PLANTATION COMPANY, LD.—A GOOD DIVIDEND.—We have come to regard this Company at the premier Tea Company of Ceylon, being the largess and one of the most prosperous. When, therefore, it does well, having interests in many districts of the island, and at both high and low altitudes, it certainly is hopeful for the Ceylon Tea enterprize generally. We are, therefore, pleased to be able to state that the last mail brought news to the Colony that the Directors of the above Company had decided to declare an *interim* dividend for the past half-year at the rate of 7 per cent per annum, which, considering the enormous rise in exchange which has occurred during the last five months, is a most satisfactory result, and one of which no one should be more proud than Mr. G. A. Talbot, the Manager of the Company, and the superintendents.

BOOK NOTICE.

SAP: DOES IT RISE FROM THE ROOTS?

By J. A. Reeves. (London: George Kenning.)

The purpose of the author, he tells us, in the beginning of his book, is to describe certain known facts, to lay before the reader an outline of the theories hitherto advocated, and to show that there is no evidence to prove "that the sap in trees rises at any time; that inorganic matter rises from the soil; that the soil is exhausted by the growth of vegetation; that sap is elaborated in the leaves; that suckers from the roots are injurious." The physiologist and the cultivator will at once see that the author has a hard task before him. It is quite true that contradictory opinions and conflicting statements have been and are held upon several of the points raised by the author, that very little is known for certain, and that very much remains to be done before all the questions relating to the movements of the juices in plants can be solved. It will be understood that the problem is partly physical, partly physiological—physical in so far as concerns the mechanism of the plant, and the forces which set the machinery in motion; physiological in what concerns the plant in action. Some knowledge therefore, of physics, of chemistry, of vegetable anatomy are essential, and the capacity of applying the principles derived from them to the explanation of the observed phenomena is no less a necessary condition. The author of the work before us attacks, with perfect impartiality, the views of his predecessors; so far as he knows them; he demolishes their arguments to his own satisfaction, and concludes by the assertion that, "instead of water ascending and gases decending, the facts ... go to prove that the water descends to the roots, and the gases ascend to the leaves, both actions being in strict conformity with the laws of gravitation.

Oppressed, as every physiologist and teacher must be with the unsatisfactory state of our knowledge on the subject, we should gladly hail our author as a guide, if he were able to show satisfactory credentials, and then to substantiate his statements. If we turn to his credentials, we find they are two-fold, consisting of "extracts from the best authorities;" and amongst these, while we find a few whose names carry weight, we find some who at best would only pretend to be compilers; and many others of a very miscellaneous character, whose opinions in such a matter, however honest, are of no value whatever as evidence. The author's references to the literature of the subject are ludicrous, as much for what he has omitted, as for what he has requisitioned.

In addition to these extracts from "the best authorities" and others, from writers who would certainly not claim any authority for themselves, the author lays before the reader a brief record of his own observations and experiments. We fear the physiologist will hesitate as much to accept them in their entirety, as he would to accept the author's literary evidence. In this department we natnrally look for evidence of the author's personal knowledge and competence to deal with his subject. We find a great deal of assertion, much adverse criticism, some of which is, no doubt, legitimate; but some of which will fail in its effect from the inability of the author to prove that he is competent to deal with his subject. Take for instance, a passage on p. 48, and consider whether the physiologists would be likely to attach importance to the theories of a writer who can say, "The roots [formed from a Pelargonium cuttiug] being a hardened or solidified exudation of the sap [!], of course, grow from between the rind and the wood."

It is no wonder that a writer who can thus describe a root, should arrive at a very different conclusion as to root-action from other people. This question of root-action is the one in which cultivators will naturally take the most interest, and the reader perusing the pages of Mr. Reeves' volume, will naturally inquire—What is the use of the roots? So far as we can see from Mr. Reeves' pages, they can be of no use except as supports. If what he tells us be true, there is no need for root-watering at all. Manures are superfluous; root-pruning never needed; the care exercised in transplanting or in potting is so much waste labour.

Leaf-action, again, in the writer's views is reduced to little more than the absorption of water. Ignoring the teachings of physiologists, and the experiments of botanists, the author says boldly, "The elaborative function so constantly attributed to the leaves of trees appears to be nothing more than elaborated idea (*sic*) unsupported by the least evidence." Clearly the author has not read his Sachs, nor his Vines, nor has he observed to any purpose what happens when Celery is blanched.

Speaking of "suckers," the author's notion of what they really are seems rather vague, while his statement that a healthy tree has no suckers, may be contradicted by the first white Poplar or Elm he may come across.

In fine, whatever the deficiencies in our knowledge of the circulation of juices in plants, and they are great, we do not think that Mr. Reeves' book at all helps us to supply them. His teaching will not commend themselves to the practical horticulturist, while they will most certainly be repudiated by the botanists.—*Gardeners' Chronicle.*

SCOTTISH TRUST AND LOAN COMPANY OF CEYLON.

Report of the Directors to be laid before the Thirteenth Ordinary General Meeting of Shareholders, held on Friday, the 24th day of October 1890.

The Directors present their Thirteenth Report, being for year to 31st of August 1890:—

ESTATES IN COMPANY'S POSSESSION.—The cultivation of the estates in the Company's possessions continues to receive careful attention, and the sales of tea and coffee during the year have commanded satisfactory prices in the London market. The sales of cinchona were restricted owing to the state of the market, and part of the Company's produce has been retained in the hope of better prices The whole cost of tea cultivation has, as formerly, been charged to revenue. Acting on the advice of the Company's Ceylon agents, the Directors authorized the erection of a tea Factory at Kaipoogala, from which remunerative returns are anticipated. The outlay on Tea Factories and machinery amounted during the year to £655 10s, and the Directors have written off the sum of £745, 4s 6d, being one-fifth of the total expenditure on this account during the past two years.

PRODUCE ON HAND.—The valuations have, as formerly, been carefully made by the London Agent, and are largely based on the result of actual sales made subsequent to the date of the closing of the books.

MORTGAGES HELD IN CEYLON BY THE COMPANY.—Sundry payments have been received during the year in reduction of mortgages, and interest has been punctually paid, with the exception of the amount shown in the accounts, which, however, has been reduced since the books closed. Early in the year the Directors found themselves compelled to take active measures in connection with two Rupee Bonds standing in the Company's books at the old rate of exchange, at the *cumulo* sum of £11,000. The estates were known to be much deteriorated in consequence of the failure of the coffee, and tea cultivation had barely been commenced. The Directors were most averse to take over these estates, and judged it in the best interests of the Company to accept an offer of £8,000 payable by instalments in sterling money, which was made to them by a neighbouring proprietor. The loss of £3,000 arises in about equal proportions from the fall in Exchange, and the depreciation of the estates, and the amount falls to be written off. The Company now retains only one Rupee Loan, of about £1,000.

DEBENTURE DEBT.—The amount borrowed and the rates of interest have again been reduced.

The Balance at the Credit of Profit and Loss Accounts is £5,925 9 0

and the Directors propose—

To write off the above loss	£3,000	0 0
To pay a Dividend of 6 per cent, free of Income Tax	2,250	0 0
	£5,250	0 0
Leaving	£675	9 0

to be carried forward to next Account.

The Dividend will be payable, as before, on the 11th of November.

Under the rotation fixed by the Directors, Mr. Dickson retires from office at this Meeting; but he is eligible for re-election in terms of Section 14 of the Articles of Association.

During the year Mr. J. Campbell Penney, who has acted as Secretary of the Company since its formation in 1878, tendered his resignation on his appointment as Accountant of Court. The Director appointed Mr. Francis A. Bringloe, C.A., in his place.

The Auditor for the current year falls to be appointed. FRANCIS A. BRINGLOE, Secretary.

NOTES ON PRODUCE AND FINANCE.

THE CUSTOMS AND DUTY-PAID ARTICLES.—Instructions have been given to the Customs officials to furnish, for the information of a Committee of the House of Commons, a return of the quantity of duty-paid articles, including tea, coffee, wine, beer, spirits, manufatured tobacco and snuff, &c., consumed in England, Wales, Scotland, and Ireland respectively. The return asked for is to be rendered quarterly, commencing from the period ending Dec. 31st next, and all shipping and carrying companies are requested to furnish the Customs with an account of all such articles conveyed by their routes between each of the three divisions of the United Kingdom.

THE PRICE OF CHEAP TEA.—Tea was never so cheap as it is today, and never so dear, says a grocer's paper. It can be bought at any price from 1s per lb. A good deal was made of a parcel of Ceylon tea which fetched 30s 6d per lb. in London the other day. However, it appears that Sheffield can beat that, for we are informed that Mr. Tuckwood has in his Fargate stores a parcel of Ceylon tea for which he gave 55s per lb. in London, and the broker would buy it back at 60s.—*H. and C. Mail*, Oct. 24th.

ADULTERATION AS A FINE ART.—According to statistics produced in an American paper the average quantity of genuine coffee actually imported averages only 130,000,000 lb. per annum, but with roasted beans, peas, and rye and other coffee substitutes, an annual consumption of at least 216,000,000 lb. is provided for, some estimates indeed placing the yearly consumption of bogus coffee in the United States at 120,000,000 lb. We learn that the "bean" is still the most difficult to produce, but a good "specimen," composed of rye flour, glucose, and water, is now manufactured in Philadelphia and Trenton. It is further stated that "taking even the lowest estimate, the cute Yankee engaged in this particular field of 'commerce' makes 25,000,000 dols. a year out of his fellow-countrymen, the manufacturers taking six millons of this, and the retailers nineteen millions."

A NEW COFFEE COMPANY IN BRAZIL.—A Brazilian paper refers to the formation of an important company "with a capital of 50,000,000 dols. already subscribed, and 'which does not contemplate a monopoly nor a struggle with the intermediate exporter, seeking merely to direct the market towards stability, subject only to the natural fluctuations caused by consumption, limiting the bases upon which it proposes to operate, incurring none of the risks of exporting—it being forbidden to it to work in this direction—and making of itself only a great buyer which may resist for the moment artificial declines, at the same time facilitating transactions in the article." Occupying itself in all the industries accessory to the proposed business, the coffee-bagging company will establish the necessary workshops, will acquire warehouses and stores, will provide for means of carriage and shipment, and will establish agencies in the markets of New York, Havre, Hamburg, and London. At the head of this enterprise, of which the president is Visconde Cruzeiro, are as directors and auditors, Conde de S. Clemente, Conde de Figueiredo, Barão de Andarahy, Barao de Ipanema, Dr. João Baptista de Castro, and Comandadores Urbano Faria, Manoel de Araujo Guimaraes, and Joaquim de Castro de Silva."—*H. and C. Mail*, Oct. 24th.

THE JAVA BUDGET.—The Amsterdam correspondent of the *London and China Express* writes in the issue of Sept. 26th:—

The Java Budget was introduced in the Second Chamber on the 22nd inst. The service of 1890 promises a more favourable result than in 1889, as there will be a profit balance of f.4,500,000 instead of a deficit of f.7,500,000. The expenditure for 1891 is estimated at f.136,840,646 and the revenue at f.116,414,315. There is thus a deficit of f.20,426,331 or f.12,916,926 more than estimated for 1890. The quantity of coffee to be offered at auction at 1891 will be about 190,000 piculs, against 520,000 piculs for 1890, and in the quantity of 190,000 piculs there are included 60,000 piculs reserved for the sale of 1890. In consequence of this the proceeds of the coffee is estimated at about f.15,500,000 less. * * * The average sale price of the coffee is estimated at 52 cents, against 48 cents last year.

In commenting on the budget our contemporary says:—

Almost the whole of the estimated deficit for 1891 is caused by the reduction in the quantity of coffee, which it is anticipated will fall short by 15,500,000 guilders of even the lesser income received in 1890. The quantity, according to latest advices, is only expected to total 190,000 piculs, against 520,000 in the present year, which itself was only one of a constantly descending sequence. It is not necessary to remind our readers that in past years the amount netted by the Government of Holland has been immense from coffee, and the falling off of millions of guilders shows how large they are. When some three years ago the receipts had fallen off to a large extent the Government appointed a commission to inquire into the whole subject, and though the members made a number of suggestions on the matter, all were not put in force, and the continued ravages of leaf disease have more than counterbalanced any modifications that were introduced into the method of culture. The *sereh*, or leaf disease, is a matter which may or may not be successfully combated in time. It is sincerely to be hoped that science may devise some means, but seeing that about one-third of the world's production of coffee is estimated to come from Netherlands India any other means that can be devised to again reinstate the production should be energetically applied. One great means would be to give the natives a greater interest in growing the bean. The abandonment of the compulsory growth enforced by the Government might be relinquished, or an increased price given to the native for the coffee he produces. This would give him a zest which is only supplied at the present time by the periodical visits of the inspector to see that the minimum number of trees is kept up. Perhaps, viewing other circumstances in Netherlands India, it would be better to increase the purchase price rather than abandon the compulsory growth. There are many places in the Padang Highlands of Sumatra which would prove suitable to its extension provided the remuneration was greater. The natives here have always been more antagonistic to the present system than have their *confrères* in Java, and the Government should seriously consider the question whether it would not ultimately conduce much to their own gain if they allowed to the native cultivators a reasonably fair share of the profits of the industry.

ESSAYS ON THE FERMENTATION OF COCOA.

(From the Trinidad "Agricultural Record.")

FIRST PRIZE ESSAY.

The fermentation of cocoa, or sweating as it is often termed, is very properly considered as an essential part of its preparation for the manufacturer's use. The principal objects to be obtained may be set down as the development of flavour, the suppression of the bitter principle, so marked in the Trinidad varieties, and a certain allotropic modification of its substance (*i.e.*, the Cotyledons) not easily recognised by chemical analysis.

Fermentation properly consists of decomposition or slow combustion (oxidisation) accompanied by the formation of new products; in the case of cocoa this is spontaneous, and must by no means be confounded with the scientific methods known to malsters, distillers, &c., in the process here described, the object being not to deal with the products, but to affect the cocoa bean by long continued heat, moisture, &c., and, furthermore, to remove the adherent pulp. This sweating must not be regarded either as a simple process; on the contrary, it includes, more or less, the secondary fermentations, such as the lactous, butyric, mucous and putrefactive or eremacausis.

The cocoa pulp to be fermented is a viscous gummy mass not unlike the substance of the custard apple or soursop, and contains an abundance of fruit sugar, cellulose and carbo-hydrates necessary to support combustion or fermentation; it also possesses, as many other fruits do, within itself a natural diastase and yeast ferment; having, therefore, been in contact with atmospheric air and then closed up in a chamber, packed with plantain leaves, &c., the alcoholic fermentation is readily established, the self-contained natural ferments, as already described, being soon supplemented by countless bacteria from the air.

If the mode of proceeding in sweating or fermenting cocoa was the same throughout, it might be easily described. Such is, however, very far from being the case. The great difficulty is that the Trinidad varieties (termed on the Spanish Main "Trinitario") are so very different in character, "each sub-variety or hybrid requiring a different period of fermentation," that the planter is at his wit's end to make his batch turn out all alike, and nearly every one has, therefore, "a way of his own."

On the best estates in Venezuela the Criolo alone is planted, but as it was found not to bear so well as the "Trinitario," our seed some time ago was extensively planted along the Guiria Coast, but after a short experience they concluded that the choicer and higher priced cocoa paid best, and I have myself seen planters in that district rooting out our cocoa trees from their plantations.

The Criolo is much better flavoured than any other, and requires but three days' fermentation. This choice kind has been extensively planted in Trinidad, but surrounded with inferior plants (and perhaps on inferior soil) it has become hybridised and assimilated to the native sorts, and has not maintained its supremacy, so we must ever look to the mixture of Criolo, Forestero and Calabacillo, &c., with which we are blessed, only taking especial care in picking to exclude pasi or flat beans and unripe pods. If our varieties were well marked and we determined the exact temperature and the precise number of days that each kind wanted, then, as many persons advocate, it would be well to separate them in the field, but practical men know better than to attempt this, or, at least, on any large scale, and they are contented to deal with them as a whole.

The general practice in fermentation varies from that of the small *conuquero*, whose object is to realise quickly and to get the utmost weight possible, to the elaborate plan of Mr. F. Strickland extending over fifteen days. The *conuquero* puts up his beans to drain and forthwith exposes them to the sun for, say, five or six hours, then heaped and packed up, they sweat afresh until the following day, when they get five or six hours more sun and so on. He turns out a fair looking bean sometimes, and pays especial attention to its red appearance, inasmuch as he knows that the light red will always bring another dollar per fanega in the local market; this is true, and is probably owing to the fact of its weighing lighter and being cleaner, due to the more careful rubbing and removal of the gummy coating. In America this red cocoa is especially approved, and quite regardless of the interior condition of the bean; this may be of a very dark brickdust colour varying, according to the quality, to purple or yellow. Another contrivance of the small grower is that of bagging the cocoa at end of day, whilst still hot from exposure to sun, and so to sweat it during the night; this little scheme was learned from the Venezuelans, and is often practiced in Port-of-Spain by cocoa dealers to improve unfermented cocoa.

Next we trace the system of the more pretentious planter who boasts of elaborate sweating and drying houses; their fermentation varies from five to eight days, the process, however, is carried on "without the least reference to the thermometer" in close chambers, and it is certain that in many cases they heat the cocoa up to a stage at which alcoholic fermentation could not go on, say 160°. What follows then is destruction of the diastase and other ferments, and a lower type of fermentation or eremacausis (as in manure) the cocoa becoming eventually fusty and sour. The planter working on such a scale should "break bulk," as the tobacco planters term it, when it reaches 140° or earlier.

Treat it as you may, however, fermentation at high temperatures cannot go on beyond eight days, for the reason that the fuel, *i.e.*, the Sugar, is all exhausted, if not the ferments, and although it may be possible to start it afresh by adding some invert and a little dried yeast, in the same way as tobacco curers often referment fusty tobacco, yet, most men will say "*cui bono.*" *At the best* it will contain a large proportion of unsatisfactory beans which on section will shew their inferiority, and, "nota bene," section is the test employed by all brokers now in examining samples of high class cocoa. At this stage of our inquiry it will be proper to consider the bearing of the state of the weather on fermentation as just described, a very important matter, where the cocoa has to be dried during persistent rains, and this very often happens when the crop comes in early. The small proprietor then is not so very unreasonable, according to his light, in making the fermenting and drying process go hand in hand as it were, for the partially fermented cocoa stands damp weather and absence of sun longer than that which has been thoroughly treated. Unsweated cocoa, moreover, gives the same results on analysis as any other, and although it is not aromatic, and fetches a smaller price, the poor man argues that it is better than a dead loss. A much better remedy for these troubles will, however, be found further on.

It would be a mere waste of time to dwell longer upon the unsatisfactory short and unscientific method in common use, so we will pass on to the plan introduced by Mr. Strickland and for which he deserves full credit. His system has been adopted with various modifications in both Grenada and Trinidad, but to understand its importance we must study the composition of the bean first, and see how it is affected by the fermenting process according to the different varieties.

Reviewing twelve separate analyses by such eminent authorities as Professor Parkes, Hassall, Playfair and others, one is surprised to see that their estimation of fat or cocoa butter should vary from 36 to 56 per cent. The late Professor McCarthy found from 18 to 28 per cent. (from uncured cocoa probably). Is this a slur upon chemical science, or does it not rather prove the wide diversity of our cocoas in respect to that particular constituent and, thereby, explain the different requirements with regard to fermentation? The average of these analyses is follows:—

Cocoa butter	...	50
Albumenoid substances	...	20
Starch	...	13
Salts	...	4

Theobromine	2
Other substances (including in one observer humic acid 7)	11
Total ...	100

This relative composition of the different varieties of cocoa is maintained whether in the green state, fermented, or roasted. Are we not then justified in deciding that no chemical changes are brought about in the bean by fermentation, or at any rate none that can be formulated?

The ingredient ulmine or humic acid is a curious discovery, and one would fancy straight away that it was derived from Sugar! But that cannot be, for the starch granules within the bean are not changed into Sugar. Mr. Prestoe thought that the sweating of cocoa was a malting process (vide Annual Report of Botanic Gardens for 1880, para. 337), and many planters still think that germination has something to do with it; if so, it can be but in the very earliest stage, inasmuch as the radicle is always *in situ*: it may influence the swelling out of the bean which always takes place in the sweating house, and that is about all. When the vinous fermentation sets in, germination is arrested. At this stage, if fermentation has been properly established, the cotyledons are found separated and the vinous liquor of the pulp, which passes through the membranous covering, occupies this space, as well as the lacunæ between the convolutions, the cocoa bean being distinguished as *foliaceous*. This it is which has so marked a physiological influence and affects its flavour, the bean being, as may be said, *cuite dans son jus*.

This phenomenon is described chemically as "osmosis," and may be shown in a very simple manner by placing the fermenting beans in a solution of fuchsine, which passes inside at once.

When the cocoa is eventually dried—in the sun or otherwise—the fluid, of course, disappears, but the *lacunæ* remain, and are the cause of the elastic feeling on pressure which some buyers hold by so much. *It is the sign of fermented cocoa.* If the following axioms are admitted, viz.:—

1. The different requirements of our cocoa with regard to fermentation are mainly regulated by the amount of fat they contain.

2. It is not possible to separate the varieties in the field for practical purposes,

we may proceed to consider Mr. Strickland's method. He has a series of vats or tanks (3) in a row, built of concrete. They are 11 feet wide, 5 feet deep, and about 22 feet long, (the row of three); they are covered by a galvanised iron roof, but the shed is not boarded up from the level of the tanks to the roof (about 5 feet), there is a vent, of course, below for the escape of liquor, and the cocoa is covered carefully on top with plantain leaves; there is no other cover.

The drainage from these tanks runs away to a little pond and stinks quite as bad as the lees from a sugar battery. One cannot help thinking this is a foolish waste of good material, for if the pleasant tasting vinous liquor cannot be used as a beverage, why not convert it into vinegar?

The cocoa remains in the first vat five days, and the temperature is not allowed, under any circumstances, to rise beyond 115° or 120° (by thermometer); this is regulated by the admission of cold air through bamboo tubes, with many openings (5 bamboos in each tank), with their ends protruding through holes in the concrete wall at each end of the tank; the ends of the tubes are plugged with clay when required to modify the current of cold air—a rough and ready plan, but quite effectual. In this tank the evolution of carbonic acid gas is very marked, and may be easily demonstrated by connecting the ends of the bamboos with a glass filled with lime water. There is also a delicious odour from the fermenting mass, as of apples or cider. The vinous fermentation in this vat induced by "saccharomyces cerviciæ" (?) is accompanied before removal probably by a commencing lactous fermentation, the ferment of which is "penicillium glaucum,"

$$C_6\ H_{12}\ O_6 = 2\ C_3\ H_6\ O_3$$

The cocoa is next turned over to vat No. 2, and about this time a marked acid reaction is shewn by the reddening of litmus paper. The lactous fermentation may then go on alone at a somewhat lower temperature, and after another five days the cocoa is turned into vat No. 3. Here, some very complex changes take place, such as the conversion of lactic into butyric acid,

$$2\ C_3\ H_6\ O_3 = C_4\ H_8\ O_2 + 2\ C\ O_2 + 2\ H_2$$

The pleasant cider-like smell of the vinous ether has vanished, and it is curious that it should be replaced by its isomer (Butyric Acid). The latter is familiar as the sour smelling substances met with in rancid butter. The presence of butyrates in this vat is very easily shewn. One must be careful that at this stage the temperature does not fall below 95°, and even then, some of the secondary fermentations must take place, (which some people think might be left out, for fear of spoiling the flavour of the bean) such as the mucous and putrefactive, with vibrio and the formation of nitrous and nitric acid, and at times the evolution of offensive gas, the beans becoming discoloured and covered with algæ. After five days in this vat the cocoa is removed to the drying house, where three days' exposure to the sun suffices to dry and finish its preparation. The cocoa has then decidedly not an inviting appearance, it is dark, somewhat shrivelled, not too elastic on pressure, and even sour smelling, but this sour smell is certainly not the *common sour smell* which is condemned in inferior cocoa. It is by section only that the advantage of this process can be seen, and then you will find a characteristic light cinnamon colour, an agreeable odour, and every bean *uniform*—not a purple or yellow bean, even amongst the flattest and most unpromising. This is what the manufacturers want, and it is the only way known at present to get over the difficulties of sweating the many varieties of our cocoas. It may, however, be suggested that the outward appearance of this cocoa is susceptible of improvement; and with this view washing might be tried, and the cocoa afterwards sprinkled with a solution of boric acid to prevent mildew. If treated with this or some similar *antiseptic* such as sulphurous acid (fuming sulphur) "as suggested by Mr. Prestoe," it might be dried in a current of air without any exposure to sun at all and would resist damp for many days, but if dried by artificial heat such as that of Mr. Ross of Grenada, (dry heat) or hot water apparatus, the risk would be still less. This plan would be applicable to all cocoas, of course, without respect to the period of fermentation, and in wet weather it would be found a very great advantage to remove the mass of *sour gummy substance*, although this may act as a preservative coating when the cocoa is sun-dried. The husk is certainly much more brittle in washed cocoa, and does not therefore protect the bean as it should; it weighs also considerably lighter, but this might be made up by *re-coating* the bean with a mixture of starch, gum tragacanth, and boric acid. This would be preservative, and improve the look of the cocoa very much; colour might be added if desired. If so, it should be *red earth* and not common colouring material, because earth coating is recognised as legitimate. Some might prefer the fresh cocoa pulp; if so, boric acid should still be an ingredient, and the proper way would be to sprinkle during the drying process, and not wash on in quantity. One favourable point in the removal of the fusty products of fermentation before drying would be the saving of infinite *labour* in treating and hand rubbing the cocoa as usually practised. The boric acid might be added in the proportion of 1 per cent.

"REM ACU TETIGISTI."

SECOND PRIZE ESSAY.

* * * * *

After picking, the pods are gathered into heaps, this heaping being a first step in the process, and one requiring special attention.

The time fermentation in the pod is allowed to take place varies according to the state of the weather, for

instance, during warm and sunny days from twelve to thirty-six hours, but during the rainy season or other showery days when the development of fermentation in the pod is slow, the duration may extend to as much as six or seven days; the exercise of some judgment is required here so as to give the operator a fair start to enable him ultimately to achieve success. The next is heaping, being easier to hand for the breaking process, the pod is taken in the left hand and split on both sides longitudinally and opened in a somewhat similar manner to the shell of an oyster; the gelatinous contents are then scooped out and thrown upon plantain or fig leaves, which must be closely spread upon the ground, previously, for the purpose of placing the pulpy mass thereon. In case of rain meanwhile, an impromptu covering of leaves forms an ample protection from wet, which, if not prevented as much as possible at this stage, will result in rotting within a very short period of time.

The principal method of transport of the green cocoa from the fields to the fermenting cells is in baskets (expressly manufactured for the purpose), carried upon the backs of donkeys. Before entering into further details of the processes of the fermentation of cocoa, I shall describe the manner in which a fermenting house should be built; an oblong square framework of any size as may be required and of about ten feet high, roofed over with galvanized tiles, the sides of which should be concreted up not higher than three feet, four inches, sectioned off into three equal compartments; a size of eight feet, six inches by four feet, six inches each cell will be found very handy for working purposes; about six holes each side of, say, three inches diameter should be pierced through each compartment, the lowest three being placed about six inches above the floor, while the upper ones should be placed about eighteen inches up and equally distant from the ends of the compartment (to secure uniformity of ventilation when required). Through and through the holes, should be fixed in bamboos, which have been previously bored around and about at three inches apart with §ths of an inch auger holes. The floor should be double, a lower one being made of concrete, four inches space left, and then an upper one made of creole wood pierced with auger holes forming three-inch squares throughout; both floors being dished in from the sides to the centre at an angle of about thirty degrees: holes being left through the partition and end walls in the bottom centre to allow the watery matter thrown off by the fermenting cocoa to escape. The tops of the fermenting cells should be provided with tight wooden covers hermetically fitted and the framework above left open.

To prevent acidity in the cocoa, which is often caused by the chill resulting from its contact with the cold sides of the concrete cells, I recommend that short lengths of board be fitted in on every side, the horizontal holes being cut through so as to allow the free passage of the perforated tubes beforementioned. Well, our fermenting (or sweating house, as it is sometimes called) being finished, we proceed to fix in our perforated tubes, which are then well plugged at each end with wooden or clay plugs, to prevent during fermentation an inrush of atmospheric air exceeding the regulated amount required; the lower escape holes are also closed and then cell No. 1 is filled up nearly to the top with green cocoa.

Covering over the mass with plantain or fig leaves aids slightly in hastening the process of fermentation, but this is not an absolute necessity if the wooden covers are well and closely fitted on and covered over with a tarpaulin held in its place by any loose pieces of wood at hand. At the end of four and twenty hours during warm weather and somewhat longer during wet weather, one of the upper and another of the lower ventilating tubes should be unplugged to prevent a sudden chill, another of the causes of sourness in cocoa; the unplugging should be done on the side away from the direction in which the wind happens to be blowing at the time, both to allow the escape of carbonic acid gas and also the introduction of a thermometer so as thereby to be enabled to regulate the mean temperature of the fermenting cocoa which should not exceed 110 degrees Fahrenheit. At the end of seventy-two hours all liquid is let off from one of the plug holes at bottom, the covers being unshifted, the operation of an interchange of cells takes place.

Two or more experienced hands armed with wooden scoop shovels get inside on top of the now steaming cocoa and partly by trampling and rubbing with hands, feet and shovels, the whole mass is rubbed together and disintegrated, shovelled up and over into cell No. 2, which had been previously prepared to receive it. No. 1 being properly cleaned and refilled with green cocoa, the same precautionary measures, now as before, being strictly adhered to, the fermentation continues; in cell No. 2 the temperature may be allowed to rise as high as 118 degrees Fahrenheit, but should not exceed this as otherwise an excess of heat may stew, or ultimately result in shrivelling up a large number of the beans; this can always be avoided by a uniformity of regulation in the mean temperature of the fermenting cells.

After the cocoa taken from cell No. 1 remains in cell No. 2 for another seventy-two hours, this cell is then opened and here the handling and management of the scoop is of prime importance, every portion, every grain of the cocoa must be turned over and over, while being also handled to sort, or separate such as may yet be sticking together during its transference over into cell No. 3, No. 2 is cleaned and well ventilated, where into the contents of No. 1 is transferred, and No. 1, after being also cleaned and aired, is filled up again with green cocoa and so on to the finishing of the picking on hand. After the expiration of a further ninety-six hours or about ten days in all (being sufficient to complete the process of fermentation), and also to render complete the metamorphosis of suppressed germination, the cocoa is now ready, the weather being favourable for transference to the curing house.

Permitting cocoa to remain so long as from fifteen to twenty days undergoing the process of fermentation, especially during the latter stage, is merely making a choice between fermenting a few days longer and drying a few days less and *vice versâ*.

The above variety of processes to be carried out as they are here laid down requires a nearly continuous succession of sunshiny days, for according to atmospheric changes from warm and dry, to moist or wet, so has also the fermentation of the various qualities of cocoa to be regulated; so that an extension of the fermentation process to nearly three weeks is justifiable only during the rainy season, or otherwise during a continuous succession of rainy days, but great care and experience are required to prevent the cocoa from being rendered sour, mildewed or irretrievably rotten.

The above processes of fermentation of cocoa, as followed out in the Island of Trinidad in some instances and adapted to the Criolo and all other qualities indigenous to our soils (with slight variation) to the thin-skinned red and yellow kinds, the duration of fermentation, when such is found necessary to be done apart from the thick-skinned red and yellow kinds also, should be shortened by at least six hours at each stage; but here again we have to depend much upon atmospheric conditions besides a mixed cocoa cultivation.

Cocoa prepared as above, when sectioned, will be found to have developed a rich cinnamon colour, the grains will be mealy, plump and fair to look upon, the smell pleasant, while not a vestige of mildew nor sourness will be present.

The advantage of washing cocoa in Trinidad is a matter of opinion; this question lies principally within the domain of the experimentalist; opinions are divided as to its local adoption; much general gain would result in case experiments in this line should prove commercially successful for the improvement of the quality of cocoa grown here; but to have a cocoa-house filled with washed and wet cocoa, and then to be hemmed in by a succession of rainy days extending over weeks together, the consequences following therefrom can better be imagined than described. Washing does not recommend itself either at any one

of the stages of fermentation, as the chill then caused may rather be productive of harm than good.

Colouring or painting over the bean with pigments should not be countenanced for one moment, as resorting to such measures is both retrogressive and deceptive; retrogressive because it prevents an expansion of experimental ideas to seek out the means whereby to develop natural first-class colours, and deceptive because when the subterfuge is most depended upon it will of necessity fail signally. The production of the first-rate article can and must be realized,—that which the frequenters of Shove's and others so well love to base quotations upon in the markets of England, Europe and America, there realizing paying prices and here returning a harvest of gold to the thoughtful and industrious, whereas on the other hand subterfuges are sure to be found out in the long run, and but bring in train disappointment to individuals and ultimate loss to entire communities.

In conclusion, having in the course of this essay touched upon all the principal circumstances connected with the fermentation of cocoa, a brief summary of the means whereby a first-class marketable article can be turned out will not be out of place. They are as follows:—

(1st.) Warm sun-shiny days.

(2nd.) Great attention to the cleanliness and proper airing of the cells. (Fermenting tanks.—ED.)

(3rd.) A proper and uniform regulation of the mean temperature of the cells during fermentation.

(4th.) The fermenting cocoa should never be allowed to remain in its lees.

(5th.) The handling, interchange of cells and sorting process being deftly done and the curing being gradually and regularly proceeded with during the first forty-eight hours, these taken in the aggregate may be accepted as the *summum bonum* of the fermentation of various qualities of cocoa and also the turning out of a first-class staple.

To produce aromatic and well-developed beans in the cocoa pod is the *ultima thule* earnestly aimed at by our really pushing and enterprising planters.

SOL.

THIRD PRIZE ESSAY.

When we ask ourselves the question, "How to ferment Cocoa," we set ourselves the task of resolving a problem that presents a multiplicity of side issues, each bearing directly on the main question, and each vital to it. It would be erroneous, indeed, to start with the cocoa already broken and boxed in the sweating compartments, for a uniform fermentation, and that it is we aim at, necessarily depends on the uniformity of the fermentable matters. The first step, therefore, must be a proper selection in the field, and a judicious classing of the cocoa we intend fermenting. The best criterion for this selection, the surest principle for this classification, is undoubtedly the degree of maturity of the cocoa. As cocoa ripens its saccharine parts increase proportionately to its maturity, and since, as we will further on demonstrate, this saccharine principle plays a most important part in the fermentation process, it is but logical to set up as a basis for our selection the amount of contained saccharine matter; in other words, the amount of maturity. And this selection is of vital importance; for the less mature cocoa, less rich also in saccharine, will ferment much slower than the riper beans, and if these two be "sweated," as the term goes, together, we will find the latter oversweated when the former has but just reached the proper point.

Having therefore properly classified our cocoa, according to its degree of maturity, our next step is to place it in sweating boxes where it can ferment. We now come to the question: "What kind of boxes will best ensure the result we are aiming at;" viz., a uniform fermentation.

The fermentation of cocoa is essentially alcoholic; the sugar of the pulp becoming converted into alcohol and carbonic acid; so that, as Lavoisier says: "If we could re-combine alcohol and carbonic acid gas, we would reconstruct Levulose," (fruit sugar.)

Now, basing our arguments on the firmly established dictum of Pasteur "that alcoholic fermentation is the function of the life of certain cellular vegetable organisms, Zymogenic Mycrophytes, which are *a priori* the leaven, and the production of alcohol is simply the result of the absorption, at the expense of the sugar, of the oxygen necessary for their vitality," we feel no hesitation in laying down this rule for the disposition of the sweating boxes. These boxes should be not more than fifteen inches high, and the cocoa in them should be uniformly laid. This maximum of height will obviate the mutual pressure of the beans, preventing the amount of atmospheric circulation required for conveying, to the mass, the organisms on which fermentation depends; and it would, besides, economize the labour now utilized in transfering the cocoa from one box to the other, to ensure the contact of the lowest beans with that air, which they would never receive in the sweating compartment of the depth in vogue.

A point, which will fitly find its place in the present paragraph, refers to cocoa which though mature has been weathered or rained on in the field. Part of its saccharine principle has been washed away, and being now, but a poor medium for the development of the microphytes, it is apt to "postpone" a great deal, often undergoes putrid changes, and becomes fit only for the manure heap. Under-matured cocoa, from a similar cause, a deficiency of levulose is also retarded. A great deal of cocoa was lost last November and December, especially among the smaller proprietors who ignore the remedy requisite to save the cocoa. And this remedy is so simple that I am indeed surprised it has not been more generally employed by cocoa planters. It is rational enough to suppose that if we can replace the deficient material, levulose, we will ensure a healthy and uninterrupted fermentation. The best substitute is sugar, and that of the commonest kind, that is to say, sugar containing the most glucose. Cocoa treated in this way and raised to the same composition as matured cocoa will ferment as readily, as quickly, and as thoroughly as the latter.

During the process of fermentation a great amount of heat is generated, and this acting on the bean both through the pores of the pellicule and through the opening at the top, known as the "Hile," vaporizes the aqueous elements and develops the fatty substance which absorbs and retains the essential aroma of the cocoa. Still the heat generated is not sufficient to vaporize all the aqueous portion of cocoa, and it is in our drying houses that the residual moisture is finally expelled. For this reason, thoroughly fermented cocoa, containing a minimum quantity of moisture, must be dried gradually so as not to blister the bean, especially if the remaining pulp or "bava" has been washed off as is done in Ceylon. On the other hand, cocoa indifferently fermented, or surrounded by an undue proportion of moist bava, is very liable to be attacked by fungi, and to mildew, if, as is often the case, heavy rains retard the drying process. The repeated hand and foot rubbing, practised to remove the mildew, often breaks the bean; and the fungi spread to the interior of the cocoa, which, if not rendered altogether unmarketable, is, at all events, much depreciated in value. No artificial means of drying cocoa has yet given satisfactory results; but in rainy weather the following process has been found to minimize the risks of mildew. It consists in heating pulverized red earth, and mixing it intimately with the cocoa. This pulverized earth acts both by absorbing the moisture from the cocoa and by vaporizing that moisture. By taking advantage of a sunny day the cocoa may be freed from its earthy coating by slight washing and immediate drying.

But before concluding, one point is deserving of notice in this matter of cocoa fermentation. It is the specific wants of the various markets. Nothing is better known to the cocoa planter, when his cocoa is sold abroad, than the fact that, however scientific the preparation of his cocoa, by fermentation, the special wants of a particular market, may require an imperfectly fermented cocoa with certain external characteristics rather than a perfectly fermented cocoa

But this feature is not gaining ground from the obvious superiority of the perfect over the imperfect cocoa. QUOD SCIAM.

ESSAY BY "TALISMAN."

* * * * * *

Various qualities of cocoa are grown promiscuously in cocoa plantations, therefore they have to be picked and fermented altogether. There is no remedy for this evil except where a new cocoa estate is to be formed, when the planter can choose the best quality of cocoa to plant, known as the Creole Cocoa and almost universally grown in Venezuela.

2. Fermentation process.—Begin picking cocoa, say on a Monday, and continue picking up to Friday, each day heaping up the cocoa pods so as to cause a certain amount of fermentation; on the Saturday cut open the cocoa pods and put the beans in large sweating boxes covered up well. On the following Saturday take the cocoa from the boxes and place it in the drying houses, clean and open it out, then immediately before the gum of the cocoa gets dry sprinkle on fine sifted red earth and hand-rub occasionally until the cocoa is dry, then it can be sacked ready for shipment, but care must be taken not to bag it before the cocoa is perfectly cool. This is the process adopted on the *San Antonio* estate which realizes the first market price.

3. Another process.—Ferment the cocoa as described in paragraph 2 for three days, then take it out of the boxes, stir thoroughly, and put it back covered up well, giving it further fermentation for three days; then take it from the boxes and open it out in the drying houses, rub it occasionally until dry, but do not sprinkle on any red earth as mentioned in paragraph 2. This second process is commonly carried out on all the large estates, and obtains the second best price in the London markets.

4. Another process.—Pick the cocoa and ferment it in boxes or simply cover it up in a large heap for four days and open it out for drying; hand-rub each morning, then sack it. This mode is practised by the small cocoa proprietors.

5. Another process.—Each day you pick; in the evening open the pods and take the beans to the sweating house, cover up well, adding each subsequent day's picking to the first. Do this for three days successively, every evening mixing up the cocoa and covering up well. On the morning of the fourth day put the cocoa in the drying-house; clean and rub. In the evening gather up the cocoa in a large heap, then cover it so as to exclude air. Continue this process alternately drying and fermenting for three days and nights—that is, three days' drying and three nights' sweating. On the morning of the fourth day take about forty pods of cocoa and open out in about three buckets of water, wash out all the juice and take that water and throw over the cocoa in the drying-house, slice up the pods and put them to soak in water. On the fifth morning after the cocoa has had another night's sweating, open out for drying, skim off the gum from the pods that were put to soak, take the gum, apply to the cocoa and rub well; but before the gum is dry sprinkle on sifted red earth or red ochre and hand-rub occasionally until the cocoa is dry. On the morning of the sixth day get some good quality of butter, wash out all the salt thoroughly and rub the cocoa with it. About three cents worth of butter is sufficient to each bag; the butter will give the cocoa an agreeable perfume without destroying the chocolate aroma, and will prevent mildew, one of the greatest enemies that cocoa planters and shippers have to contend against.

6. To generate fermentation in hard, green, unfermented cocoa, take about three to five bags according to the quantity in hand, wash and dry it; get about forty pods of cocoa and follow the process explained in paragraph five, but with this difference: put the cocoa in a sweating box, saturate with cocoa juice and cover up well to cause fermentation. The next morning repeat the process, mix up the cocoa and again cover to cause fermentation. In the morning of the fourth day put it out to dry and continue the process explained in paragraph five in regard to alternate drying and sweating, adding in this case a very small quantity of good molasses to the cocoa gum skimmed from the cocoa pods by process described in paragraph five.

7. Artificial Process by Steaming.—Take the beans of the cocoa fresh from the field with the pulp on and put them into large coppers, first taking care to line the interiors of the coppers with plaintain leaves in order that the cocoa should not touch the metal; throw in one or two buckets of juice from the pulp of the cocoa with a little water as described in paragraph five. To generate steam add a few bay leaves, if at hand, cover the cocoa to exclude air and put fire under the coppers, heating slowly and examining the cocoa now and then to see that the fire is not too hot and cracking the shells of the beans. At the expiration of from two to three hours it will be found that the cocoa beans have become round and full, with a good red colour externally. Withdraw the fire and cool down, then put into the drying-house, employing the alternate drying and fermenting process explained in paragraph 5. This artificial steaming and fermenting is certainly the most expeditious, taking a few hours only, instead of days, and it can be accomplished with a few cheap appliances, and the fire can be connected without much ingenuity to a drying apparatus if required in wet weather.

APPENDIX.

(*A.*) Properly fermented cocoa by the processes described in paragraphs 2, 3 and 5 has a sweet chocolate state, nice aroma and a pretty cinnamon colour when the bean is broken. It has more fatty matter than inferior cocoa.

(*B.*) If planters were to apply to our well-known and energetic Botanist, Mr. J. H. Hart, I am certain that they would get assistance from him by advice as to the best quality of cocoa to be planted, and in a few years the new plantations would yield the best quality of cocoa, and fermentation would become easier.

(*C.*) The mode of fermenting cocoa as described in paragraph 5 is from my experience the best way of curing cocoa, the alternate drying and sweating causing every bean to be of the same quality, the interior having a fine cinnamon colour with an aromatic smell, and the exterior an uniform red colour and is heavier than when fermented by the other processes.

(*D.*) As an example that the renovated cocoa may take a price equal to good fermented cocoa, I may mention that in the year 1881 I shipped fifteen bags of cocoa of the same estate brand for trial—five of the process described in paragraph 3 and five of that described in paragraph 4, and also five of the renovated cocoa described in paragraph 6, putting a private mark on each lot of five bags and writing to ask my agent in London to sell them separately. I was astonished to find that the renovated cocoa realized the highest price, viz: 80 shillings per cwt., the other two processes realizing one or two shillings less.

(*E.*) The application of butter to cocoa for the prevention of mildew as described in paragraph 5 may excite the risibility of some persons, but I have tested it well; and cocoa that has had butter judiciously rubbed on can be shipped without fear of mildew to any cold or damp climate. The milk of the cow must have some latent virtues antagonistic to the little germs or microbes which infest damp cocoa. This mildew is called grey cocoa in the London markets, and is rated at the lowest price.

(*F.*) One of the evils prevalent on cocoa plantations is the picking of unripe cocoa; the beans are hard, flat and green and cannot be properly fermented. If these beans are not carefully separated from the good, as is done on the *San Antonio* estate, there is a certainty of deterioration in the market value. The cheapest method is to separate the unripe fruits from the ripe in the field; heap and cover the unripe fruit whilst in the pod and break open after eight days; bag and sell to the chocolate manufacturers in the island. Cocoa planters are generally penny wise and pound foolish in engaging inexperienced men at low rates of wages to pick cocoa. These undisciplined hands not only pick a great quantity of unripe cocoa, but do a great deal of damage to the cocoa trees.

Ten experienced men will do as much work per diem (without doing the damage as described) as fifteen inexperienced labourers.

(*G.*) An evil that ought to be remodied by Government is the clause in the Cocoa Ordinance which prevents the cocoa dealers from buying less than ten pounds of cocoa. This prohibition induces the small holders of cocoa (when they have not got the sufficient legal quantity of cocoa of their own to sell) to raid on their neighbours' cocoa for the purpose of making up the required 10 lb.; and whilst engaged in these nocturnal excursions it is only natural to suppose that they should make a great addition to the 10 lb. at their neighbours' expense. This pilfered cocoa is generally sold green and unfermented to the shopkeepers or dealers in the country. The planters who heap up the pods in the fields as stated in paragraphs 2 and 3 suffer greatly from these thieves, but by taking in the cocoa every evening as mentioned in paragraph 5, the robbers have less chance of stealing; and this is another reason, and a paying one, that the mode prescribed in paragraph 5 is the best way to ferment cocoa.

(*H.*) A good sugar planter knows well that to make good sugar and to get a good return in the boiling-house, he must commence operations in the cane-piece from the first agricultural stage. So it ought to be with a good cocoa planter. The first care should be to cultivate the cocoa trees in a manner that would make them bear healthy fruit abundantly. The result of this would be a large return of cocoa yielding well and the process of fermentation made easy.

(*I.*) There are small stinging ants which build an earthly nest round stems of the young cocoa pods, and there are large black ants that nip the young pods; these depredators destroy at least three-fourths of the cocoa crops, and the pods all turn black on the trees. There are many of the pods injured by the ants which are unhealthy when they arrive at maturity, making fermentation difficult. A little white lime sprinkled round the roots of the trees will make these destructive little insects migrate to more congenial quarters.

(*J.*) It would be a boon to the Colony if His Excellency the Governor, who has hitherto been the great promoter of the major and minor industries, would unite with the Chamber of Commerce and endeavour to prevail upon the English Government to reduce the duty on chocolate from 2d. to 1d. per pound, thus equalizing it with the raw material. Capitalists would then be induced to invest in chocolate manufactories, and I may venture to say that unfermented cocoa would never be purchased by them which in a great measure would compel the small planters to ferment their cocoa properly. The Botanist, Mr. Cruger, and many others who followed after him in trying to establish chocolate factories in Trinidad failed, as the extra duty on chocolate imposed on arrival in England did not allow them to compete with the Home factories, and our chocolate industry consequently has had to succumb to the adulterated chocolate made in England, some of which is actually imported here where the cocoa trees flourish and where the manufacturing of chocolate ought to be one of the major industries.

TALISMAN.

[The prize essays are published by direction of His Excellency the President of the Central Agricutural Board. The essay of "Talisman" is added because in our opinion it is of interest, as illustrating the "old and time-honoured" system of procedure.

They cannot be taken as they now stand for the purpose of comparison "as prize essays," because in the case of the second essay certain portions have been excised as not bearing directly on the subject of fermentation, and being unsuitable for publication in this journal.

In the second essay the statement "that fermentation begins in the pod" is in our opinion erroneous (the same thing is stated by "Talisman"); possibly the author meant to say *a certain degree of softening*, or losing of tissue rather than fermentation (?) We all know that the juice of the grape does not ferment unless the skin is pricked, and in the same way with the contents of a cocoa pod, it must be *broken* before atmospheric air can gain access to it and fermentation take place.

Mr. Hart, as judge of the competitive essays at the San Fernando Exhibition, has promised a Notice in the next issue, and he will probably touch on some interesting points in the unsuccessful essays at the same time.—EDITOR.]

THE COCOA PRIZE ESSAYS.

At the meeting of the Trinidad Central Agricultural Board,

Mr. Hart announced that the essays on the fermentation of cocoa had been opened, and that the first prize was awarded to Dr. J. F. Chittenden—(His Excellency): I guessed you would have got it—(applause)—The second prize had been awarded to Joseph Augustus Crichlow, of Arima. The third prize had been awarded to Mr. Eugène Lange (senior). His Excellency had been kind enough to add second and third prizes to the prize of $25 originally offered. There were nine essays received, and one was disqualified by coming in too late. With the consent of the authors the successful essays would be published in the *Agricultural Record*.

Mr. Adrien de Verteuil gave notice of the following motion: "That, with the object of meeting the difficulties which too often arise from continuous rainy weather, it is advisable to adopt some process for drying cocoa by hot air, or any other artificial means, and to appoint a Committee who will inquire and report on the best method to be recommended."

DRYING COCOA BY HOT AIR.

Waltham, St. Mark's, Grenada,

March, 1890.

DEAR SIR,—In reply to your letter asking me for some information of the working of my cocoa-drying house, I have pleasure in enclosing a rough plan, by which you will see that the idea is most simple, but it answers its purpose splendidly. The pipes are of iron, and are one foot in diameter and half an inch in thickness. The drawers, or trays, are 7 feet by 2½ feet, the bottoms of which are of thick wire netting. The oven, which is placed outside the house with a shed over it to keep off the rain and to store fuel, should I think be built of bricks.

In my house I can thoroughly dry cocoa straight from the sweater in 48 hours.

Col. Duncan had an American fruit-dryer, but it was found useless for drying cocoa.

I may mention that I was the first in this Island who dried cocoa by hot air, and now many of the planters here are erecting similar houses.

I hope you will be able to understand the plan of the house. I am *not* good at draughting.

Yours, &c.,

CHARLES H. A. ROSS.

To Dr. Chittenden,
Secretary, Central Agricultural Board.

[The plan Mr. Ross has been kind enough to send is hardly suitable for the purpose of a lithograph, but it can be seen by any interested in the subject, on application.—EDITOR.]

THE GREEN ONYX which is being quarried in the west of Grant County, New Mexico, is found in a fissure vein about 50 feet wide and over a mile in length. The stone is becoming fashionable in the United States for interior decoration. It shows a variety of colours—green, white, pink, and salmon—is both stripped and mottled, and susceptible of a high polish, while it is the only kind of onyx which can be carved like marble. Blocks of it have been offered by the proprietor of the mines for use in the construction of the exhibition buildings of the World's Fair.—*Globe*.

THE NEW WATCH COMPASS.

(Communicated.)

A paragraph is going the round of the home papers to the effect that the watch in anyone's pocket may serve to indicate the points of the compass, at any hour of the day. It was pointed out by a Yankee, that you have only to direct the hour-hand of a going watch to the sun, and midway between such hour and XII will be due *south*. For instance, the hour-hand at IV o'clock directed to the sun, II will mark south. This is new to me, and seems to be taking the world by surprise—even Stanley, the explorer and American, never having heard of it.

Pending the arrival of an "authoritative" explanation, I submit the following:—The earth's surface presents everywhere, to us diminutive crawlers upon it, an "offing," as at sea—that is, a perfectly circular patch of a few miles in diameter. This patch of surface, however, is the same, for all celestial phenomena, as if it were the plain parallel to it of the full diameter through the earth's centre. Neglecting this fact, and the variation in the sun's north and south declination, we arrive at the approximate rule that 'the sun rises in the East and sets in the West,' occupying at the equinoxes twelve hours, from VI to VI, in doing so. But whether the days are short or long, the sun is *always* due *south* at XII o'clock. This is true for all countries north of the Mediterranean, but not always the case in Ceylon, where in June, at XII noon, the sun is due *north*; but this *en passant*.

Now if you will imagine this "offing,"—which as the same on land as at sea (only the hills, houses and trees prevent our noticing it),—to be divided round its southern semi-circumference (*i.e.*, the southern horizon from E. to W.) into 12 equal parts, (as a watch whose face is marked for 24 hours is divided) the reason of the rule becomes sufficient obvious,—bearing in mind that the watch in your hand *however much you move it, or walk about with it, is practically, and actually as on a pivot, in the very centre of your "offing."* At VI the hour-hand points to the rising sun, XII is due west, and IX must necessarily be due south. As the sun advances in his course, the hour-hand—of a watch marked for 24 hours—would follow him, hour by hour (XII. always being south); but as the corresponding semi-circumferance of the ordinary watch is divided into 6 hours only, one hour of the watch covers two hours of the sun. *Hence the result* that, by keeping the hour-hand to the sun, the "XI" of an ordinary watch moves east at precisely the same rate as the hour hand moves west, till they meet at noon, both there indicating due *astronomical* south. They then pass on, receding from each other as they had advanced, midway between them *necessarily being* at any instant of time due south.—Q. E. D.

The true compass indicates the magnetic north, while the watch can only indicate the cardinal points astronomically and approximately. Bearing this in mind, it is a pretty use to which to put our watches, and may not unfrequently be found useful.

ASTRO.

COFFEE PEST.

In the correspondence on the above subject, which we publish in another column, it is rather amusing to find Miss Ormerod referring Mr. Thomas Dickson to such well-known local authorities on coffee pests as Nietner, Morris and Green. Miss Ormerod, although one of the greatest living authorities on insect pests, admits that fungi are out of her line. Had Mr. Dickson consulted Mr. D. Morris, that gentleman would have affirmed, and with truth, that he *had* discovered a remedy for *Hemeileia vastatrix* in sulphurous acid, the product of a mixture of lime and sulphur, applied to the coffee bushes, in dewy or drizzly weather. This acid proved fatal to all the fungi it reached; and not only bushes but whole estates were cleared of the pest. But all in vain while millions of spores existed all around and were ready to enter the stomata and suck the life-blood of every fresh coat of foliage put on by the unhappy trees. It was found that unless the whole of the coffee in Ceylon could be simultaneously relieved by the entire destruction of every spore of the deadly fungus, there was no use in fighting a losing battle. The general principle, too, that the best way of fighting a plant pest is to strengthen the plant by means of manure, failed in this case, because it was found that manuring merely provided food, in the shape of rootlets, for white grubs underground, as well as for the fungus aboveground in the shape of fresh leaves. Finally, as if to lead the unhappy coffee planter to take up the patriarch's cry, "All these things are against me," green bug made its appearance, attacking the juices of the coffee bush with a virulence far exceeding that of the old pest, the brown or black bug. Phenyle, which Miss Omerod recommends, is not a new remedy in Ceylon, although we do not recollect hearing of it as an application to the roots of the bushes. Those who have coffee still yielding any crop might try this radical application. There is true philosophy in Miss Ormerod's recommendation that any mixture applied for the destruction of green bug should be of a viscid nature so as to adhere until not only the parent scale insects were killed, but the thousands of their progeny hidden beneath them were smothered. All kinds of spraying applications have been tried in the United States, including fine sand. The danger in all such cases, as Miss Ormerod points out, is, that what destroys the pest may fatally injure the plant by entirely destroying its foliage and harming the bark. Those interested ought certainly to purchase and study the new edition of Miss Ormerod's valuable book. They will there find directions for preparing and applying the mixtures most likely to prove effectual in ridding coffee bushes and fruit trees of insect pests. We are rather surprised that Mr. Dickson's correspondent did not say anything of insects which are the natural enemies of scale bugs and prey upon them. We observe from our exchanges that such insects are being introduced and largely bred in California, and it is stated with good effect in ridding orange, peach and other trees of scale insects. It is possible, though hardly probable, that the coffee fungus may, with effluxion of time, disappear from Ceylon, and coffee be again amongst our staple and profitable cultures. Let us cherish the hope, while we cultivate our new staple, tea.

MAKING FARMING PROFITABLE.—Now, in order that farming may be profitable, we must make the consumption of a cheap food produce a thing that will sell for a high price. Wheat, barely, oats, are costly food; on the contrary, barn, clover-hay, linseed, and cottonseed, are cheap foods. It pays, therefore, to sell grain and buy these cheap foods. Manufacture only answers on the condition of buying raw materials cheap, which we subsequently convert into articles of high value. Farmers, like manufacturers, must buy cheap and sell dear. Part of the food the beast eats is converted into heat. The animal heat must be kept up at any cost in every part of the body, else it will lose weight. The system must be maintained at 98 deg. Fahr. The production of milk is in a great measure determined by the quality of the food. The best food, in my opinion, is clover-hay and mixed grasses, clover is good; you cannot sow too much of it. Bran is another good food. Bran contains phosphates and other elements entering into the formation of the bones and muscles. Cottonseed, in the form of cake or meal, is a good food for milk making. It contains an excess of albuminoids, and is one of the best things to mix with straw, hay, ensilage, &c.—*Facts and Conjectures.*

COORG AND ITS COFFEE.

(*From a Correspondent.*)

The Commissioner of Coorg, in a recent Statement of the past season's crop of plantation coffee, showed that 1,746 tons were exported from the district, via the West Coast, against 1,098 tons—and 700 tons Eastward, against 596 tons—in 1888-89, making a total of 2,446 tons against 1,684 tons in 1888-89. The returns are prepared from data furnished by the various curing firms through whose hands the produce passes. The Commissioner also gives the quantities passing through the toll gates where accounts are kept. The figures for the past season are 3,353 tons against 2,760 tons in 1888-89. These quantities are understood to represent all the coffee that leaves the province, native grown as well as plantation; but in connection with them the Commissioner remarks that "no dependence can be placed upon the toll gate returns as showing accurately all the coffee which passes out of the province," making allowance for quantities exported through channels not included in Colonel Clarke's returns the following will probably be found a close approximation to the actual exports for the past season:—

Plantation Coffee	...	tons	2,700
Native Coffee	...	„	1,500
Total Crop of the season	...	tons	4,200

A forecast of the crop in the early part of the season had been made by the Commissioner from figures supplied by the principal owners of estates. The estimate was 6,715 tons, so the shortfall is quite 2,500 tons. The forecast was framed no doubt on the belief that the crop would be a good one, judging from what the blossom promised; and a good crop was due, for the previous season's had been miserably small. Some time before it ripened, however, the planters had made up their minds for figures much below estimates, and in most cases disappointment increased with the gathering of the crop. It is seldom too such small yields have followed each other; not only so, but it is feared the one about to be picked will be little better than the last, making three small crops in succession, a thing almost unknown in the annals of Coorg coffee planting. The same remarks, however, apply to the neighbouring districts of Mysore. The question now is, is this simply the result of unfavourable seasons, or does it indicate a more serious condition of affairs, actual deterioration and impaired fertility in the plant? There are pessimists who take the latter view, and who point to the poor returns which young estates give, even in good seasons, in these days compared with what the same sort of places gave in former times. They point to properties on the ghauts which, in spite of all that was done for them, went steadily, rapidly, and irretrievably to the bad. Open new land in the ghaut and you cannot make it yield as the old land did. Travancore, North and South Wynaad, they say, have had a shorter life, only because shade in Coorg and the Mysore districts have helped to baffle for a while that fell destroyer, leaf disease. But every plant and sapling has felt its fatal touch. Its germs have entered the sap, and the deep green and glossy leaf, with sturdy stem and lithe branch, must ere long wither and die under the baneful blight. This is certainly a gloomy picture, begotten perhaps of a despondent and morbid state of mind. Still it is so sufficiently true to nature that it would be foolish not to keep it in view, although the more hopeful need not allow themselves to be too seriously impressed by it. It cannot, of course, be gainsaid that he is surrounded by evidences of the extensive and destructive effects of leaf disease, for it has caused all but the total extinction of coffee in Ceylon, while in Java, which showed a yield second only to Brazil some years ago, things are little better. Travancore and Wynaad have gone the same way. Those who take a hopeful view point to the healthful appearance of estates that are properly cultivated and attribute the short yields of late years solely to unpropitious seasons. As to shortage of yield on young estates they say that the land, where such is the case, is only second class, all the best land having been taken up years ago. To what extent shade will neutralise the effect of leaf disease time alone will show whether it will save it entirely, or only delay the fatal period. A year or two will probably show whether the pessimist or optimist is right, and the next crop or two will doubtless be watched with nervous anxiety. There is, of course, in Coorg a good deal of coffee which may now be considered old, having been planted 25 to 30 years ago—at these ages it is considered that the plant has passed its prime and its yielding powers begin to fail; and there is no doubt this is only too evident on several estates.

The failure of the old Munzerabad plant or "chick" was fraught with useful lessons. It was understood to have originated from seed brought by the Arabs from Arabia and planted in the Bababoodin Hills. It had always been grown under the original forest shade and it produced a berry second only in quality to Mocha itself. But 15 or 20 years ago a general failing of its fertile powers became apparent. Crop in any quantity was only obtained once in two years, and it was difficult to get seedlings when planted as supplies to come on at all. It became worse and worse, but meantime some planter—was it Mr. Jupp of Igoor?—happened to bring some Coorg seed from Mercara, where he had been on a visit. He tried it on land he had several times planted up with local supplies unsuccessfully. The result was most satisfactory. It was found that the Coorg sprang up and flourished as if on fresh virgin soil, producing a plant much more vigorous and fertile than the old Munzerabad. Some time, however, elapsed before its superiority became generally known, and longer before the fact was generally admitted. But it was only a matter of time. At length nothing was planted but "Coorgs." The old plant seemed quite used up, its bearing power becoming less and less though this might appear all the greater by contrast with the heavy yield of the Coorg tree. It had not suffered much if at all from leaf disease, being always well protected by shade, and it would hardly be said that the soil on which it drew was exhausted. The heavy deposits of leaf from the original forest trees, with which they were shaded, along with the moderate amount of manuring which was generally done, maintained the integrity of the soil. On the same soil at least the new plant grew spendidly. This seems to point to the advantage of the timely introduction of a new variety of plant, and the Coorg planters would do well to return their attention to the subject. Seed from Arabia, or better still perhaps from the indigenous coffee found growing in our new African possessions on the shores of the Victoria Nyanza and other parts, might be obtained. The Government would no doubt willingly help the planter in procuring it. Planters in Wynaad are going in for Liberian, but I think most men would probably prefer the Arabian species. It is to be hoped that everything will be done to avert such ruin as has overtaken the coffee enterprise in Ceylon and elsewhere, for although the fears of those who think the Coorg plantations likely to meet the same fate may not be realised, the planter should do all he can to provide against such a serious contingency. The Government, too, should be alive to the importance of the matter.—*Madras Mail*, Oct. 28th.

SNAKES of the Boidæ family are sometimes found very tightly coiled within the clusters of bananas imported into the United States from the West Indies and tropical America. Not long ago a specimen, which proved to be the *Epicrates angulifer* of Cuba, was captured in Savannah, and is now in the United States National Museum. Another was taken in the same way at Chicago, and found to be the boa imperator of Central America. They are generally young ones, as the adults could not be so easily concealed there.—*Globe.*

Correspondence.

To the Editor.

THE CEYLON TEA INDUSTRY FROM THE POINT OF VIEW OF AN EXPERIENCED LONDON BROKER.

12, Great Tower Street, London, E C., Sept. 26th, 1890.

SIR,—May I trespass again on a space in your paper respecting the tea industry of Ceylon. It appears to me that the fears of the planters have again been disturbed by what appears to me an unnecessary alarm, chiefly caused by the great rise in exchange. The enhanced rate of exchange is certainly an important item in the increased cost of the tea in the selling market, and to compensate for this, the planter or shipper requires an equivalent increase in price. But I would ask the question whether this does not also affect the price of tea from India and China; therefore, on that point Ceylon is no worse off than the other two places of production. Indeed a rise in the exchange is more detrimental to the low-priced China teas than to the better grades which India and Ceylon produce, and therefore it is not likely that China will materially increase its supplies to this country.

Again, in looking at the effect which the increased cost will have upon consumption, it must be borne in mind that the reduction in the duty here, will up to the present time fully meet the difference of exchange, so that practically the consumer is now paying no more than he did before the duty was reduced, and it is a very doubtful question whether the reduction alone of 2d per lb would have led to any marked increased consumption. Further it must not be forgotten that there has of late been a great increase of wages in this country, and increased wages mean increased spending power in the hands of the masses, who exercise that power to a considerable extent, and purchase the better descriptions of consumable articles, than when wages are low: and this is the case notably in sugar and tea.

As Ceylon tea continues to gain favour throughout the country, the consumption under these circumstances necessarily increases; therefore I fail to see how Ceylon tea especially can in any way be injuriously affected. On the contrary, there is now more hopefulness for a full maintenance of present values which already show an improvement, nearly, if not quite, equivalent to the difference in exchange: and any temporary depression in the market can scarcely be considered as sufficient ground for despondency.

The following figures will show the deliveries of tea in London for eight months, by which it will be seen that the percentage in the increase this year of Ceylon tea over the deliveries of last year is more than double of the percentage in the increase of Indian tea for the corresponding periods.

Deliveries of Tea in London for each month from January to August in 1890 and 1889:—

	CHINA.		INDIAN.	
	1890. lb.	1889. lb.	1890. lb.	1889. lb.
January	7,136,443	8,837,000	8,831,223	8,932,000
February	6,898,311	7,399,000	8,187,293	8,007,000
March	6,519,764	7,939,000	7,141,953	8,143,000
*April	4,681,753	7,565,000	5,155,941	7,721,000
*May	11,494,064	7,901,000	14,492,028	8,741,000
June	6,047,080	5,871,000	8,630,442	7,256,000
July	7,811,703	7,338,000	7,291,521	7,379,000
August	7,311,749	5,931,000	6,861,027	6,030,387
	57,900,897	58,781,000	66,591,131	62,209,387

Decrease in 1890 of 880,103 lb. Increase in 1890 of 4,382,044 lb.

	CEYLON. 1890.		1889.
January	2,215,670	...	1,945,932
February	2,126,498	...	1,915,114
March	2,681,078	...	2,137,832
*April	1,334,678	...	2,105,016
*May	5,019,890	...	2,893,198
June	3,613,768	...	2,667,890
July	3,932,286	...	3,677,728
August	3,793,038	...	3,200,918
	24,116,906	...	20,543,628

Increase in 1890 of 3,573,278 lb.

—Yours obediently, J. HENRY ROBERTS,
(S. Rucker & Co.)

GREEN TEAS IN TRAVANCORE.

October 9th.

DEAR SIR,—As you kindly inserted a letter a few months ago from Travancore regarding Mr. Robt. S. Imray's first experiment and samples in green tea when so favourably reported on by Mr. F. F. Street, it may interest your readers to know what further advances he has made in the manufacture of it. The enclosed is an article which appeared in the Madras *Times* of the 6th. I may mention that Mr. Imray's *first* break of green tea fetched a very fair price in the London market so that there is every reason to expect that his *second* break from which the present sample I believe was taken and sent to Mr. F. F. Street, will fetch a much higher price still, judging from Mr. F. F. Street's report and valuation of it.—Yours faithfully, TRAVANCORE.

INDIAN TEA EXPORTS.

Indian Tea Association, Calcutta, Oct. 11th.

DEAR SIRS,—The General Committee have the pleasure to hand you their usual Monthly Return of shipments of tea from Calcutta, and also a Return of Exports of Ceylon Tea for four years up to the 18th September 1890.

EXPORTS OF INDIAN TEA FROM CALCUTTA.

	1890 lb.	1889 lb.	1888 lb.
Exports to Great Britain in Sept.	14,263,059	16,253,978	12,188,328
Exports to Great Britain from 1st May to 30th Sept.	40,415,251	40,761,934	40,025,482
Exports to Australia and New Zealand in Sept. ...	712,200	806,863	495,061
Exports to Australia and New Zealand from 1st May to 30th Sept. ...	2,293,446	1,807,392	1,341,564
Exports to America in Sept.	25,837	23,516	19,990
Exports to America from 1st May to 30th Sept. ...	62,072	90,847	63,119
Exports to other places in Sept.	195,095	154,311	158,867
Exports to other places from 1st May to 30th Sept.	526,277	1,061,604	464,217
Total Exports from 1st May to 30th Sept. ...	43,297,016	43,721,777	41,897,382

—Yours faithfully, S. E. J. CLARKE, Secretary.

A COLLECTION OF SEEDS OF INDIAN AQUATIC PLANTS, such as the Sinhara nuts and others, are to be sent from India to New South Wales for experimental cultivation there under the local Agricultural Department.—*Pioneer*, Nov. 6th.

MR. ROBERTS ON FACTORY-BULKED TEAS AND ON SILVER AND EXCHANGE.

October 17th.

SIR,—In reply to "Inquirer's" letter which appears in the *Overland Observer* of 20th Sept. last, page 976, about "factory-bulked" teas and exchange, I hope the following explanations will supply the information required.

If packages of tea are marked "factory-bulked," and on examination after arrival here the teas in those packages are found to "run evenly," and provided also the tares of the packsges are of uniform weight—they are passed as "factory-bulked" and sold accordingly; but if found otherwise, although marked "factory-bulked," they are re-bulked here.

In the case of packages *not* being marked "factory-bulked," the teas are bulked here as it is presumed they have not been bulked at the "factory."

If parcels marked "factory-bulked" could always be relied on as being of even quality and even tares, the trade generally prefer these, so as to avoid the necessity of turning out for bulking in the warehouses here which is done to ensure uniformity.

With regard to the other enquiry as to the relation between the prices of Bar Silver and Exchange, it invariably follows that as the price of Bar Silver fluctuates, so the rate of Exchange rises or falls in the same ratio, though there is no fixed standard of an *exact* proportionate difference, as other circumstanees occasionally intervene to cause variations. Bar Silver in the early part of July last was at about 48d to 49d per ounee and Exchange was then about 1s 6½d; when the price of Bar Silver in the heginning of Sept. rose to 54½d, Exchange rose to 1s 8¾d; and recently again, with Bar Silver at 50d, Exchange is 1s 6¾d;—the percentage of rise and fall being in hoth instances about equivalent, and which, for all practical purposes, may he taken as a safe basis for calculation.

—Yours faithfully, J. HENRY ROBERTS.

S. Rucker & Co., 12, Great Tower Street,
London, E. C.

COFFEE PESTS.

London, October 17th.

DEAR SIR,—To leave no stone unturned to try and find out some remedy or palliative for green hug and fungus on what remains of our once fine coffee fields in the Uva district, I applied to the foremost authority in England on insect and other pests which devastate our fruit trees, viz., Miss Ormerod. In oase it interests you I enelose her correspondence, hut I had to wind up by stating that in my 43 years' experience of Ceylon I had made the acquaintance of all the Ceylon authorities she quotes, viz., Mr. Nietner, Mr, Green, and lastly Mr. Morris to whom she refers me, and that in the case of the latter he had, like Balaam of old, been called to curse and lo! he found himself powerless before *Hemilea vastatrix* and had to go home even like the son of Beor.

I am now sending to Ceylon a keg of sulphste of copper such as has been found so useful in the vine disease and we will try it on a few rows of eoffee after I have acquired the knowledge as to application, and this I hope to receive in a day or two.—I am, yours faithfully,

THOMAS DICKSON.

St. Albans, Sept. 26th, 1890.

Thomas Dickson, Esq.

DEAR SIR,—I am always glad to be of use so far as the intensely heavy amount of work sent to hand permits, and though I am uot acquaintod by *personal* observation with the coffee attacks I will try to offer some suggestions.

You mention "An insect called 'Green Bug' (Aphis) forms its scales in our coffeo tree branches," &c., &c.

From the mention of "scales," I conjecture the pest to be *the* "Green Bug Scale" insect—the *Lecanium viride* scientifically—on which it so happens that I have a very careful and as far as I can judge good practical paper.

But first with regard to your enquiries. I have *never* used sulphate of copper as an insecticide; therefore am unable to offer any advice on the subject. As I rarely work on extra-British attacks, perhaps you are very much better informed than myself as to what answers—but as in the case of this insect it is presumably expected to kill by contact,—aud if your attack is a scale, so very much of the infestatiou would, for a while, be sheltered under the parent insect that I should not *expect* it to be of much use; and so far as I know I should expect it would be likely to do a deal of harm to foliage.

The very best reply that I could give to your enquiries would be to lend you my pamphlet, and I would do so with pleasure if you would distinctly *promise* me to return it within a fortnight. I am so greatly inconvenienced and injured by books not being returned that I now hesitate to lend any.

But in this pamphlet is reference to Phenyle being used as a watering at the root, and I have myself found such excellent effects brought about by the application of this in the form sold as "Soluble Phenyle" that I think it might be well worth trial.

But with regard to washes, I should think that soft soap and kerosine (or mineral oil) washes would be far more likely to do good than su phate of copper.

You want something *tenaeious* which will stick to all the little "buglets" before they have settled down into full development with the sheltering scale, and also something which will so coat the mothers scale that the eggs beneath her, or youug hatching larvæ (popularly "buglets") may be killed before they escape.

What is known in South Australia as Burford's "Soap and Su'phur Compouud" is easily mix.d and I should conjecture would be serviceable.

You have to remember in dealing with attacks of insects of the kiud you name, *i.e.* bug or scale (or Aphis) that it is probably of *no* use to attempt to *poison* them. They feed by inserting their suckers into the tissues whence they draw their supplies; therefore however, poisonous the wash it is more likely than not that unless it is so caustic that it kills by contact, (and also damages the vegetable tissues) it will do no harm to the insects.

What you need is a *sticky* wash such, for instance, in general uature as is used for hop wash in England. This settles *on* the insects and chokes up their breathing pores, or in the case of the eggs, prevents them hatching. With regard to formation of these washes (or "emulsions") you would find endless good recipes in the publications of the U. S. A. Government.

If you care to study recipes taken by myself from almost world-wide (authorized) sources you would find many very good working ones in my own Manual just published, of which I enclose a circular. Under the head "Soft Soap Washes in India" you will find reference to mixtures found serviceable for scale, aphis, &c., &c.

I do not like to suggest purchase of a book of my own; but I cannot give you the recipes at full length in a letter and I know no other work where you would find at any moderate price similar details.

Trusting that this may be of some service, I am, yours truly, ELEANOR A. ORMEROD.

St. Albans, Oct. 7th.

Dear Sir,—Enclosed is the paper on the "Green Scale-Bug," in which I hope you may find something useful.

I know that in the case of the attack known as "rust" in carrot I have found much good result from the use of a preparation sold by Messrs. Morris & Little, Doncaster, called "Soluble Phenyle." This is to

some slight degree absorbed into the plant as shown by analysis, and also the preparation contains stimulants to growth (what I do not know), so that the mixture acts well in more ways than one. It is a fertilizer and an insect deterrent, so far as carrots are concerned, but I do not know whether it would answer on the large scale of coffee growing.

Do you know "The Coffee Tree and its Enemies" by the late J. Nietner, Ceylon, 1880? There is a deal of information in it both on *Hemileia* and Coffee insects?

When you return me the enclosed I would lend this to you if you like, but I believe it has long been out of print; so I should have to ask you to be sure to return it to me.

Hemileia being a fungus is not in my line of work—my Department at the Royal Agricultural Society is British Agricultural Insect Pests—but I am only thankful if I can be of service, and I should think that if you were to write to Dr. D. Morris, Sub-Director, Royal Botanic Gardens, Kew, Surrey, that he would be able to give you the names of the most approved publications on the subject.

If you were able to run down to Kew yourself this would probably greatly facilitate. You could consult the chiefs at the Herbarium and see publications.

It is not in the regular work of Mr. Jackson, the Curator of the Museums, but he is a very old and valued friend of mine, and if you could see him I am sure (in case that is if you wish for an introduction) that if you mention my name he will do all he can to put you on the right path to obtain information. His address is, J. R. Jackson, Esq., Royal Botanic Gardens, Kew, Surrey. And he would tell you when he was likely to be at the Lake Museum where his offices are more especially.

As you say it seems hopeless to wash at the rate of 1,200 trees per acre, but yet we are obliged even in England to wash and grease band on a great scale. At Toddington we have 120,000 trees thus to attend to.

Did I enclose a circular of my new Manual? I think that most kinds of available wash must surely be named.—Yours truly, ELEANOR A. ORMEROD.

THE NEW WEIGHING AND TARING REGULATIONS.

October 17th.

DEAR SIR,—Can you explain the new weighing and taring regulations for tea at the London Customs?

I do not understand what is wanted to insure the minimum loss of weight: it appears more important to have the tare correct than the net weight, but perhaps some correspondent of yours will be able to give us an example.

Suppoeing a break of 40 chests tared from 23 lb. 8 oz to 23 lb. 14 oz. for the whole 40 chests and it was desired to pack 90 lb. net with minimum loss in weight, how would one set about packing it and the next break say also 40 chests taring from 24 lb., to 24 lb. 7 oz, also to contain 90 lb. net?

What I wish to arrive at is the necessity or otherwise of taring within half-a-pound. Under the old system if your packages tared say 23 lb. 14 oz. it was called 24 lb., and to get in 90 lb. certain one would add 90 lb. 2 oz., making 114 lb. 2 oz. gross = 114 lb. If one's package on the other hand tared 23 lb. 2 oz. it was called also 24 lb., and to make the total 114 lb., one had to add 16 oz. tea; it was obviously important to have one's tare as nearly under a full number of lb. as feasible when the loss in weight (*i.e.* extra tea put in chest) was reduced to a minimum.—Yours faithfully, dear sir, INQUIRER.

EXAMPLE.

Pekoe.	(Gross 114 lb. 2 oz. = 114 lb.) lb. oz.	lb. oz.
5 cheete tare say	.. 23 8	(90 10)
6 „ „	... 23 10	(90 8)
14 „ „	... 23 13	(90 5)
15 „ „	... 23 14	(90 4)
4 chests		

Pekoe Souchong.	(Gross 115 lb. 2 oz = 115 lb. lb. oz.	lb. oz.
14 cheets tare say	... 24 2	(90 16)
10 „ „	... 24 3	(90 15)
5 „ „	... 24 6	(90 12)
11 „ „	... 24 7	(90 11)
40 cheets.		

With regard to above tares it is desired to pack so as to get credit for 90 lb. net tea.

The figures in brackets represent the tea which would have had to be packed under old system.

[We trust some public-spirited Broker or Tea Buyer will give planters the benefit of their opinion on the above.—ED. *T.A.*]

CEYLON TEA IN RUSSIA.

Kandy, Oct. 22nd.

SIR,—This is certainly most gratifying intelligence about Russia going into the market for our tea, but where is sufficient of the article to come from to supply Australia, America and Russia as well as England? That I fear will be the rule! If agents for the customers named come here and find they cannot satisfy their orders, is it not to be feared their clients will go elsewhere? Producers should therefore do their utmost to keep the local market well supplied.

I look with confidence to 75 cents per lb. being the average before another twelvemonths are over our heads. 'Maun it be so"! Then look out for a "boom.' ONE INTERESTED.

"CHERTSEY" TEA AT THE TEA SALES.

Chertsey, Yatiyantota, Oct. 30th.

DEAR SIR,—I regret to find that a mistake has occurred in your paper: I would therefore thank you to be good enough to rectify same.

The actual prices realized by Chertsey at the local sales lately, were as follows:—

100 lb.	Bro. Pekoe out at	.. 55 cents
270 „	Pekoe Sold at ..	.. 41 „
200 „	Pekoe sou. out at	.. 38 „
80 „	Souchongs out at	.. 34 „
180 „	Pekoe Fannings sold at	.. 33 „

In the local papers my broken pekoe, I find, has been put down as "out at 51c": this is misleading, and may have an influence of an unfavourable shape on the bids at future sales.

Hoping you will place this matter to rights I am, dear sir, yours faithfully, F. J. DICKSON.

TEA EXPORTS.

The Strathellie Tea Co., Ltd.,

Nawalapitiya, Nov. 3rd.

DEAR SIR,—Now that the Commercial Season has been altered from the fiscal to the calendar year I intended postponing until next month my computation of probable export of tea. At your, request, however, I now give my figures for the fiscal year. You will observe that they are made up on the same basis as regards acreages which I have on previous occasions taken, adding however 20,000 acres as giving their first returns at say 100 lb. per acre, and that I have allowed for a slight decrease on the *maximum* acreage rate, with the increased area (70,000 acres). My approximations *again* run out

somewhat in excess of yours ;

70,000	acres at 340 lb.	per acre	= 23,800,000 lb.
45,000	,, 300	,,	= 13,500,000 ,,
35,000	,, 250	,,	= 8,750,000 ,,
30,000	,, 150	,,	= 4,500,000 ,,
20,000	,, 100	,,	= 2,000,000 ,,
		Total say	52,550,000 ,,
Deducting the odd 550,000 lb. for local consumption			550,000 ,,
We get probable exports at say ...			52,000,000 ,,

Uva will make a distinct mark on tea exports this season and if no serious labour difficulties intervene, I fancy my estimate of 52 millions will be overtaken.—Yours very truly,

ARTHUR E. SCOVELL.

PADDY OR RICE CULTIVATION IN CEYLON.

Nov. 6th.

SIR,—A controversy has been for long carried on and still continues as to whether the cultivation of rice is a remunerative or an unremunerative industry. In a recent issue of your paper was printed a contribution thereto by a public servant who claims to have proved by an account of four experiments, over three of which he lost money, that the cultivation is a profitable one ; while other persons have on other occasions published accounts of experiments by which they have purported to show that the cultivation of rice is the shortest and easiest road to ruin, or, as the case may be, the readiest route to the heaven of Mr. Andrew Carnegie.

The present writer, who has never sown a grain of rice or turned a watercourse or cheated a renter, ventures very respectfully to submit to the parties to this controversy that they are shooting wide of the mark if what they wish to find out is not what the returns should be, but what to the ordinary unlearned agriculturist they actually are. In so far as the question is of other than academic interest, it is interesting only as the results will enable us to gauge and estimate the condition of the ordinary native inhabitant of the country. The question is interesting not as an agricultural but as a political problem, and as such it is solved by demonstrations which employ factors that are outside the lines of native usage. The Government Agent of the Eastern Province has tried his experiment with an English plough in his hand and an agricultural primer in his pocket; other experiments and experiences of which accounts have been published, though lacking these advantages and differing among themselves in other respects, all agree in this that the system on which the labour has been employed and paid is different to that used in the ordinary course of native cultivation. If then what we want to find out is how the native agriculturist gets on in his native simplicity, and personally that is what we desire; then and in that case our experimentalists throw no light on the question.

It has occurred to your correspondent, who has been pondering over the little results of so much misapplied ingenuity, and he is not a little vain of being the first person to make public so recondite a suggestion that the proper way to ascertain whether a native industry is remunerative is to enquire what classes of workers are engaged upon it, and to ascertain first the outgoings and then the distribution of the net proceeds, and he has thought that these particulars, if correctly ascertained and reported are likely to go further to throw light on the matter that the experiments of a whole college of agricultural instructors.

But before going further it would be well to define—it would have been of no small advantage to the parties concerned to have done so earlier in the dispute—what precisely the question at issue is. Is or is not the cultivation of paddy a remunerative industry? Remunerative to whom? The answer which is bound to come—"the goyiya"—is not sufficient, for Mr. Elliott clearly is answering the question as if it referred to a capitalist landowner, and most of the other contributors to the discussion have done the same; some appear by the "goyiya" to mean the day-labourer to the exclusion of the landowner, and yet others, (among them the editor of the "Independent,") take him in his double capacity as landowner and labourer, and do not hesitate to state that he makes nothing in either capacity.

Let us appeal for a moment to Political Economy. It is a maxim of that science, undisputed even in Ireland and probably unsuspected by the parties to this argument, that the three elements and the only three elements of production are land, labour and capital, the returns for their services received by the three cooperative elements being respectively rent, wages and interest. Our goyiya in his native simplicity may represent one, or two, or all three of the elements at once, and the returns he draws from the cultivation may be either wages only, or wages and rent if he is the landowner as well as the cultivator, or wages, rent and interest if he supplies from his own resources his seed paddy, and the other needful if scanty capital. The industry will be unremunerative if it returns to the landowner less rent than he would have obtained had he devoted his land to some other cultivation : unremunerative to the labourer if he draws less wages in it than he would have gained if he had devoted an equal quantum of industry to other pursuits: unremunerative to the capitalist if he draws from the capital advanced for employment in it a lower return than he would have obtained if it had been used in some other way.

It is then apparent that the question resolves itself into three; and an endeavour will now be made, by a statement of the native practice in the employment of labour and the distribution of crop, to show how answers must be sought to those three questions. It is to be premised that by the native agriculturist nothing whatever is paid for, neither the labourer's wage, nor the capitalist's interest, nor the landowner's rent, until the harvest is reaped, and that the wisdom of immemorial antiquity going before the wisdom of the Education Department ordained that the labourer in the rice field like the modern schoolmaster should be paid by results. The system is this : All those persons who have had any share in producing the harvest being present, and the crop having been reaped, threshed and cleaned, the whole as it lies is divided as follows :—

(*a*) 1-10th gross crop to the landowner to meet his liability for the Government tithe.

(*b*) 1-7th gross crop, for the cost of reaping and threshing.

(*c*) 1½ times the amount sown to the person who provided seed paddy—the supply of seed paddy being a privilege of the owner.

(*d*) Sundry small payments, for services rendered : huwandiram, measuring, the soothsayer, &c., &c.

After the above deductions have been made, the balance is divided into three equal parts, of which the owner takes one (*e*), the person who supplied

cattle (usually the owner) a second (*f*) and the cultivator the romainder (*g*).

Clearly (*a*) and (*c*) are rent, (*e*) and (*f*) the profits on capital, (*b*), (*d*) and (*g*) are wages.

If the crop fails wholly, no one gets anything but (*a*) and (*c*) remain a debt to be discharged out of the next harvest. If in part, the deductions are made in the order (*b*) (*c*) (*a*) and the balance, if any, distributed by the rule. It must be remembered that this distribution is not the same for all fields, or for all parts of the country. The systems of distribution are many, but they are all on the same plan; the one above described is for a field yielding 10 fold: a common class of fields. Richer fields yield a larger and less fertile fields a lower rent, the balance being divided in different ways. The less fertile the field the better the *apparent* though not the real wages: this being, of course, to meet extra labour in cultivation and increased risk of loss.

It follows that among native cultivators, pursuing their cultivation in accordance with their own customs, the landowner gets a rent in kind exactly proportioned to the productive capacity of his land; the capitalist gets a certain and liberal interest on his loan, and a proportionate return, if successful, on that portion of his enterprise which he has entered on as a speculation; and the labourer a return in proportion to the success of his labours. But does the landowner thus get a less rent for his land than he would if he cultivated it with some other product, that is, is the industry unremunerative to him? In Colombo the native paddy-land-owner has turned his paddy-land into grass fields; outlying corners of fields, unfertile or incapable of irrigation, are in the Western and Southern Provinces sometimes planted with cocoanuts: very rarely in old days the Kandyan planted coffee in his disused rice field, but on the whole, once a paddy-field always a paddy field is the rule in Ceylon. Even the Jaffna Tamil who grows everything keeps his paddy-field for its accustomed use in its turn. Surely it is probable—the writer is not a philanthropist and will therefore not venture to dogmatise,—that this is so because it is to the owner's interest; in other words because paddy land owning is remunerative. For what is the alternative? That a very large body of persons, and no inconsiderable number of whom are wealthy, intelligent and speculative commence or continue to grow rice on land which could be more profitably employed otherwise, because (*a*) it is the custom or (*b*) because they are oppressed by unpaid headmen or (*c*) because they think the cultivation of rice a more honourable pursuit than others. These are the only reasons that are ever offered us on the other side and it is not for a seeker after truth to deny that they may have weight, but do they account for *all* the facts? A large body of persons, Sinhalese, Tamil and Malay have migrated from Hambantota and its neighbourhood to Tihawa to cultivate rice. Was it under the influence of custom, or at the instigation of unpaid headmen, or in the pursuit of reputation, or did they hope to make and—for they are constantly being followed by others—do they make money?

Is that wealthy speculator Mr. de Mel seeking the bubble reputation at Muturajawela, or is he terrorized by a village arachchi?

Under the new Walawe irrigation work in the S. P. not yet working 1,000 acres of Government land have already been purchased by private buyers: are they seekers of honour, slaves of custom, or victims of the Geat Unpaid?

Are the rich Moormen who poured their money into the Government coffers in return for irrigable laud in Batticaloa content with the mere name of landowner, or do they hope for a profit?

The local philanthropist tells us that they have engaged in the least remunerative of native industries. Have they, and if so why have they, or do they by any chance understaud their own business better than the local philanthropist?

And, now comes the turn of the capitalist. He need not keep us long; nobody ever wastes a tear on him. On his advance of seed paddy he gets 50 per eent interost certain, and he may be trusted to be making a good thing over any other advance he makes. Let us leave him and turn to the labourer. Does the labourer in the rice-field get more or less than a similar amount of work would earn for him in other occupations? No one can certainly tell; for though it is possible to measure his receipts, no one can measure the amount of his work, for the fact is this, that 2 or 3 days of arduous labour at the beginning once over, the rest consists of a hand's turn done at odd times and is by no means incompatible with the contemporaneous pursuit of other industries.

It is constantly stated in this connexion that Sir C. P. Layard, a very high authority, expressed his opinion that labour in the riee-field was the worst paid of all labour. It is usual for the philanthropist and sometimes for less positive and better informed persons to quote as nearly as he can remember them Sir Charles's words and to apply them to both branches of the industry—but this is because he has never had them with their context in the original. The statement is, if the writer—who is far from books of reference—is not mistaken, contained in one of the earliest printed Administration Reports of the Government Agent W. P.,* in the course of which an account is given of the improvement in the position of the peasantry following on the extension of the coffee enterprise. Mr. Layard, as he then was, spoke of the wages to be earned by Sinhalese as carpenters, cart drivers, fellers of jungle, &c., and he added, (the quotation is from memory): "Paddy cultivation is about the least remunerative industry in which a villager can engage." Too much has been made of this very moderato statement of an opinion, which went in fact no further than that, at a time when speculation was brisk and the coffee industry in the height of its prosperity on the borders of W. P., the stay-at-home agricultural labourer could make less wages by following his ancestral pursuits in his native village than he could earn by migrating to a place where business was brisker and by their plying such trades as he was fit for. It has no sort of application to the employment of the agricultural labour in ordinary times and at a distance from European centres of trade and speculation, and it does not refer to the landowner at all. But, that being so, tho opinion so expressed, probably a correct one so far as it then went and in the place for which Sir Charles intended it, is not to shut out all further argument concerning consideration of the point? Let us try the question by such other tests as are at disposal.

What are the best known or least disputed points in connexion with Sinhalese labour? They are these. That during the periods when paddy farming operations are in full swing it is impossible by the offer of any reasonable wages to induce the Sinhalese to engage in any other works and that no field in a fairly populous district ever lies uncultivated for want of labour. If these two undisputed facts are not to be accounted for by the remunetrative nature of the work, what

* Tho statement was made in answer to our personal enquiry and embodied in a "Summary of Informations" some thirty years ago, but "A." 's argument is all the same very strong.—ED. *T. A.*

is the explanation? Why is it that, though the planter may want labour for his estate, the Government for the roads and the native employer for his plumbago pit, the owner of a paddy-field never lacks an *andakaraya*? Is it due, as we are told, to the tyranny of custom, the oppression of the unpaid headman, or the keenness of the villager in the pursuit of honour?

Or is it—*it seems possible*—that the villager likes best the work at which he can make most wages in the easiest and most congenial way? At least he himself never complains of the work but only that there is not enough of it.

Are we all quite sure that we know the villager's business, as we know that of the native capitalist, better than he knows it himself?—Your obedient servant, A.

SUNFLOWER AS FUEL.

DEAR SIR,—With reference to your article on the *fuel question* I enclose an extract which appeared some years ago in the *Observer* in case you may think it worth while to reproduce. I know how the sunflower grows in the lowcountry, and I believe it must thrive better higher up. It appears to me that an experiment on a small scale might easily be made just to ventilate the matter—from sowing to reaping would only take about four months, the question of rich soil would be no great obstacle, as no large area would be required, and if systematically grown the resulting potash could be reapplied to after crops—with any other available manure.—Yours &c., ——

(*Extract referred to.*)

SUNFOWERS AS FUEL.—A correspondent of the *Dacota Farmer*, after having tried "turf," Coalwood and Sunflowers, has settled upon the lastnamed as the cheapest and best for treeless Dakota. He says: "I grow one acre of them every year and have plenty of fuel for one stove the whole year round, and use some in another stove besides. I plant (? sow) them in hills the same as corn (only these seeds to the hill), and cultivate same as corn. I cut them when the leader or top flower is ripe, and let them lay on the ground two or three days; in that time I cut off all the seed heads, which are put into an open shed with a flow in it, the same as a corn crib; the stalks are then hauled home and packed in a common shed with a good roof on. When cut in the right time the stalks when dry are as hard as oak, and make a good hot fire, while the seed heads with seeds in, make a better fire than the best hard coal. The seed being very rich in oil it will warm better and burn longer bushel for bushel, than hard coal. The Sunflower is very hard on land. The piece of ground selected to plant on should be highly enriched with manures. In the great steppes (prairie region in the interior of Russia and in Tartary) where the winters are more severe than here in Dakota, the Sunflowers are, and have been for centuries past, the only kind of fuel used."

SUNFLOWER CULTIVATION: PRACTICAL EXPERIENCE.

Storm Lodge, Colombo, Nov. 10th.

DEAR SIR,—In your issue of Saturday is a letter on sunflower as fuel. Having experimented on the plant I give you results. For the many uses to which flowers, seeds, and stems may be put, consult, "Beeton's Dictionary of Daily Wants," which gives full information with directions for cultivation. When living in Maskeliya (1876-1880) I grew sunflowers in a part of my garden for feeding poultry. There was a rose hedge near, with the usual accompaniment of small beetle. These visited the flowers in thousands feeding on the stamens, but, so far from doing harm, by their agency the seeds were fertilized and every head was full of good seeds.

In 1885 I got out two bushels of seed from Sutton's, 'Giant Russian" variety, to see if it would pay to cultivate in the lowcountry for oil. Mr. S. C. Obeyesekere very kindly cleared two acres of virgin forest for me on his estate at Rambukkana. We planted the seed 18 inches apart in rows three feet from each other, the result being a very large crop of flowers, some of which measured over a foot across; but nearly all the seeds were *deaf*, a few only at the lower border of each being fertile. This was probably due to the absence of insects; the seeds that were fertile having become so by pollen dropping down on them from above.

In addition to this clearing Mr. Jameson and I rented ten acres at the Model Farm, which we planted in a similar manner. Unfortunately, just as the plants were coming up, Capt. Cleland, although warned by the man in charge, marched the R. D. F., followed by a large crowd of natives over the ground, the result being that all except a few growing round trees were trampled out.

Those that remained being amongst roots and under shade grew up small, their flowers also being small and, like those at Rambukkana, partially fertilized, probably from a similar cause.

In all we got a few bushels of seed which Mr. —— very kindly crushed in one of his poonac mills, the result being five bottles of oil, smelling strongly of coconut oil; this from the mill. I sent this to a friend in London who submitted it to a firm of oil merchants. They reported it as worth about the same as cocoanut oil, but that perfectly pure oil would be worth as much as olive. You will see that Beeton says "sunflower affords good pasture for bees." I am sure that with their assistance, or that of other insects, it can be very profitably grown in many parts of Ceylon.

I forgot to mention that the stems of those grown in Maskeliya burnt in a stove (They were pithy and not a bit like oak, as you mention,) gave a very large percentage of potash, some pieces, especially roots, coming out like coral—only much more brittle and friable.—Yours faithfully.

T. H. F. TOTHILL.

TEA-GROWING IN RATNAPURA.

Ratnapura, Airy Hill, Nov. 11th.

DEAR SIR,—I have this day posted to your address a sample paoket of tea grown on a land in the town of Ratnapura and prepared at my own residence. I shall thank you to try the tea sent and afford me your opinion.—Yours faithfully,

J. P. JAYEWARDENE, Head Clerk, P. R. C.

[The tea seems very well made, but the flavour is peculiar and an expert says this is owing to over-firing. This can readily be avoided again.—We are not at all afraid of the result should the Sinhalese gardenholders turn their attention to tea, for before they produce their million lb. or so, we may expect one if not two millions of the population of Ceylon to become regular drinkers of the new beverage. —ED. *T. A.*]

JUTE MESH FOR TEA.

Yatiyantota, Nov. 13th.

SIR,—I send you, as promised, samples of jute mesh made in Calcutta. I have been expecting another sample of a better make of the single yarn mesh (both warp and weft should be hard spun), but it has not come to hand. The prices of these will be about 18c. and 15c. per yard.—Yours truly,

E. F. DAVIS.

[The samples referred to can be seen by anyone interested at our office. They seem substantial enough.—ED. *T. A.*]

EXPERIMENTS AT THE SCHOOL OF AGRICULTURE.

Mr. S. Davis, Travelling Agent for an American firm of implement makers, accompanied by Mr. W. H. Davies, visited the School of Agriculture this morning by arrangement, and spent about two hours in demonstrating the use of some new inventions. Two hand implements were first tried, with attachments for hoeing, raking, moulding, &c., which worked most admirably in the Indian corn and turmeric plots. They are well adapted for all manner of crops sown in rows, and are the most perfect implements of their kind. The amount of labour and time thoy save are incalculable, while the prices of the machines are comparatively cheap. Next an experiment was mads with the horse hoe which was attached to two buffaloes. This implement was also made to do the work of ploughing, skimming, moulding, trenching, &c., and is said to be largely used in tobacco and sugar-cane plantations. The exhibition of the working of theso machines was much appreciated by the students. The horse-hoe is perhaps too heavy for the cattle of the country, and there is probably not much scope for the use of the implement, which may also bo too expensive for the Ceylon Agriculturist, but the hand machines, which can no doubt be seen at Messrs. W. H. Davies & Co's. ought to have a good sale in the island, as they are simply invaluable for garden cultivation of every kind, Indian corn (which by the way is being very successfully raised at the School of Agriculture) and such crops.

NOTES ON POPULAR SCIENCE.

BY DR. J. E. TAYLOR, F.L.S., F.G.S., &C.,

EDITOR OF "SCIENCE GOSSIP."

Dr. Beyerinck has just described before the Royal Academy of Sciences at Amsterdam some highly interesting and important experiments relating to the infection of the common bean (Vicia faba) with a species of bacillus (Bradicola). He filled twelve pots with sterilised river sand, which had been rendered very poor in nitrogen by washing with distilled water. These pots he divided into four sets of three each. On April 25 a well-sterilised seed of the bean was planted in each pot. The dust of the air was wholly excluded from the pots, and arrangements were made so that the watering was carried on under dust exclusion. The first sot of pots was watered with 0·1 of phosphate of potash, 0·03 chlorate of lime, 0·06 sulphate of magnesia, dissolved in one litre of distilled water. The second set with the same mixture; the third set ditto, to which was added 0·2 grammes of nitrate of lime; and the fourth set ditto, to which was added 0·2 grammes of sulphate of ammonia. When the plants had developed their second leaf, the three pots of the first set and one single pot of each of the other three sets were infected with a gelatine culture of bacillus, cultivated in 1889 from the tubercles of the common bean, and since that time kept in successive cultures. The bacteria used to infect the beans with were mixed with sterilised common water. On June 20, on one old cotyledon of a bean, a fungus (Penicillium) was found. The experiments were, therefore, not continued further. All the plants were taken from the pots, and their roots were well washed and examined. Every one of the six infected plants bore many tubercles, whilst not one of the six remaining non-infected plants showed the least sign of tubercles. Dr. Beyerinck showed that the presence or absence of nitrogen, as nitrate or as ammonia, is indifferent with regard to the practicability of the infection.

That nitrifying organisms exist in the soil has been known for some years past. A French scientist, however, has communicated to the Academy his discovery that not only are nitrifying microscopic organisms universally distributed, even on the bare rocks of mountain peaks, but that to them may be attributed a considerable share in the important work of breaking down rock-masses into soils.—*Australasian*.

BARK AND DRUG REPORT.

(From the *Chemist and Druggist*.)

LONDON, Oct. 23rd.

CINCHONA.—At Tuesday's auctions a fair average supply of bark was offered for sale, the catalogues including :—

	Packages		Packages	
Ceylon bark ...	1,658	of which	1,251	were sold
East Indian bark ...	735	do	484	do
South American bark	1,129	do	431	do
Total ...	3,522	do	2,166	do

The assortment was a fairly good one so far as the Ceylon cinchona was concerned, while East Indian barks also included some very good lots, particularly in Succirubras and Officinalis, a large proportion being of somewhat old import. South American Calisayas were strongly represented, and met a fairly steady sale, up to 1s 1d per lb being paid for the richest lots, though it is doubtful whether the average price now realised by these barks is a remunerative one for the growers. No Java bark was offered at all. The sales opened with a fairly good competition, but this ceased after the first two or three catalogues, and prices gradually ceased off, a large proportion being bought in. The average unit may be placed at about 1¾d per lb, or, say, about 8 per cent lower than at the previous auctions. Druggists' barks, however, were in very steady request, and realised full values generally. One of the German manufacturers did not compete at all until near the end of the auctions.

The following are the approximate quantities purchased by the principal buyers :—

	Lb.
Agents for the Mannheim and Amsterdam works	107,231
Agents for the American and Italian works	73,520
Agents for the Frankfort o/M and Stuttgart works	52,121
Agents for the Brunswick factory	49,547
Agents for the Pelletier works ...	48, 33
Messrs. Howards & Sons ...	42,773
Agents for the Auerbach factory ...	36,740
Mr. Thomas Whiffen ...	25,115
Sundry druggists	30,097

KOLA.—A small bag (41 lb.) of good bold well-dried West Indian seeds sold by auction last Friday at the extraordinary price of 2s 8d per lb. For fair dry nuts 2s 6d to 2s 7d per lb. has been paid privately this week. The report that sales have been made at 1s 9d in Liverpool is discredited here unless the quality of the kolas is exceptionally poor.

COCONUT OIL : rather lower, good to fine Cochin, on the spot, 34s to 34s 6d; for distant shipment, 33s 6d c. i. f. is quoted; fine Ceylon may be had at 33s on the spot or at 29s c. i. f. for distant shipment.

THEFT OF CARDAMOMS AND CACAO FROM THE YATAWATTE ESTATE.

IN THE POLICE COURT OF MATALE.

November 8th.

Jas. R. Martin, complainant *v.* Kandi Carpen, Defendant.

In this case the complainant, who is a gentleman known as being "loath to come to Court," charged the accused with the theft and unlawful possession of a quantity of cardamoms partially cured, property of Lanka Company, valued at R3. It appears that for some time past the outturn of the cardamom crop when cured ran short in small quantities, and the complainant had reason to believe that some light-fingered person or persons had something to do with it.

In evidence it transpired today that the defendant was employed by Mr. Martin on both Ross and Yatawatte estates, and owing to his having been suspected of misconduct was paid off.

The accused engaged a house in the Yatawatte village about half-a-mile from the estate and was keeping a "kada" there dealing in dry fish, arecanuts, etc.

On the evening of the 6th instant he was coming along the village path and when he got on to the main road, met the clerk of the estate and a sawyer. The former questioned the accused as to the contents

of the bundle under the arm when he said it was arecanut and as things would have it, the sawyer said that he wanted a chew of betel badly and both felt the bundle when the accused dropped it in the hands of the latter and ran away. The evidence for the complaint proved conclusively the possession and the charge having been read and explained the defendant said he had cause to shew and wanted time to get his witnesses which was allowed, the accused in the meantime being remanded till Friday next.

The next case was that in which one Podia was charged with the possession of some Cacao partly cured. The accused in his statement said that he had purchased the Cacao from Kandi Carpeu (accused in the previous case) and had paid him R5. This boy used to go about in the Yatawatte village from house to house trading in dry fish, salt and other sundries, at the same time purchasing whatever he gets from the villagers and from what could have been gathered. Podia was a ready purchaser from Kandi Carpen; this case is also fixed for Friday next, Podia being remanded.

It is an admitted fact that cardamoms of the Malabar variety are not grown within a radius of six miles from the Yatawatte estate with the exception of a few bushes on Nawagala which does not give a crop worth curing, neither are there any bushes of this variety in the village.

As regards Cacao there are but very few trees scattered about the village and not a single villager could have the quantity taken up and none of them know the process of curing as this quantity had been.

PEARL FISHING is still carried on—says a home journal of Oct. 31st—on the Tay, though by no means to the extent that it used to be. Last week a brooch was presented to a lady of the neighbourhood in which were forty Tay pearls, six of them being large and valuable.

TEA AND PROGRESS.—Another sign of social progress is the new Tee-to-tum cafés in the East-end. A quiet elegant and almost artistic one may be found in the Commercial-road, and a less pretentious but very pleasant one exists in the Whitechapel-road. These cafés are founded and managed by Mr. Buchanan, a wealthy tea-merchant, who is quite an enthusiast for social reform. He does not desire to make money out of the enterprise, but to provide an attractive place which shall be at the same time restaurant and club for the East-end masses.—*L. & C. Express*, Oct. 31st.

TELEGRAPH LINES are subject to a great variety of pests. In the neighbourhood of Rio Janeiro, says the London *Globe*, there is an orchid that flourishes on the excrement of birds which encrusts the wire and the "earth contacts," resulting in leakage of the current to the ground, which is a fruitful source of trouble. Again, in Japan, where the lines run along roads bordered by cryptomeria trees, the large webs of a spider, dripping with rain or dew, frequently interrupt the traffic. In Norway the poles are often perforated by a large woodpecker, which is supposed to mistake the humming of the wire for a nest of insects in the wood; and we now learn from Arizona, U. S., that the green woodpecker of California, *Melanerpus formicivorus*, is in the habit of digging cavities in the red cedar poles. In these it builds its nest or stores the larvæ upon which it feeds. Of course, the poles are snapped across by the high gales. In Ceylon, branches of coconut palms falling on the wires sometimes drag them down, and on the Wilson's Bungalow road, a vegetable growth has been pointed out to us on the wire, arising doubtless from bird droppings, which interferes with insulation.

PARIS GREEN AND LONDON PURPLE.—The *Gardeners' Chronicle* hears of much recklessness in America in the use of this poisonous tree dressing, and others deleterious to human beings and grazing animals. The requisite quantity is often greatly exceeded, thereby adding to the cost and labour of its application. One farmer used it over a crop of cabbages, and caused serious illness to those who partook of them. Too much caution can scarcely be taken in the employment of these preparations of arsenic. Sulphate of copper is somewhat less poisonous, and it is almost equally efficacious when used against the Codlin-moth and mildew. This is what has been recommended in a mixture for green bug on coffee.

SEA-WATER AS THE SOURCE OF GOLD.—We were aware that silver in quite appreciable quantity was diffused in the ocean, but now we learn from a paper read before the British Association that to the same source we must look for the origin of gold. Mr. J. Logan Lolley, F.G.S., stated

—that while geological evidence is against its igneous origin, all the gold of all the rocks may have been derived from aqueous deposition; that, in fact, all this gold may have been deposited by marine action in the same way as the materials of the aqueous rocks themselves have been. And, moreover, our unaltered sedimentary rocks, even of tertiary age, may contain an equal amount of gold in proportion to their bulk with that of those altered or metamorphosed Cambrian and Silurian rocks, which have hitherto been regarded as the earth's great treasures of the precious metal. The knowledge now possessed of secondary and tertiary auriferous veins in California controverts the Plutonic as well as the palæozoic hypothesis, and the discovery of gold in sea-water and of its precipitation by organic matter alters the position of the question from that it occupied in the days of Murchison and Forbes. Since silica may combine with gold under heated conditions, and the silicate of gold so formed be soluble in hot water, as is also silica, gold in the form of silicate could be carried by water, heated by deep-seated conditions or by the neighbouring uprise of fused matter, from its original position, and be deposited in veins with silica itself when subsequent segregration would separate the silica of the silicate of gold and leave it as free gold imbedded in quartz as it is now found. The discovery by Sonstadt of nearly a grain of gold to the ton of sea-water shows that the sea has always held in solution an ample store to give to its sediments the amount of gold they are now found to contain, and Daintree's discovery of the power of organic matter is precipitate gold from a solution of the terchloride explains the deposition of gold from sea-water, since on the sea-bottoms there has always been a large amount of organic matter. Though the gold so deposited would be in infinitesimal proportion to the mass of the marine mineral sediments, it would be aggregated by nuclei of metallic sulphides by which it would be retained until thermal conditions favoured its conversion to a soluble silicate. The sulphide of iron, or pyrites, is known to nearly always contain gold, and hence it is to be concluded that the gold of the sedimentary rocks which have not been subjected to the favouring conditions for its separation and preservation in quartz veins is now in the metallic sulphides these rocks contain. In such rocks as the chalk and the London clay, the amount of pyrites is very great, and the author concluded by giving a rough estimate of what may be the amount of the gold now in the surface-rocks of the south-east of England, from which it appears that these deposits may contain gold to the value of £100,000,000 sterling.

The Chairman said that the prospect held out by Mr. Lobley was very encouraging, and he hoped that some one would be able to suggest how so much wealth could be rendered available. There was good ground for believing that gold deposits were gradually growing, and therefore for the present this enormous amount of gold might be left until it had aggrogated into convenient nuggets. (Laughter.)

HILLCOUNTRY PLANTING REPORT.

THE DWARF MOUNTAIN BAMBOO AND ITS FLOWER—THE PATANA SWAMP BAMBOO—OTHER BAMBOOS—FLOWERING TREES—BO-TREES AND PLANTAINS AT HIGH ALTITUDES — TRAVELLING BY ROAD *vs.* RAILWAY—THE WEATHER.

The dwarf mountain bamboo, which forms so large a proportion of the undergrowth of the Ceylon forests, at and over 4,500 feet altitude, is in flower and seed here at present; and in reply to a letter from me Dr. Trimen states :—

"Your small mountain Bamboo is *Arundinaria debilis*. I think it flowers yearly as do many of the small species, whereas most of the larger kinds blossom and seed only at long intervals. The patana swamp one is *Arundinaria densifolia*. It is flowering and seeding profusely this year for the first time in my experience, and I cannot find that anyone has ever seen it in that state before."

It is not in accordance with my observation that the dwarf bamboo flowers annually: on the contrary, I remember the late Mr. Wm. Ferguson being interested in the flowering and seeding of this species some years ago, as to him a novel circumstance and as enabling him to distinguish this bamboo from the other prevalent in our jungles, and of the long supple stems of which baskets, sieves, &c., are woven. Then as to the patana swamp or aquatic bamboo, I wrote very fully about its abundance and extreme beauty, as also its probable utility as a substitute for osiers, after a visit to Horton Plains in March 1888. Specimens brought away on that occasion are near me as I write, as perfect in tall elegance and fine foliage (though altered from green to yellow in colour) as when they were cut from the banks of the Belihuloya, at an altitude of 7,000 feet, on the occasion mentioned. I again visited the Plain in Nov. 1889 with a companion to whom I had descanted on the attraction which this bamboo added to the Maha Eliya expanses. In proportion was my mortification to find that the swamp bamboo had flowered and fruited, and that most of the tall, slim, beautiful stems had withered and were lying prostrate. This state of things I also fully described in a letter "from the Hills." The scene of desolation, although on a smaller scale in relation to space but especially as to size of plants, reminded me of my experience in South Wynaad in 1876, when I saw hundreds of thousands of large and tall stems of *Bambusa arundinacea*, which had flowered, seeded and died down, and of which I procured a large quantity of seed. Plants from that seed grew only too well at low altitudes, but here they have made but poor progress, except in sheltered ravines.

I should think Dr. Trimen will find that many of his correspondents in all parts of the world will be glad to have seeds of the specially elegant *Arundinaria densifolia*.

About two other plants which Dr. Trimen has been good enough to identify for me, he writes :—

"There is nothing to say of any general interest about the two mountain trees of which you send me specimens.

"A is the montane form of *Turpinia pomifera*, a common inhabitant of the hill forests. I did not know its young foliage was so brilliant; I suppose I do not happen to have seen it just at the right time.

"B is *Pygeum Wightianum* (not a 'Weralu' but) called 'Ununu' by the Sinhalese, a name which enters into the composition of several place-names.

"Many trees 'flush' (as the tea-men say) with the first rains of each monsoon, and many also blossom twice in the year at the same times."

I wrote to Dr. Trimen respecting *T. pomifera*, because up here it vies with the iron-wood in splendour of colouring, the tints of the flush shading from pink to scarlet and orange. From the *damba* and *kina* this tree differs, inasmuch as the whole of the foliage does not become coloured, but only masses of flush at the ends of twigs, which at a little distance assume the appearance of rich clusters of flowers, contrasted beautifully with the green of the glabrous leaves. On a portion of Lorne estate which was not burnt, some of these trees were left to grow separately, and having plenty of room and light, they are truly beautiful objects handsome in form and rich in contrasted colouring. Many ravines and dells in Nuwara Eliya are at present brightened with the warm red of the young foliage of this tree, the more welcome as the rhododendron trees at present scarcely show a flower.—*P. wightianum*, which I fancied might be a *symplocos* or a *weralu*, has been recently enriching the forests with an abundant wealth of spikes of white and fragrant flowers. It is quite worthy of being associated with the name of the great South India botanist, as famous in the south as Wallich was in the north, more than half-a-century ago, when the former was publishing his *Icones*, and the latter, having admitted that the Assam plant which he had ranked as a *camellia* was a true tea, was teaching botany to the students of the Calcutta Medical College, amongst them Loos and Dickman and Anthonisz and Wambeek from Ceylon.—Of course the well-known Oonoonagalla estate in Madulkele has derived its name from the prevalence of this tree in the forests which so long ago were felled to make room for such cultured plants as coffee, cinchona and tea. A young bo-tree has just been planted opposite the Nanuoya station. In loking at it, I douoted if it would grow at the alttude, but I now recollect that one of the first estates opened in the Dimbula District was Bogahawatte. The estate of Kehelwatte, close by, was, I suppose so named in consequence of the prevalence on its forest site of the wild plantains ? How the opening of the railway has thrown once wellknown places and familiar names into the shade ! How many of the present generation of Europeans in Ceylon know anything of the once frequently traversed Colombo-Kandy road ? But much of the country can best be seen in the course of leisurely road drives.

This day, which opened so brghtly, continued sunny and hot until clouds gathered at eventide and we heard a distant rumble of thunder ; but no rain fell, and there is every prospect of a fine day for our projected visit to Mr. Nock's mountain paradise under the hoary and precipitous brow of the lofty Hakgala,—the three peaks of which look towards the Central, Uva and Sabaragamuwa Provinces with loving regards.

COLD MORNINGS AND HOT DAYS—A TRIP TO HAKGALA—THE FERNERY—FLOWERS—POTATOES—A FINE VIEW OF UVA—FUTURE IMPROVEMENTS FURTHERED BY THE RAILWAY—RAIN WANTED.

NANUOYA, Nov. 12th.

"Hotter and hotter every day," with mornings cold in proportion, must be the meteorological record. Yesterday was a "blazing hot" day in Nuwara Eliya and Hakgala : a day which rendered the cooling effect of a drive through the atmosphere grateful, and doubly so the dense shade and coolness of the beautiful "Fernery" at Hakgala. We cannot wonder at this being the favourite resort of visitors to the mountain Gardens ; for, besides the wonderful collection of ferns, which Mr. Nock is engaged in classifying and naming, there is a great variety of allied plants, or plants which habitually indicate a preference for the shade into which we were glad to retire on this occasion, although we had been

charmed with the many beautiful or new vegetable and floral treasures arrayed on the parterres and in the borders of the open and prettily turfed expanses. To children a visit to these Gardens affords great enjoyment, and those who accompanied us had "such fun" in running round and round and hither and thither over the maze of narrow walks, on the sides of the ravine in which the Fernery is situated, and were so delighted with all the interesting and beautiful objects they saw, that they gave voice to the feeling of us "children of a larger growth," when they expressed reluctance to leave Hakgala. Mr. Nock, as usual, had many plants, new or newly in flower, ornamental and useful, to which to direct our attention; and not the least interesting "exhibit" was a plot of potatoes, wonderfully prolific and healthy, although the fourth successive crop was being grown in the same ground. I could speak of our admiration of roses, camellias, begonias, tree daisies and other things of beauty, but the place must be visited to get an idea of its beauty, and on a day such as we enjoyed, to realize the grandeur of the view of the vast spreading valley of Uva, with its rice fields, its patana hills and forested mountains and the majesty of the precipitous face of sheer rock which rises over the Gardens. We saw interesting photographs of the views from some points, but not of a size to do justice to the massiveness of the mountain or the extent of the prospects. The sight of the enormous proportion of grassy prairies in Uva cannot but raise questions as to the possibility of improving the pasturage in some cases, of culture of useful food or fibrous products in others, and of considerable afforestment in suitable situations. We cannot doubt that much of this is in the future, progress —material, intellectual and spiritual—being indefinitely furthered by the railway over which trains laden with passengers and the exchanges of a profitable commerce will soon be entering the ancient Principality of Uva and awakening its echoes to the sounds of a new dispensation.

This morning here is no exception to the sunny brightness and perfect calm of the openings of previous days, and but for a mass of moist looking haze up towards the table-land between Totapala and Pidurutalagala, we should feel inclined to predict a continuance of the present brilliant weather. Mr. Nock on the Uva side, like others on this side who are putting out plants, would be glad of a little rain. Our thermometer went down to 52° in the very early hours of this morning, but all the signs point to a sun heat today represented by not far from three times that figure.

SUPPLY BASKETS AND THEIR VALUE IN TRANSPORTING—SUCCESS OF EUCALYPTS &C.—PEPPER IN CEYLON—THE WEATHER.

NANUOYA, Nov. 12th.

Yesterday, when *en route* to Nuwara Eliya, we came upon a gang of coolies, eight in number, carrying loads, each made up of several hundreds of funnel-shaped supply baskets, packed one into the other in long rolls. The baskets had probably come from Kalutara to Nanuoya by train, and we naturally speculated on their destination. With a good deal of probability, considering the extensive failure in planting after the ordinary fashion in the partially cleared forests below Nuwara Eliya, we credited the consignment to the local forest officers. In any case it would seem that it would be better for foresters and planters to incur the cost of such baskets, where sections of bamboo, or other substitutes, are not available, than to lose, as is so frequently the case, plants put out, which have cost so much in the shape of purchase of seed and labour expended on nurseries. Plants differ very much in sensitiveness to the effect of transplanting. Tea does well when put out at an early stage of growth and I believe better when of an age which renders "stumping" necessary. Frenelas, on the other hand, succeed as seedlings, but "insidious defunction" is the rule with plants above half a foot in height. Many of the Australian eucalypts, too, die from the effects of transplanting. No wonder though the grevilleas are such favourites: not only are they amongst the most free-growing and beautiful of trees, but the plants put out in anything like decent weather practically all succeed. That is in the hill and mountain regions, for of white toons and grevilleas recently sent to a low-country estate the report is that fully 80 per cent of the toons have succeeded, while 95 per cent of the grevilleas perished. The fact is probably significant of the zones in which each will best flourish, although I have seen some fine specimens of grevillea and also of Norfolk Island pine at Colombo.

The mention of the lowcountry estate in which I am interested reminds me of "Peppercorn's" recent allusion to the comparative failure of the plant from the fruit of which that clever writer has derived his *nom de plume*. Our climate in the south-west of Ceylon bears so much of general resemblance to that of Malabar, where some of the best pepper in the world is grown, that many of us thought that the vine ought to grow well and be fruitful of its special spice with us. In my own case I had encouragement in the shape of groves of jak trees in native gardens near my land, which were certainly not grown merely as ornamental creepers. I have, therefore, grown the vines to some extent on trees and on rocks, and in both cases, there has been no failure in luxuriant growth. But fruit has not been in proportion, and of the small quantities of peppercorns yielded, my native neighbours have for two successive years helped themselves pretty liberally. The effect of turning the tops of the plants downwards, of pruning and of watching will be tried before the experiment is abandoned; but I have a considerable degree of fear that pepper must be added to Liberian coffee, cacao, indiarubber trees and manioca as cultivation of a non-paying nature, in the locality where tea and coconuts flourish.

November 13th.

The fine weather remains unbroken, although the sky clouded over and there was an attempt to rain yesterday. The light, cool breeze we get is steadily from the north-east; and this clear, cold but sunny morning does not certainly indicate the proximity of rain. All we knew of *your* great rainstorm up here was the appearance of a mass of darkness far in the west and far below us, which led to the exclamation, "They are having heavy rain at Colombo." This being the last working day before the Tivali, extra pluckers have been crowded on to save the abundant tea flush. Another will be well on before steady work is resumed, we fear.

AFFORESTATION—AUSTRALIAN TIMBER TREES—USEFUL JAPAN TIMBERS—RICE CULTIVATION IN CEYLON.

NANUOYA, Nov. 12th.

In writing this morning about our yesterday's delightful trip to Hakgala and of the vast expanses of patana visible in Uva I mentioned the afforestation of portions of those patanas as desirable. Amongst the most barren portions of our patanas are those the soil of which consists mainly of ironstone. Now it is in soil of this nature in Western Australia that two of the best of the eucalypts flourish and bear timber of the best quality. I refer to the JARRAH (*E. marginata*) and the KARRI (*E. diversicolor*). Those trees and others ought, therefore, to be tried on such soils,

good-sized holes being of course dug for the reception of the plants or seed, and time for thorough æration being allowed before the seedlings or the seeds are deposited. The fact I have mentioned of specially fine timber trees growing best on hard ironstone soil has been stated by Baron Von Mueller and other writers on Australian trees, and has been repeated by the author of a paper on some of the leading Australian timbers written for the Institution of Civil Engineers in 1887, and to which Mr. Walter Tringham has been good enough to draw my attention. Mr. Chamier, M. I. C. E., the writer in question, gives a fair account of the conflicting testimony as to the power of jarrah to resist the attacks of the white-ant and *teredo navalis*. It seems to be certain that jarrah is one of the best wood for jetties and for many other purposes. Those purposes do not include its use as firewood, however; for Baron Von Mueller dwells on its non-inflammability as its great merit for roof shingles. The cost of working some of the best Australian timbers is great, on account of their weight and extreme hardness. But such qualities add to their value as sources of hard wood sleepers for railways. In this purpose, however, karri and red gum (*E rostrata*) timber seems superior to that of jarrah. It is interesting to learn from Mr. Chamier that he accompanied the late Mr. W. T. Doyne (the first Chief Engineer of the Colombo-Kandy railway) on an official visit to Western Australia for the purpose of reporting on harbour improvements when the magnificent jarrah forests and their utilization were reported on by Mr. Doyne. But the Government contented itself by according liberal encouragement to private enterprise. The export is considerable, and the demand in advance of supply. On the estate whence I write, as I lately mentioned, we have found this fine tree by no means a slow grower, and specimens of this eucalypt and of *E. robusta* are amongst our finest trees. The timber of the jarrah, like all others, would be more valuable and appreciated, if it were well seasoned. *Karri*, which grows to the size of 300 to 400 feet, resembles jarrah, but is not so red in colour. Its transverse strength is superior and it can be obtained in pieces of enormous size. Red gum (*E. rostrata*) differs from jarrah and karri, in preferring moist situations and yet its timber is of the very best quality, and is a special favourite for railway sleepers. This is the tree to grow beside streams or in swamps. Next to red gum Mr. Chamier classes the various iron barks, *E. siderophloia*, found mainly in New South Wales and Queensland. Its timber is one of the hardest and stronges t in existence. But it is of such slow growth that it may not be so suitable as many of its congeners for cultivation in Ceylon. The next tree mentioned by the writer is the world-famous blue gum (*E. globulus*), which grows rapidly enough in Ceylon and can be coppiced for firewood, but it seems to flourish in many other countries, the Cape, Algeria and even Italy, better than in many parts of our island. The timber is good, but, unless well seasoned, is apt to warp and shrn k. Mr. Chamier's list closes with stringy bark (*E. obliqua*). This, with *E. gigantea* and *E. capitellata*, yields the bulk of the "hard wood" used in Australia, useful for a large number of purposes, although not equal to those trees previously noticed.

In the same volume of the Proceedings of the Institution of Civil Engineers is a paper on useful Japan timbers, by Mr. J H. T. Turner, Assoc. M. I. C. E. The writer states :—"Of the 120 kinds of Japanese timber catalogued by the late Dr. Gesto, in the transactions of the Asiatic Society of Japan, the six following have been selected for notice, as those which chiefly concern the builder, namely Shira, Kashi, Keyaki, Aku Matsu, Kuro Matsu, Hinoki, and Sugi." The last-named is the so-called cedar, *Cryptomeria japonica*, of the timber of which most of the tea boxes used in Ceylon are made. Of "Momi," which is advertised as preferable, in being destitute of odour, I find no mention. The shooks we get here are composed entirely of Sugi wood, which is just a superior kind of deal, occasionally prettily marked with wavy shadings, so that I cannot doubt its looking well as furniture or wainscoting, if polished and varnished. But neither when I have stood close to the carpenters when they were planing and fitting the pieces have I observed any marked odour, nor have we ever had complaint of its affecting the tea through the lead lining. The tree, *C. japonica*, is very largely and successfully grown in and around Nuwara Eliya and personally I have readily invested in a pound of the seed advertised by Messrs. Mackwood at so moderate a price. Apart from our own experience of this handsome, araucaria-like tree, the sight of some fine specimens, well-grown at an early age, in the Hakgala Gardens yesterday quite reassured us of this being a good tree to grow. So, we should think must be the very handsome *Pinus sinensis*, resembling considerably in foliage that king of pines, the *Pinus longifolia* of the Himalayas, with its copious bunches of foliage consisiting of spines so long and elastic as to look like masses of green hair. Mr. Nock is growing some other pines, including *Pinus canariensis*. The sugi, or *Cryptomeria japonica*, may not yield a first-class timber ; but it is useful and easily wrought, and, although last on Mr. Turner's list, it stands well with us for readiness of growth and beauty of form. Specimens of a little over four years old in Nuwara Eliya are over 20 feet high, although they have put on abundance of lateral branches from the root upwards. The timber is useful for house work as well as for tea boxes and like purposes, Mr. Turner describes Keyaki as the most important of his group. Its scientific name is *Zelkova Keaki*. The wood is light brown, strong and durable, handsomely marked and takes a fine polish, so that it is valued for furniture. This tree ought, if possible, to be introduced into Ceylon. The Shira Kashi is an oak, (*Quercus glauca*), and, therefore, not likely to be successful here. The *Aka Matsu* or Me Matsu or Red Pine (*Pinus densiflora*) seems a very useful tree equally good for house building and all kinds of carpentery. This tree ought, also, to be tried in Ceylon. So also, ought the Kuro Matsu or O-Matsu (*Pinus Thunbergii*), the common timber of the Japan hill forests. Still more valuable, apparently, is the Hinoki (*Chaecypario obtusa*), good for house construction, railway sleepers and cabinet work.—In Japan, as in many other countries, the trees are cut at too early an age and the timber is very imperfectly seasoned. The proper cutting age of the trees named varies from 30 to 50 years, but there can be little doubt that in our climate maturity will be attained at half the periods required in Japan. Many of the trees good for timber at an advanced age must be useful for fuel at much early periods of their existence,a good proportion coppicing freely. *Cryptomeria japonica*, we cannot doubt, will coppice well, seeing that it can be easily propagated from cuttings. This we know from experience as well as from books. Mr. Turner mentions that in Japan "neglect of seasoning is seldom aggravated by the use of paint of any kind, but it is not unusual to stain wood with shibu (the juice of persimmon) darkened with lamp black or ashes. Shibu is a powerful astringent, and does not hinder the sap from leaving the green timber, whilst it affords some protection from the weather." We suppose most of our readers are aware that lime in moderate

quantity is useful, placed in water where logs of timber are seasoned; and that, applied in quantity and directly, it gives a dark hue to the lightest coloured wood.

I have read with interest and pleasure the very able letter, signed "A.," on Rice Culture in Ceylon, proving that whatever the force of the sentiment of regard for "patrimonial inheritance" may be, it cannot possibly account for thousands of persons, year after year, being willing, or, even if they were willing, being able to continue an unremunerative pursuit. Rice-growing must certainly be remunerative, according to the native standard of profit, or it would not be persevered in. As the writer points out, if the returns are not such as might be obtained by superior modes of cultivation, the pursuit suits native idiosyncracy, because, if the results are moderate, so is the amount of physical labour necessary to obtain them: a few weeks of exceptional work and then mouths of the dearly loved *dolce far niente*. The late Mr. James de Alwis went the length of saying that Europeans often did injustice to native cultivators from ignorance of their habits. "Ye are idle! ye are idle!" has been said of them when observed sleeping during the day hours, by persons who knew not that the preceding night had been spent in labour on the fields. And it is a fact that I have personally seen the Jaffna cultivators busy raising water from wells and irrigating their fields on moonlight nights. The natives can work hard and continuously, occasionally, so as by the results of such labour spurt to secure the luxury of absolute idleness for lengthened periods. This, in a pursuit which is ordinarily remunerative, or it would be abandoned. But there can be no question that with steady industry applied to improved modes of culture, the pursuit would be far more remunerative and the condition of the cultivators far better and happier than is at present the case. That is, if to steady industry in improved cultivation, provident habits were added. The object of the School of Agriculture and its *alumni*, the "Agricultural Instructors," scattered over the country, and of gentlemen like Mr. Elliott, is to teach the people to increase the produce of their lands by improved methods of agriculture and by steady instead of spasmodic work, and also to inculcate such provident habits as saving seed-paddy from the proceeds of harvest, instead of paying, as many of them do, 50 per cent per crop season for its supply. If the landlord supplies the seed and receives it back with 50 per cent added, it will be acknowledged that this is unjust to the labourer, whose share is in proportion lessened. But in most cases the seed-paddy is supplied by outsiders, who also lend money for exorbitant interest on the mortgage of lands. This it is, the going into debt to usurious moneylanders, which weighs down the cultivators here as in India, and which in the latter country has induced Government to pass exceptional laws, providing that in no case can the land be alienated, and arranging a system of money advances by Government to the cultivators at moderate interest, a system which our Government might well imitate. For the rates of interest charged by ordinary moneylenders are generally excessive and ruinous. In a large number of the cases of experimental land settlement by Mr. J. H. de Saram, the lands were mortgaged, in most instances to members of the "great unpaid" class, for sums on which 16½ per cent interest (why the odd fraction?) had to be paid. How can any ordinary enterprise bear such a rate, or the much higher rates which I believe are in many cases exacted! While, therefore, it is certain that paddy cultivation pays fair returns, or it would be abandoned, it has to bear burdens compared to which the Government rent of less than 10 per cent is as nothing. The efforts of those who are labouring in a legitimate manner to improve the condition and lighten the self-imposed burdens of the goyiyas are, therefore, worthy of all encouragement and praise.

MOISTURE ON PLANTS MISTAKEN FOR DEW—FROST AND TEMPERATURE AT NUWARA ELIYA—THE DEPOSITION OF DEW—MIST EQUIVALENT TO RAIN—EFFECT OF DUST IN THE ATMOSPHERE—THE MIST LINE AND COFFEE—MIST AND HEALTH—FIGS—FINE WEATHER.

NANUOYA, Nov. 14th.

Now that the season is approaching, has indeed arrived, when, according to the popular conundrum, the moisture which ascended from the earth for *sun-dry* reasons will descend in *dew* (due) time, Dr. Macpherson's article in *Longman's Magazine*, embodying the results of the very interesting experiments by Mr. Aitken, F. R. S., of Falkirk, possesses special interest. It seems that moisture on plants, which for centuries has been mistaken for dew, is really exuded from the leaves by an amount of reserve energy in the roots, which in the case of healthy vegetation acts with a force quite remarkable. That the leaves of plants exuded moisture, especially when exposed to sunlight, has been long known, and the process was described by Boussingault in the case of mint. What Mr. Aitken has established, besides measuring the force with which the roots act, is that the moisture excreted from the leaves of grass and other plants in a healthy condition takes invariably the form of a drop (what in Scotland we call a blob) resting on the extremity of the leaf, and that such false dew exists when true dew, for which it has constantly been mistaken, is entirely absent. We have all been in the habit of crediting the atmosphere with depositing condensed moisture, when in reality, the moisture has come from the earth and has been forced up the stems of plants and out through the pores of healthy leaves by a species of energy even more remarkable than that which enables some forms of mushrooms to upheave not only superincumbent earth but even heavy masses of stone. Dead or withered leaves never show this excreted moisture, but they can be "wet with the dews of the night;" with moisture diffused over their whole surface. So with healthy leaves: in addition to the *drops* of excreted moisture at their points, their whole surface, and specially their lower surfaces, can be rendered diffusively moist by true dew, which is *always* evaporated from the earth, that earth being ever warmer than the air in contact with it. If plants or stones or any substance on the earth's surface have been rendered cold, or rather have been deprived of their warmth by the radiation of heat into space, the moisture coming warm from the earth is condensed on such cold objects, especially on their undersides; the dew, in a very low temperature, taking the beautiful form of rime or hoar-frost. This is the explanation of the snow-white appearance so frequently assumed on cold, clear nights and mornings by the grassy plains of Nuwara Eliya, in the winter months of November, December, January, February, and March, —the cold, or rather the abstraction of heat, being there intensified by the evaporation of swamp moisture as well as the radiation of heat. In February and March the mean nocturnal temperature at our Sanatorium is 7 deg. below the mean shade temperature: that is the mean nightly temperatures for those months is 50 deg. and 51 deg., against

57 deg. and 58 deg. mean shade temperature. But on exceptional nights the temperature goes down to freezing point. For instance, in January and December 1859, the minimum nocturnal temperature went so low as 32 deg.; in February 33 deg.; in November 33 deg. 3; and in March 34 deg. Coffee trees growing in swamps, at elevations far below that of Nuwara Eliya, were sometimes blighted ("killed by frost" was the popular idea) in very clear cold weather. Of course the injury arose from air near the ground chilled by the combined effects of evaporation of moisture and radiation of heat into space. There can bo cold at night and in the early mornings, intense enough to injure vegetation, without the presence of actual frost. But to return to Mr. Aitken's conclusions regarding dew. It will be obvious that dew, owing its origin always to the earth, as he has proved, is not always condensed by plants or other objects near the surface. Much of it occasionally ascends into the atmosphere, until it meets with strata cold enough to condense its minute particles. It then [illegible] back to the earth whence it arose, if there is a [illegible] is blowing it may be carried [illegible] hard and

ERRATA.—On page 452, 2nd column, last line of subheadings, "FIGS" should be "FOGS." On page 453, 1st column, line 25, for "added" read "*eddied*," and in line 34, "subjects" should be "*objects*."

[illegible] has been conden[illegible]
or in one of "the fields of uppe[illegible]
I have correctly represented the main results of Mr. Aitken's interesting experiments as embodied in Dr. Macpherson's paper; but the paper is so interesting and in some aspects so important, that I trust you may be able to reproduce it in its entirety. In any case I cannot deny myself the pleasure of quoting the concluding paragraph, in which the scientific facts are clothed with the language of poetry, thus:—

These two facts, then, have now been established: that what was long considered to be dew is merely the exudation of vigorous plants, and that true dew rises from the ground. Brilliant globules are produced by the vital action of the plant—the liquid being the *elixir vitæ* of vegetation—showing life in one of the most charming forms in the phenomena of nature, especially when the deep-red setting sun makes them glisten all a-tremble with gold light; while an infinite number of minute but glistening particles of moisture bedeck the blade-surfaces in the form of gentle dew, which has risen in water-vapour from the warm bosom of Mother Earth, to refresh the thirsty plants and diffuse fragrance all around.

I wish I knew as much about one of the earliest meteorological phenomena mentioned in the sacred record,—the "mist" which "arises out of the ground" in a moist state of the earth, as, by means of the paper referred to, I now do about the dew, which is peculiar to weather in which the atmosphere contains the minimum of moisture. In Nuwara Eliya, for instance, rain and mist prevail in June, when the average mean relative humidity is represented by so high a figure as 95 deg.; dew, in its frozen state, giving hoar-frost in Feb.; the average humidity of which month is so low as 73 deg. Mr. Blanford in his valuable work on the weather and climates of India and Ceylon is less satisfactory in dealing with haze and fog, than in any other department of the work. He does not seem to have studied the phenomenon of mist in mountain regions, such as that whence I write, and where for days together sometimes the sky is darkened by dense vapour at and above 5,000 feet altitude, while brilliant sunlight prevails below the limit mentioned. While dew is condensed by cold, it would seem as if heat were the agent required to dissipate fog or mist. And yet there is a haze which owes its origin to heat. I always feel that above 5,000 feet here the prevalence of mists should count a good deal in qualification of our comparatively limited annual rainfall of 90 inches. That quantity must be equivalent to over 100 inches where mist does not prevail? Why does it prevail, and why is it occasionally so unpleasantly persistent, and why is mist-moisture not rapidly condensed and precipitated by the cold of the atmosphere, as dew vapour is? For above the mist line the temperature is appreciably colder than at the lower altitude, where, if mist does form, it soon "lifts" or is dissipated. But for dust in the atmosphere, we are told, rain [illegible] not resolve itself into drops, but would [illegible] every material thing including the interiors [illegible]lings as much as their exteriors. In that [illegible] does the absence of dust at high altitudes [illegible]at for the frequent prevalence of the perva- [illegible]form of moisture known as fog or mist? [illegible]ord does not help me with answers to such [illegible]ions, except as answers may be found in terms [illegible]ief as the following, under the heading "Fog":— [illegible]is a well known physical fact that two masses [illegible]ir at different temperatures, and both completely [illegible]ged with invisible vapour, when intermingled, [illegible] no longer hold the whole quantity in suspension; [illegible] excess must therefore be deposited as fog." But [illegible] diffused particles of moisture which constitute [illegible] are surely not deposited? They sometimes [illegible]main suspended in the atmosphere for days. The Rev. Joseph Burnet, a very careful observer, mentioned to me the curious fact that the line of prevalent mist and of connected success in coffee culture in the Matale districts of our hill region was found to be 4,500 feet. Here the line is about 5,000 feet, and on the eastern side of the mountain system it is higher still, coffee having flourished at 5,500 in Haputale. Except in cases of bronchial affections, misty weather does not seem to be insalubrious, but on the contrary healthier than hot, bright, dry weather. It is a popular belief that, as mountains are denuded of forest, mist will disappear, but my experience does not confirm this belief. It seems mainly a question of altitude and, no doubt, of temperature of the air as the result of altitude. In cold, north-east monsoon weather, however, we often look down from our clear heights on lower ranges and valleys enveloped in a sea of white mist, I have no meteorological work at hand to refer to, except Blanford's, and the Penny Cyclopedia is now somewhat ancient. Still the following seems worthy of quotation:—"Mist. The vapour of water, when mixed with air of the same or a higher temperature, is invisible; but when the temperature of the air is reduced below that of the vapour, the vapour becomes visible and forms a mist. * * It has been found that the quantity of vapour in the air diminishes nearly uniformly with the temperature, from the equator to the poles. But as the quantity of vapour which the air will hold at any given temperature is limited, whenever that quantity is at or near the point of saturation, a very small reduction of temperature renders the air misty, and a further reduction converts the vapour into rain."

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57 deg. and 58 deg. mean shade temperature. But on exceptional nights the temperature goes down to freezing point. For instance, in January and December 1889, the minimum nocturnal temperature went so low as 32 deg.; in February 33 deg.; in November 33 deg. 3; and in March 34 deg. Coffee trees growing in swamps, at elevations far below that of Nuwara Eliya, were sometimes blighted ("killed by frost" was the popular idea) in very clear cold weather. Of course the injury arose from air near the ground chilled by the combined effects of evaporation of moisture and radiation of heat into space. There can be cold at night and in the early mornings, intense enough to injure vegetation, without the presence of actual frost. But to return to Mr. Aitken's conclusions regarding dew. It will be obvious that dew, owing its origin always to the earth, as he has proved, is not always condensed by plants or other objects near the surface. Much of it occasionally ascends into the atmosphere, until it meets with strata cold enough to condense its minute particles. It then falls back to the earth whence it arose, if there is a calm; but if wind is blowing it may be carried and added so as to fall on surfaces so hard and dry, that obviously from them no moisture could be derived. This is the explanation of dew on arid ground and on rocks which possess no moisture or none near their surface. It follows from all that has been stated, that, unless we carefully observe and distinguish, we may be deceived by leaf-excreted moisture into assuming the presence of dew when it is absent. But I submit that when we see such subjects as spiders' webs of the most beautiful and elaborate geometrical forms made conspicuous in every detail by means of diamond-like reflections of sunlight from copious moisture on every filmy thread, we cannot be mistaken as to the existence of genuine dew which has been condensed near the surface of the earth or in one of "the fields of upper air." I believe I have correctly represented the main results of Mr. Aitken's interesting experiments as embodied in Dr. Macpherson's paper; but the paper is so interesting and in some aspects so important, that I trust you may be able to reproduce it in its entirety. In any case I cannot deny myself the pleasure of quoting the concluding paragraph, in which the scientific facts are clothed with the language of poetry, thus:—

These two facts, then, have now been established: that what was long considered to be dew is merely the exudation of vigorous plants, and that true dew rises from the ground. Brilliant globules are produced by the vital action of the plant—the liquid being the *elixir vitæ* of vegetation—showing life in one of the most charming forms in the phenomena of nature, especially when the deep-red setting sun makes them glisten all a-tremble with gold light; while an infinite number of minute but glistening particles of moisture bedeck the blade-surfaces in the form of gentle dew, which has risen in water-vapour from the warm bosom of Mother Earth, to refresh the thirsty plants and diffuse fragrance all around.

I wish I knew as much about one of the earliest meteorological phenomena mentioned in the sacred record,—the "mist" which "arises out of the ground" in a moist state of the earth, as, by means of the paper referred to, I now do about the dew, which is peculiar to weather in which the atmosphere contains the minimum of moisture. In Nuwara Eliya, for instance, rain and mist prevail in June, when the average mean relative humidity is represented by so high a figure as 95 deg.; dew, in its frozen state, giving hoar-frost in Feb.; the average humidity of which month is so low as 73 deg. Mr. Blanford in his valuable work on the weather and climates of India and Ceylon is less satisfactory in dealing with haze and fog, than in any other department of the work. He does not seem to have studied the phenomenon of mist in mountain regions, such as that whence I write, and where for days together sometimes the sky is darkened by dense vapour at and above 5,000 feet altitude, while brilliant sunlight prevails below the limit mentioned. While dew is condensed by cold, it would seem as if heat were the agent required to dissipate fog or mist. And yet there is a haze which owes its origin to heat. I always feel that above 5,000 feet here the prevalence of mists should count a good deal in qualification of our comparatively limited annual rainfall of 90 inches. That quantity must be equivalent to over 100 inches where mist does not prevail? Why does it prevail, and why is it occasionally so unpleasantly persistent, and why is mist-moisture not rapidly condensed and precipitated by the cold of the atmosphere, as dew vapour is? For above the mist line the temperature is appreciably colder than at the lower altitude, where, if mist does form, it soon "lifts" or is dissipated. But for dust in the atmosphere, we are told, rain would not resolve itself into drops, but would saturate every material thing including the interiors of dwellings as much as their exteriors. In that case does the absence of dust at high altitudes account for the frequent prevalence of the pervasive form of moisture known as fog or mist? Blanford does not help me with answers to such questions, except as answers may be found in terms so brief as the following, under the heading "Fog":—"It is a well known physical fact that two masses of air at different temperatures, and both completely charged with invisible vapour, when intermingled, can no longer hold the whole quantity in suspension; the excess must therefore be deposited as fog." But the diffused particles of moisture which constitute fog are surely not deposited? They sometimes remain suspended in the atmosphere for days. The Rev. Joseph Burnet, a very careful observer, mentioned to me the curious fact that the line of prevalent mist and of connected success in coffee culture in the Matale districts of our hill region was found to be 4,500 feet. Here the line is about 5,000 feet, and on the eastern side of the mountain system it is higher still, coffee having flourished at 5,500 in Haputale. Except in cases of bronchial affections, misty weather does not seem to be insalubrious, but on the contrary healthier than hot, bright, dry weather. It is a popular belief that, as mountains are denuded of forest, mist will disappear, but my experience does not confirm this belief. It seems mainly a question of altitude and, no doubt, of temperature of the air as the result of altitude. In cold, north-east monsoon weather, however, we often look down from our clear heights on lower ranges and valleys enveloped in a sea of white mist, I have no meteorological work at hand to refer to, except Blanford's, and the Penny Cyclopedia is now somewhat ancient. Still the following seems worthy of quotation:—"Mist. The vapour of water, when mixed with air of the same or a higher temperature, is invisible; but when the temperature of the air is reduced below that of the vapour, the vapour becomes visible and forms a mist. * * It has been found that the quantity of vapour in the air diminishes nearly uniformly with the temperature, from the equator to the poles. But as the quantity of vapour which the air will hold at any given temperature is limited, whenever that quantity is at or near the point of saturation, a very small reduction of temperature renders the air misty, and a further reduction converts the vapour into rain."

According to my observation the mists to which we are subject up here are not often condensed into rain *in situ*. They are generally raised into the higher atmosphere, to be there, no doubt, brought into contact with strata of cold air or frozen moisture, by which they are condonsed and sent earthwards again in the shape of rain-drops?

Fogs have their own merits. Some of these are noticed by Hartwig in "The Aerial World," thus:—"By preventing nocturnal radiation into space, they prevent many a tender plant from being nipped" by cold. Misty weather is also, no doubt, favourable to success of transplanting operations. On the other hand, the change to such weather as we are now enjoying is delightful, not only for its cheerful influences generally, but for the impulse it gives to flowering as well as flushing. The wealth of blossom now out is wonderful, the rose bushes being especially glorious in abundance of buds and flowers, in richness of colour and in many cases in exquisite odour. "Now is the winter of our discontent made glorious summer."

Your goodnature must have been in the ascendant, when you admitted so much controversy about a matter so plain as that a man pursuing a squirrel which he never overtakes cannot possibly go round the animal. Someone will next ask if two parallel lines cannot meet. Whatever possessed Vantosky Benton, the philological and poetical, to father the proposition of a (pseudo) "scientific friend" that a man who goes in a circle always with his face one way and who never gyrates "turns on his axis"? I feel inclined to join the Bengalee Baboo, who execrated Sir George Campbell's *cui bono*! That for the mock scientist. As for the true poet, to him, even in his association with a strange bedfellow, I say:—

"While terra firma on its axis,
Diurnal turns,
Believe me, both in faith and practice,
Yours, ——."

The propounder of the self-solving riddle has the merit of having done justice to the agility of the squirrel, however. There is one beside me as I write. Not Miss Jewsbery's "little mime and thief" of the Colombo coconut topos, which he makes musical with his metallic notes; but a grey mountain squirrel, with a long-spotted tail. To this appendage he evidently attaches much importance, dressing it carefully when he so funnily and with such care performs his toilet. He is such a dear affectionate little pet: a greatly improved edition of a monkey, with his pretty hands and his flesh-coloured nose. When awake he is incessantly in motion, and when inclined to sleep he curls himself up and wraps his tail around him. A bit of a Huntley & Palmer's biscuit gains his heart, and in an empty biscuit tin in his cage he frequently indulges his nest building instinct, packing it full of straw and then attempting to pack himself into it. When a finger is presented to him, he nibbles at it and pretends to bite, but he never does so. The case is very different with his neighbour, an Australian parrot of brilliant plumage. *He* likes to have his neck scratched and his head stroked, but in the midst of a purring noise by which he expresses his pleasure he gets tired, and then he makes no pretence of biting, but uses his nutcracker beak with emphasis. When the squirrel first came and received attention, the parrot rushed between with jealousy and anger, and now he often clings to the bars of the cage and attempts to catch the squirrel, vain attempts which the animal seems to enjoy. Indeed I think the parrot himself is actuated by the sense of fun, for, although in our quadrangle he plays amicably with the Australian magpie, he posts himself at the door of this bird's cage to prevent access, biting at the long legs of the "magpie." The latter, instead of using his sharp bill, takes the parrot's action all in good part.

To pass from birds to snakes, it would be very interesting to know if the snake mentioned by Mr. M. H. Thomas, which projected its venom into the Madras officer's eye, was able to do so by voluntary muscular effort, or whether, in the effort to strike, its head did not come in contact with some object which led to the spurting away of the poison? My inclination is still to doubt the power of projection. That the deadly reptiles should be provided with apparatus most efficient for the purpose of injecting a deadly fluid, seems mystery enough.

"TEA-PLANTING IN CEYLON."

TWELVE VIEWS "WITH THE SEASON'S GREETING FROM CEYLON."

Messrs. H. W. Cave & Co.'s Christmas booklet is an extremely neat production, the cover with its coloured picture of Lanka's coast, fishing-boats and palm trees which has been engraved and printed here, being fully worthy of the twelve Views (from photographs of the late Mr. M. H. Clerke of Effindale estate,) reproduced at home. The price being so low as two rupees a copy, there is sure to be a great run upon this most attractive Christmas gift. The Views include:—'General View of Estate, Bungalow and Factory, Tea Nursery, Pruning, Plucking, Weighing-in, Withering, Firing, Sorting, Sifting, Packing, Shipping.' A nicer X'mas gift from Ceylon to friends at home there could not be; and if accompanied with a few lb. of good Ceylon tea, all the better. Happy thought: let our tea dealers buy up the edition from Messrs. H. W. Cave & Co. to distribute with their packets!

SCOTTISH TRUST AND LOAN CO. OF CEYLON.

The thirteenth annual meeting of the Scottish Trust and Loan Company of Ceylon was held yesterday in Edinburgh—Mr. Henry Johnston, advocate, presiding. The report showed a credit balance of £5,925, of which the directors proposed to write off a loss of £3,000 on estates. A dividend of 5 per cent was recommended. The report was approved. Mr. F. A. Bringloe, C.A., was appointed secretary in place of Mr. J. C. Penney retired. —*Glasgow Herald*, Oct. 25th.

NOTES ON PRODUCE AND FINANCE.

CONTROLLING THE SUPPLIES.—As a result of the action lately taken by the Brokers' Association, it is satisfactory to note that the supplies of Indian tea, although pretty heavy are not in excess of the quantity the dealers are able to cope with. It is to be hoped that importers, in their own interests as well as those of the whole trade, will use every endeavour to support, as far as is practicable, the efforts of their representatives in the "Lane."

TESTIMONIAL TO MR. JAMES TAYLOR.—Acting in accord with The Ceylon Planters' Association, the Executive Committee of the Ceylon Association in London has appointed Messrs. J. Whittall, H. K. Rutherford, J. L. Shand, and Wm. Martin Leake as a sub-committee to collect funds at home for a proposed testimonial to Mr. James Taylor, of Loolecondura Estate, who has played so important a part in the introduction and cultivation of tea in Ceylon. In 1862 the first considerable experiment in the

practical cultivation of cinchona in Ceylon was entrusted to Mr. Taylor. And so successfully was it conducted that in the year 1885-86 upwards of 15,000,000 lb. of bark were exported from Ceylon. In 1866 Mr. Taylor began making experiments in the manufacture of tea with leaves growing on bushes in the gardens of Loolecondura and Waloya bungalows. During the same year tea was first planted out on the former estate, the seed being obtained from plants of China tea growing in the Royal Botanical Gardens at Peradeniya. Early in 1868 Mr. Taylor received from Calcutta the first consignment of Assam Hybrid tea seed. Unfortunately these seeds failed. A second consignment arrived at Looleeondura on the first day of 1869 and with plants raised from these a field of twenty acres that had been cleared for tea in 1867 was planted before the end of the year. While these bushes were coming into bearing, Mr. Taylor was unremitting in his endeavours to perfect himself in the preparation of the leaf. And to such good purpose did he work that in 1872 he was able at once to produce a tea of such quality as not only to ensure the ready sale in Ceylon of all his produce, but also to secure the approbation of the leading London brokers. The following sums have already been subscribed:—The Right Hon. Sir W. H. Gregory, K.C.M.G., £5; Sir Alfred Dent, K.C.M.G., £5; J. Whittall, Esq., £5; H. K. Rutherford, Esq., £5; J. L. Sband, Esq., £5; Messrs. Matheson and Co., £10; Messrs. Baring Bros. and Co., £10; G. D. B. Harrison and W. M. Leake, £5; John Hamilton, Esq., £5; Messrs. Anderson Bros., £5; Norman W. Grieve, Esq., £5.

INDIAN TEA IN RUSSIA.—According to a telegram from Vienna, the Russian Finance Minister, M. Vishnegradski has proposed to the Council of State to sanction a considerable increase of the duties on tea imported from British India. The new tariff will greatly affect the British tea trade, which is carried on through Turkestan.—*H. & C. Mail.*

CINCHONA DUTCH MARKET:

AVERAGE 3·92 PER CENT SULPHATE OF QUININE.

Amsterdam, October 29th.

All the analyses for the cinchona bark sales to be held in Amsterdam on November 6th have been published now, and the manufacturing bark contains about 13½ tons sulphate of quinine, or 3·92 per cent on the average. About 27 tons contain 1·2 per cent; 59, 2·3; 80, 3·4; 123, 4·5; 31, 5·6; 15, 6·7; 7, 7·8; 1, 8·9 sulphate of quinine.—*Chemist and Druggist.*

A GARDEN OF PAMPAS GRASS.—We read in *Garden and Florist* of a garden of Pampas-grass of 10 acres in extent, which is one of the objects of interest to tourists who visit Anaheim, California. This year about 40,000 plumes will be harvested, and the yield after the plants have become well established, will average 100,000 plumes. These plumes are worth about 5 cents apiece.—*Gardeners' Chronicle.*

PROFESSOR VAUGHAN-STEPHENS who returned from Pahang by the last trip of the S. S. "Glanggi," has covered a considerable stretch of country in the course of his recent ethnological explorations among the Sakeis and other wild tribes, chiefly between the Sungei Bubau and the Kemaman river. He has brought back a large quantity of the famous ipoh poison used to tip blowpipe arrows, and also a quantity of various other barks and saps for analysis. Thirty-eight living ipoh plants have been brought down by Professor Vaughan-Stephens and have been handed over to Mr. Ridley at the Botanical Gardens. The Professor has also brought down a large number of cases of Sakei curios of sorts. In the course of his tour he has received much kindly assistance from various European officers and other residents in Pahang including Messrs, Mitchell and Wall, Mr. J. A. Boll, and Mr. McEwen (Kubang).—*S. F. Press*, Oct, 31st.

NOTES ON POPULAR SCIENCE.

BY DR. J. E. TAYLOR, F.L.S., F.G.S., &c.,
EDITOR OF "SCIENCE GOSSIP."

Dr. Cunnigham's paper on the fertillisation of *Ficus Roxburghii* is creating much interest amongst botanists, inasmuch as it reveals the possibilty of certain flowers having the female parts fertilised without pollen. Dr. Cunuiugham shows that in the above species of fig the process of ordinary pollenation is impossible, and he believes that the embryo arises as an outgrowth of the cellular tissue of the body of the ovule outside the embryo sac, and not as the result of any development within it such as happens after ordinary pollenation. Minute insects gain access to the interior of the fig, and these set up irritation and overgrowth, so that both male and female flowers are possibly matured by the overgrowth of the receptable caused by insect irritation, and the embryos of the female flowers may be due to the same agency.

It is interesting to notice that your Moreton Bay pine (Araucaria Cunninghami) which forms such dense forests in Queensland, and is such well-known ornamental tree in and near all Australian cities and towns, has been discovered on the recently explored mountains of New Guinea at the height of 10,000 ft. What adds to the interest of this remarkable tree is the geological fact that during the early tertiary period it was a native of England, for its leaves, fruits, &c., have been found at Bournemouth and elsewhere, and have been described in the volumes of the Palæontographical Society by Mr. J. Starkie Gardiner.

The phylloxera is very much abroad in France this year, and, you will be all sorry to hear, in the Champagne district, it has hitherto avoided. An inspector of vine disease has been sent down to investigate and report, so you may imagine how hopeless the case is. The district between Vincelles and Treloup is that most affected.

Mr. A. W. Badger read an important paper last week before the Royal Horticultural Society on drying fruit by evaporation. Specimens were produced, and subjected to much criticism. The process, however, is an accomplished fact, but the worst remains behind. At present, drying necessarily destroys the flavour. Mr. Badger's aim was to introduce the American fruit evaporators to the notice of British fruit-growers. He claimed that evaporated fruit keeps better, and is more digestible and nutritious than when sun-dried or kiln-dried. In one district in the western portion of New York State, within a radius of 40 miles round the city of Rochester, no less than 37¾ millions of pounds of evaporated fruit was produced the last season but one, realising the value of £297,000. The greater part of these crops consisted of apples. One pound of evaporated apples, he said, contained all the constituents of six pounds of fresh fruit. Only water, he declares, is lost, and this is replaced by soaking. But it was contended, in the discussion which followed, that the evaporation volatilises the aroma.

Mr. E. H. Acton has recently shown that, notwithstanding the prevalent opinion to the contrary, some green plants can assimilate carbon from certain organic compounds in the absence of carbonic acid from the atmosphere. He prepared what he calls a normal "culture solution" for the purpose, and he concludes that green plants cannot normally obtain carbon for assimillation from any substances except carbo-hydrates, but that a compound may be a source of carbon to the leaves although not to the roots.—*Australasian.*

SUNFLOWER CULTURE IN CEYLON.—We have to thank Dr. Tothill for his letter giving the results of his several experiments in sunflower cultivation in Ceylon. These are not very encouraging, although it is evident that a trial under the immediate care of a resident planter might turn out much better, and to secure an oil equal in value to olive oil is a result not to be despised, apart from the other advantages mentioned.

CROPS IN INDIA:

SEASON TELEGRAM TO THE GOVERNMENT OF INDIA.

Week ending Nov. 1st.—North-east monsoon, though late, has fairly set in and good rain has fallen in all the southern districts and in Ganjam and Nellore. Standing crops generally good, and reviving after recent rains in several districts. Want of rain and of water still felt in parts of Vizagapatam, Kistna, Nellore, Cuddapah, North Arcot, Chingleput, Salem and Malabar. Paddy in Godavari and oil-seeds in parts of Cuddapah blighted; sugarcane damaged by heavy rains in parts of Coimbatore. Locusts appeared in parts of Ganjam, Cuddapah and North Arcot. Outturn of grains generally middling. Prices, rice and cholum rising, other grains falling. General prospects improving.

MALARIAL TROUBLES.

It is not every one who has a proper conception of what malaria means and really is. Malaria really means bad air, but for some reason, difficult to define, it has been restricted to the emanations from swampy districts. For example, a man who has fever and ague, or, as it is known among professional men, intermittent fever, is said to be suffering from malaria; whereas a man suffering from the noisome effects of sewer-gas in his house is assuredly the victim of malaria, though not suffering from intermittent fever. The fevers then, and the ailments following in their wake, that are produced in districts where there are warmth and decaying vegetable matter, are said to be malarial.

Malaria is a hydra-headed disease. Even that one form of it, "fever and ague," presents itself in various forms. It occurs most frequently in newly-populated districts; and in lands from which it has been supposed to have vanished it has been reproduced when their soil was turned. A man who has suffered once may suffer again, after a score of years, by simply running down in health. It may appear first as a chill, followed by intense fever, which, in its train, is followed by a sweating stage. It may appear simply as an intense neuralgia, and it may be noted that the most frequent from of malarial neuralgia appears over the brow, and is known as "brow ague." As if there was some similarity, distant no doubt, between paludal fevers and sewer-gas poisoning, it may be noted that neuralgic symptoms characterize both, and quinine certainly seems beneficial to both.

Formerly, quinine, and indeed all the cinchona prepartions, were more appreciated than they are at present. In the whole range of medical treatment nothing ever is encountered which is more wonderful than the action of quinine in malarial fevers. With its administration, the disease disappear, and that quickly. No doubt the dwellers in old countries and the residents of old towns would derive great benefit from a far freer use of quinine, and here we should take occasion to point out that the ordinary sulphate of quinine, the form usually used, is objectionable; it irritates the stomach, is quite insoluble, and is frequently not all absorbed.

The soluble Quinine Tabloids are the best preparation, inasmuch as one of them dissolves in a little water the minute it touches it. They do not irritate the stomach, can be taken without the taste being perceived, and none of the drug is lost in the system. Those suffering from enervated health, whether from sewer-gas, or marsh emanations, overwork, worry, sleeplessness, or any of the thousand ills that go hand in hand with civilization, will find quinine useful—more useful as a tonic than any of the myriad drugs that glut the market.

Under ordinary circumstances a two-grain Tabloid is sufficient. In malarial troubles as much as twenty grains should be taken in a day.—*"Health" London.*

THE ENEMIES OF COTTON:

IN THE HAPITIGAM KORALE, CEYLON.

No. 1. Rats dig out and eat the seeds before they germinate.

2. A fly cuts holes in the leaves.

3. A grub rolls up the leaves and lives on them.

4. A grub enters the pods shortly after they form, and eats the seeds.

5. Rats break up the pods as they approach maturity, eat the seeds, and scatter the fibre mixed with the seed husks on the ground.

Result of all those encouragements: one sound pod in fifty.

A very prolific species of ladybird swarms on the bushes, but seems harmless, living probably on some excretion of the plant.

We will be good boys and never do it again.

WIREWORM AND LIME.—A correspondent of the *American Florist*, October 1st, asserts that 3 or 4 lb. of unslaked lime to every bushel of soil to be used, will act so perniciously on the wireworms contained in the soil that they will give it a wide berth. The best way to use the lime is to spread the soil in a flat heap, say 10 or 12 inches high, and place the required quantity of lime on the surface, and when the latter is slaked, it should be pulverised and mixed thoroughly with the soil.—*Gardeners' Chronicle.*

ARTESIAN WELLS AT MADRAS.—A bore at Negapatam has been sunk to a depth of only 200 feet which in the country of Artois itself would have been considered extremely moderate and far below the average. With a bore of this depth the water rose to within one foot of the ground surface, thus practically demonstrating that an artesian spring had been struck. In the Madras Presidency at least wells have not been bored to any great depth and great advantages might accrue if the Negapatam Councillors persevered in their efforts to sink the bore deeper, even though it may not be clear to them that better results would be achieved. The Government order on Dr. King's Report promises help from Provincial funds as an inducement to the Councillors to continue work. As it now stands the well is a success in as far as the two essential requisites of a water-supply, namely, quality and quality, have been secured.—*Pioneer.*

"CLEARING THE AIR" OF DISEASE GERMS.—We referred the other day to thunder "clearing the air" in connection with our first thunderstorm of the North-East Monsoon season. But we are reminded by a scientific writer that heavy falls of rain also "clear the air" especially when accompanying a thunderstorm. A Home writer says:—

Copious thunder-"plouts" level to the earth the millions of disease-germs that impregnate the atmosphere. It has now been acknowledged that near a large town the average number of bacterial micro-organisms is in summer about 500 per cubic yard. Of course, in a town the number is about sevenfold. Now the heavy rains carry these germs to the ground. After very dry weather, a cubic yard of rain has been found to contain 150,000 organic dust-germs, besides an enormous quantity of inorganic dust-particles. In a filthy town, no less than thirty millions of bacteria in a year will be deposited by the rain upon every square yard of surface. No wonder, then, that scientific men welcome the thunderstorm, which by the heavy showers removes from man and beast the terrible floating nuclei of disease and death. During the twenty-four hours before a thunderstorm, a man will require to breathe 37,500 bacteria, more or less active agents of sickness, besides millions upon millions of dead organic and inorganic dust-particles—a fact which makes one really marvel how he can possibly escape; yet, after the deposit of these germs by the joint action of turmeric current and copious rains, the air is far more wholesome.

ARTIFICIAL GEMS.

Mr. Charles Bryant writes to the *Standard*:—I notice that in a recent issue Mr. Greville Williams, of the Gas Light Company, has manufactured a perfect emerald from the refuse of a gas retort, and that he could in like manner produce other precious stones; but fortunately, as you state, the cost of producing them would be prohibitory, and this is one reason why those who possess jewels need not entertain the least fear that their gems are about to become diminished in value, if not absolutely worthless, by the artificial production of precious stones, because there is virtually nothing new in Mr. Williams's discovery—precious stones having been artificially produced more than sixty years ago, and with all the experiments that have since been made by eminent chemists, the results have been very far from successful in a commercial sense.

It may be interesting to many of your numerous readers to know that several kinds of precious stones have been actually produced by artificial methods, endowed with all the chemical and physical characters of Nature. In 1837 Gaudin produced rubies by heating ammonia, alum, and potash by means of the oxyhydrogen blow-pipe, the intense heat developed by this apparatus volatilising the potash and the alumina, then crystallising in rhombohedral forms identical with those of the natural stone, and having the same specific gravity and hardness. Ten years before Gaudin's experiments Berthier produced a great number of minerals, such as peridot, pyroxene, &c.

The spinel has been produced so perfectly as to be indistinguishable from the natural gem, by subjecting a compound consisting of proper proportions of alumina, magnesia, chromium, and boracic acid to a high temperature for several days, and later experiments founded on the principle of Daubree and Durocher have resulted in the production of crystals of white, blue and red corundum, *i.e.*, colourless sapphires, blue sapphires, and rubies. Crystals of chrysoberyl I have produced by subjecting the fluorides of aluminium and glucinum to a very high temperature.

Attempts have been made to produce the diamond artificially, but the specimens obtained have been so extremely small as to be of no use, and the results obtained do not differ much, so far as success goes, from those of the alchemists who sought for that imaginary substance, the philosopher's stone, in the hope that they could make gold out of the baser metals, and although the attempts at reproducing many of the precious stones have been met with a certain amount of success experimentally, no one is likely to take upon himself the trouble and expense of so unprofitable a business, commercially, as producing artificial precious stones.

Ten years have now elapsed since Mr. Hannay, of Glasgow, succeeded in producing, at much cost and great danger, artificial diamonds, by enclosing a mixture of paraffin spirit and bone oil distillate with metallic lithium in a strong wrought iron tube, and exposing it to a prolonged heat in a reverberating furnace. The success which followed was undeniable. The result was diamonds, but they were of such small size as to be practically worthless, even could they have been generated by a cheaper process especially as it was found that when placed on the cutting wheel they immediately crumbled. At the same time, if anything is certain, it is that eventually by means too simple even to be foreseen, noble crystals of a gem still precious in spite of South Africa will be manufactured in the laboratory, as a price so low that they and the prismatic pendants of the chandelier may be rated at much the same value. But the diamonds and the other precious stones came into different categories. The one is a pure substance, the others are mixtures of various mineral matters. The moment that Smithson Tennant proved, nearly one hundred years ago, that the diamond was merely carbon, the crystallisation of this element, which is one of the most widely distributed in nature, was simply a question of chemical manipulation. And the processes of the arts have of late years undergone such vast improvements that it is impossible not to believe in the eventual solution of the problem which in Mr. Hannay's hand was only a *succès d'estime*. But we may be well assured that the fortunate man who first sees the gems glittering in his crucible will not be in any hurry to take the Royal—or any other—society into his confidence. Unless differently constituted from the rest of his species, he will utilise the victory at which he has arrived for his own enrichment.

Most of the precious stones are, however, complicated mixtures of ingredients of which the mechanical disposition, as in mossagates and other pebbles, cannot always be exactly ascertained, while the precise percentages of the substance to which they owe their varied hues have often defied the chemist's analysis. Thus the gem which Mr. Williams has modified from the refuse of the Gas Light Company's retorts is composed of about sixty-seven to sixty-eight per cent of silica, fifteen to eighteen of alumina, twelve to fourteen of glucina, minute proportions of magnesia, carbon and carbonate of lime, while the intensely green colour for which the jewel is valued is believe to be due to a slight dash of sesquioxide of chromium, though this tint has by some chemists been attributed to vegetable matter, the analyst having to proceed warily when dealing with such costly stuffs as diamonds and emeralds. We may, therefore, presume that Mr. Williams has turned out his artificial emerald by skilful fusing and crystalisation of these ingredients. It is also permissible for us to imagine that in time he will simplify his process, until the Gas Company's "superior six carat" stones set in fourteen carat gold will be recommended to thirty dandies at a price which will defy competition, even though the profits from this branch of the business do not add materially to the dividends of the shareholders. Still as Mr. Bryant says, Mr. William's experiments, if interesting, are not in themselves unprecedented, except that they have resulted in the concoction of a gem not hitherto produced by the same means. For crystals of chrysoberyl have been turned out by subjecting the fluorides of aluminium and glucinum to a very high temperature, and early in this country Berthier fabricated a great many minerals, including peridot (chrysolite), pyroxene (augite), and others not of any economic importance. Colourless sapphires and blue sapphires are among the triumphs of the laboratory. But most remarkable of all, rubies of excellent hardness and hue have been produced by a process of synthesis under the action of fire, though it is doubtful whether this was the means by which they were originally crystallised in the earth's crust. As far back as 1837 Gaudin produced the ruby on a small scale, by exposing ammonia-alum to the heat of the oxyhydrogen blowpipe. By the intense heat, thus generated he obtained fused alumina which is readily coloured by the addition of oxides of chromium, the crystals appearing in the rhombohedrals and characteristic of the mineral, and having the same specific gravity and hardness. At a later date, Ebelmen arrived at much the same results by a different method. He dissolved alumina in boric acid at a high temperature, and on the cooling of the mass

obtained the alumina in a crystallised form, and if chromate of ammonium was present the crystals were to all intents and purposes rubies. Again, Sainte-Claire, Deville, and Caron heated fluoride of aluminium, fluoride of chromium, and boric acid, and in this way obtained fluorids of boron, which escaping in a volatile condition left a residue of solid alumina coloured by the chrome.

These results, it may rightly enough be urged, were mere laboratory experiments. But the manufacturer of precious stones has gone a great deal further than this stage, and it is certain will proceed far beyond the milestone at which it is at present resting. For in 1878 Fremy and Feil reproduced the ruby and sapphire on a large scale, by heating in a fire clay crucible a mixture of alumina and red lead. The result of this fusion was a vitreous silicate of lead (the silica being derived from the crucible) and crystallised alumina. When to this bichromate of potassium was added, the aluminia assumed the desired tint of the ruby. By this process spinels have been produced quite undistinguishable from the natural gems, even when the most minute tests were applied to them. It cannot, perhaps, be claimed as yet that such laboratory jewels will satisfy all the requirements of the cutter and polisher, but when this point his been once attained, it is certain that they will soon run the real, or rather the old fashioned, article very closely. The most pessimist of seeptics cannot carry his prying so far as to apply the test of the knife-point for hardness of the acid for composition of the dichroiscope for "pleiochroism," or ask the wearers to allow their jewels to be weighed for specific gravity in Sonstadt's solution. And if not, who need trouble themselves further? Family diamonds are costly articles to keep simply for the gratification of the owner's knowledge that they were dug out of the mines of Golconda or of Minas Geraes, and they would soon be locked up in safety if a set externally identical could be bought at a twentieth of the price. Already, in fact if only a portion of the tales told are true, prudent people are growing loth to keep in their jewels cases exposed to the risk of robbers, convertible securities representing an income of four or five hundred a year, when the ingenious artists of the Palais Royal can supply something undistinguishable from them for a very moderate number of francs. These jewels, which are mere imitations, not chemical reproductions like the gems mentioned, far surpass the old paste mimicries, their only fault being that if anything they sparkle rather too brilliantly. Some of them of which the basis is glass, are rather coarse. But there are others of such amazing perfection that an amateur runs serious risk in buying from unknown dealers on his own unassisted judgment. Amethysts in an especial degree have been made so fine that they have deceived connoisseurs, and numbers of them are regularly exported to Ceylon, where they are duly disposed of to the unsuspecting passengers of steamers halting at Colombo. Since the decrease in price of the real stones the danger of imposition is less, yet a case occurred not long ago in which a jeweller declined to pronounce on the value of a "stone," until he had submitted it to an expert, when it was pronounced one of the Parisian sort.—*Indian Agriculturist.*

THE AUSTRALIAN "SHE-OAK" (CASUARINA) is prospering in Aberdeenshire. "Old Colonist" who considers it the very best firewood the world produces, reports that from seed gathered by him in Tasmania, trees are now flourishing on Deeside and their growth is equal to 18 inches in the twelve months.

PADDY (RICE) CULTIVATION IN CEYLON.

We call attention to the able letter on page 462, in which Mr. Elliott—in his own name—justifies his position in reference to the recent experiments and discussion connected with Paddy Cultivation. There can be little doubt that Mr. Elliott has a more intimate and practical acquaintance with his subject than any of his critics—whether official or unofficial—and we may say than any other public servant in Ceylon. He has been consistent too in, for many years, upholding the view he has adopted and while our own inclination has been to limit the profitable cultivation of paddy to select divisions of the country—a limitation in which to a great extent no doubt, Mr. Elliott agrees—yet, we are bound to confess that he has given us reason to believe that rice cultivation is far more widely profitable in Ceylon than we had at all believed before Mr. Elliott engaged in experiments or wrote expressly on the subject.

WESTERN AUSTRALIA is certainly the coming Colony if, as a telegraphic report has it, an expert values its forests alone at a hundred millions sterling, as their present marketable value. We in Ceylon should be greatly interested in our nearest neighbour; for as its population leaps up by thousands and perhaps hundreds of thousands, we ought to do a good trade in supplying them with all the tea, cocoa &c., they require.

ELECTRIC LIGHT EFFECTS ON CANE GROWTH.—As it is a well known fact that the growth of cane or any other vegetation depends perhaps as much upon light as on heat, and that a large amount of sunshine is very desirable to secure the rapid growth of cane, the thought has been suggested that electric lights may yet be used to advantage to promote the growth of sugar in this latitude, where forcing is desirable if not absolutely necessary. At first thought, almost any one would be inclined to ridicule the idea. Still, we notice that our tropical exchanges consider that when they have storms that electricity plays an important part in the growth of cane. Is it not possible that where many electric lights are used, that the air to a certan extent becomes charged with that powerful element? If not, certainly light has great influence on vegetation, as science has proven; and this brings the thought that the "moon philosphers" may be partly right in their planting theories—or, that the *light* of the moon may produce that effect on vegetable growth that they attribute to something else.—Our attention was recently called to this subject by a friend, who said he thought he saw a greater leaf development on trees and shrubs on the side adjacent to electric lights. Later, he made the following clipping from a technical journal, which shows that it *is* a fact—and possibly a most *important* one for cane growers—that electric light has great influence on vegetable growth:—"A beautiful illustration of electric light on plants was recently given by Dr. Siemens before the Royal Society of England. He placed a pot of budding tulips in the full glare of the electric light in the meeting room, and in about 40 minutes the buds had expanded into full bloom. In giving a statement of some of his experiments, Dr. Siemens said that he had planted a number of quick growing seeds in pots, and divided the pots into four groups; one group he had kept entirely in the dark, another he had exposed to the influence of the electric light only, another to the influence of daylight only, and another to electric light and daylight in succession. Death soon resulted to those plants which were kept entirely in the dark; those exposed to the electric light only, and those exposed to the daylight only, throve about equally; and those exposed to both day and electric light throve much better than either."—*Sugar Bowl and Farm Journal.*

MANURE FOR THE GARDEN.

A capital little essay on the use of nitrate of soda for manure, and the best mode of its employment, has just issued from the able pen of Mr. Joseph Harris, M.S., of New York, of which we will give some extracts, specially written for gardeners.

Farmers and gardeners sometimes express surprise that agricultural chemists talk so much about nitrogen. When it is known, however, that of all the organic matter of plants and manures—in other words, all the matter which is driven off by burning—the only element of any direct value as plant-food is nitrogen, it will be readily seen that nitrogen is entitled to even greater attention than it at present receives.

Gardeners and fruit-growers fully recognise the value of stable and farmyard manure. In a ton of ordinary manure, containing 75 per cent. of water, there is 1275 lb. of organic matter and 225 lb. of ash. Except for its mechanical and indirect benefit to the soil, all the manurial value of this quantity of organic matter is due to the nitrogen which it contains. Is it any wonder, therefore, that we hear so much about nitrogen?

NITRATE OF SODA FOR ONIONS.

An average crop of Onions removes from the soil about the same amount of nitrogen as an average crop of Turnips; but a crop of Onions will often sell for three, or four, or five times as much as the latter.

On Mr. Harris' farm, Onions are extensively grown, and he finds it necessary to make the land exceedingly rich, especially in nitrogen and phosphates. And of all manures for producing a large crop of Onions, nothing equals nitrate of soda.

When this manure was first used, 250 lb. per acre were sown early in the spring, before drilling-in the Onion seed, with 500 lb. per acre of superphosphates. As soon as the young plants appeared, it was the custom to go through them with the hoe to break the crust and kill the weeds, and then sow 250 lb. more of nitrate. In two or three weeks, another 250 lb. per acre was sown. The effects were found to be astonishing; no amount of ordinary manure that could be worked into the soil the first season would produce so great a growth. Latterly it has been thought quite as well to sow the nitrate broadcast all at once, about the time the seed is sown.

WHY IS IT FOUND NECESSARY TO USE SO MUCH MANURE IN THE GARDEN?

Reference has been made to the great benefit derived from the use of nitrate of soda on Onions. There is a common opinion that the longer Onions are grown year after year, on the same land, in market gardening, the better will be the crop. Enormous quantities of dung are applied every year. This supplies nitrogen, phosphoric acid, potash, and other ingredients of plant-food far in excess of the amount removed with the crop. And yet it is found necessary to furnish a heavy dressing of manure every year; and if this be not done the crop is poor and unprofitable.

The same is true of early Cabbages and early Cauliflowers. It is found necessary to use enormous quantites of manure for these crops—far in excess of the plant-food removed in the crop. Gardeners who make a specialty of growing large areas of early Cabbage, find it almost impossible to make the land rich enough the first year; they find that the second or third crop, grown and manured every year on the same land, is better and earlier than the first crop.

An experienced American gardener recommends the application every year of 75 to 80 tons of stable-manure per acre for early Cabbage, and 10 tons per acre for late Cabbage. This 75 tons of manure contains 820 lb. of nitrogen, or as much nitrogen as 5,100 lb. of commercial nitrate of soda probably contains.

Ten thousand early Cabbage per acre, weighing 5 lb. each is a good crop.

These Cabbage (25 tons per acre), contains 120 lb. of nitrogen, equal to 750 lb. of nitrate of soda. In other words, gardeners use nearly 7 lb. of nitrogen in the form of manure to get back 1 lb. of nitrogen in the crop.

It is now known that the nitrogen in the organic matters of the soil or manure is slowly converted into nitric acid by the growth of a minute organism, apparently a micro-coccus. This micro-coccus cannot grow if the soil be too cold, or too wet, or too dry, or in the absence of lime or an alkali.

As a general rule, there is no lack of lime in the soil, and the other conditions necessary for the conversion of the nitrogen into nitric acid, are warm weather, and a moist porous soil.

In the early spring the soil is too wet and too cold for the change to take place; we must wait for warm weather. But the gardener, who grows for sale, does not want to wait: he makes his profits largely from his "yearly" crops. Guided only by experience and tradition, he fills his land with manure, and even then he gets only a moderate crop the first year. He puts on 75 tons more manure the next year, and gets a better crop; and another 75 tons the next year, and gets a still better crop. The nitrogen of the soil, or of roots and plants, or dung, is retained in the soil in a comparatively inert condition. As it is slowly converted into nitric acid during warm weather, the plants take it up and grow rapidly. Unfortunately, however, if we have no plants growing in the autumn, and there is much nitric acid left unused in the soil, the rains of winter and early spring wash out a large proportion of it, and it sinks into the subsoil.

How, then, is the market gardener to get the nitric acid absolutely necessary for the growth of his early plants? He gets it, as before stated, from an excessive and continuous use of stable manure, and even then he fails to get it in sufficient quantity. One thousand pounds of nitrate of soda will furnish more nitrogen to the plants early in the spring than the gardener can get from 75 or 100 tons of well-rotted stable-manure. The stable manure will furnish nitric acid for his later crops; but for his early crops, the gardener who fails to use nitrate of soda, is said to be blind to his own interests.

The same remarks apply with equal force to Celery plants. For several years, the writer has grown over a million Celery plants a year. By the use of an enormous amount of rich manure, he was able to grow good outdoor Celery plants.

Eight years ago, he used nitrate of soda cautiously as a top-dressing, and the effect was most satisfactory. The next year, having more confidence, the nitrate was sown with the seed, another dressing was given after the plants came up, and twice afterwards an application was made during rain. Instead of finding it difficult as before to get the plants early enough for the Celery growers, who set them out, they were ready three weeks before the usual time of transplanting.

At the four applications, about 1,600 lb. of nitrate of soda per acre was used, and this would probably furnish more nitrate acid to the plants than they could get from 500 tons of stable-manure, provided it had been possible to have worked such a quantity into the soil. It was said that never were finer plants grown; and compared with the increased value of the plants, the cost of the nitrate is stated not to be worth taking into consideration.

The next year the same treatment afforded equally good results, though it was noticed that on part of the land where Celery plants had been grown the previous year, and followed afterwards by a crop of late Cucumbers for pickles, and the land again sown to Celery in the spring without manure, the plants were not so good as when dung, as well as nitrate, was used.

It is now the aim to dung the land in the autumn, and use nitrate of soda in the spring. In other words, nitrate of soda is not used as a substitute for dung, but as a highly prized and invaluable addition.

NITRATE OF SODA AND DROUGHT.

Celery is a semi-aquatic plant. It delights in an abundant supply of water. But it is found that nitrate of soda is in part a substitute for water, and the same is true of many other plants. In the dry climate of America, Pansies are supposed to require a damp soil or large supplies of water. But it has been found that

nitrate of soda, even on dry, sandy soil will produce a luxuriant growth of plant, and a profusion of the largest and most brilliant flowers. The effect of this manure on the growth of the Convolvulus bine, and the colour of the leaves, and the size and beauty of the flowers, is said to be most remarkable. The effect on Asters is equally satisfactory.

NITRATE OF SODA FOR STRAWBERRIES, CURRANTS, AND RASPBERRIES.

The Strawberry grower knows the value of water. If he will try nitrate of soda he will find it wonderfully efficacious.

The effect of this fertiliser on Strawberries in the dry climate of the United States is very beneficial. It not only doubles or trebles the yield, but the berries are larger and handsomer, and consequently command a much higher price in the market.

No ordinary amount of manure will produce so great an effect, for the reason that the plants grow and form their fruit early in the season. The nitrate furnishes the plants with nitric acid before the nitrogen of ordinary dung can be converted into this essential ingredient of plant food.

A few years ago, Mr. Harris, published a statement in regard to the astonishing effect of a large dressing of nitrate of soda on an old Strawberry bed. The bed had been neglected, and was full of grass and weeds. At that time nitrate of soda had not been tried on Strawberries, and it was not known but that might injure them. But this particular bed was so run out and worthless, that no anxiety was felt whether the nitrate killed the plants or not.

Two or three heavy dressings were sown broad-cast, early in the spring and a few weeks later. Instead of killing the plants, the nitrate made them grow so vigorously that with a little assistance from a sharp hoe, and by pulling out the large weeds, the Strawberries overpowered nearly all the grass, and remarkably fine crop of fruit was obtained.

Since that date nitrate of soda and superphosphate has been used on all Strawberry plantations, and this dressing is found far more effective and economical than stable dung.

Another instance is given of an old Strawberry bed, in its fifth year of bearing, which was in an exhausted condition and foul with weeds. This was dressed in the spring of 1888 with 300 lb. of nitrate of soda per acre. The effect was amazing, for this bed of 1¼ acre, from which hardly anything was expected, gave fully 7000 quarts of Strawberries. The description was variety Crescent, with fertilising rows of Wilson, Sharpless, and others. The crop was nearly as large as the best the plot had made. This was on moist bottom-land, naturally fertile. Nitrate of soda is, at least, equally as good for Raspberries as for Strawberries. On Currants, with clean cultivation, large crops of fine fruit have been raised for several years, with a top-dressing of nitrate of soda alone, applied on each side of the rows early in the spring.

On poor land it is recommended to apply superphosphate and potash in the autumn, and plough or cultivate them in; and the following spring—and, in fact, every spring—give a top-dressing of nitrate.

NITRATE OF SODA AND WEEDS.

From what has been said about the effect of nitrate on the old grassy Strawberry-bed, it must not be inferred that this substance will kill weeds and nourish wholesome plants. Nitrate of soda, properly used, makes "rich land;" and it is known that weeds, if they have the chance, will grow luxuriantly in rich soil. It is also well known that a light, thin crop, favours the growth of weeds, while a heavy, "smothering crop," will hold them in check. Much depends on whether the crop or the weeds get the start. Hence, it is of vast importance to make the land as clean as possible before sowing the crop, and to keep down the weeds by the frequent use of the cultivator and hoe. If this is done, nitrate of soda will make the crop grow so rapidly that it will smother or check the weeds. On the other, if this is not done, the weeds will prove better fighters than the crop we want to raise, and they will secure the lion's share of the nitrate, and with the nitrate they will also appropriate other plant food and moisture, and thus the nitrate, instead of helping the crop, may actually injure it. There will be a large total growth of vegetation, but it is vegetation of the wrong kind.

NITRATE OF SODA FOR TOMATOS.

Professor Voorhees, of the New Jersey experiment station, made experiments with different fertilisers on Tomatos in 1889. The trials were made on the farm of Mr. C. M. Housell, an intelligent practical gardener, who attended to all the details. The results were as follows:—

Manures used per acre.	Cost of Manures	Value of the crop per acre.
	Dols.	Dols.
Without manure...	...	271·88*
20 tons stable dung	30	291·75
8 tons stable dung and 400 lb. complete fortilizer...	15	317·63
160 lb. nitrate soda alone... ...	4	361·13

The above manures were all applied May 7. On an adjoining plot, 160 lb. of nitrate of soda was sown May 7, and again on June 12, when the Tomatos were beginning to set; another dressing of 160 lb. was sown on the surface around the plants. This plot produced a crop which sold for 369 dols. per acre.

The first dressing of 160 lb. of nitrate yielded a profit of 85·25 dollars per acre; the second dressing of 320 lb. produced a profit of only 3·87 dollars per acre.

It is evident, therefore, that 160 lb. of nitrate of soda per acre was all that the plants needed, or could make use of without a greater supply of phosphoric acid and potash than the soil afforded.

In addition to the above experiments, Professor Voorhees made others that are worthy of consideration. The results may be tabulated as below:—

	Manures per acre and date of sowing.	Cost of Manure.	Value of crop per acre.
		Dols.	Dols.
A.	Without Manure	...	271·88
B.	160 lb. Muriate of Potash 300 lb. Superphosphate	7·2	284·25
C.	Same as B. with 600 lb. Nitrate Soda, May 7	11·2	356·63
D.	Same as C. with 160 lb. additional Nitrate, June 12	15·2	429·38
E.	Same as B. with 320 lb of Nitrate, May 7	15·2	395·25

It will be seen that the addition of phosphates and potash to the 160 lb. of nitrate soda had no effect. The reason for this is, that the soil could furnish enough phosphoric acid and potosh for all that the crop produced by the 160 lb. of nitrate required. But when an additional 160 lb. of nitrate was used, then the phosphoric acid and potash came into play, and the crop brought 429·38 dollars per acre.

It will be seen further, that the 320 lb. of nitrate applied May 7 on Plot E., did not have as great an effect as the same amount of nitrate of soda applied at two dressings, on Plot D.

It may surprise many gardeners that 20 tons of good stable manure did not produce as large a crop of Tomatos as 160 lb. of nitrate of soda. The 20 tons of dung contained not less than 160 lb. of nitrogen, while the nitrate of soda contained only 25 lb. And that the great effect produced by the nitrate of soda was due to the nitrogen, there is abundant evidence.

Why then, did not the 160 lb. of nitrogen in the dung do as much good as the 25 lb. in the nitrate? Simply because the nitrogen in the dung has to be converted into nitric acid before the plants can use it. —J. J. WILLIS, Harpenden.—*Gardeners' Chronicle.*

* A dollar is equal to about 4s. 2d.

Correspondence.

To the Editor.

ENEMIES OF COFFEE AND REMEDIES.

London, Oct. 24th.

DEAR SIR,—Following my letter to you of last mail on the subject of the application of solution of sulphate of copper to our coffee trees for extermination of the pests by which trees are beset, I now write to enclose copy of a letter I have received from Messrs. W. and A. Gilbey, the large wine merchants here, giving interesting and valuable information concerning the subject in question, and I am yours faithfully,

for THOMAS DICKSON,
W. G. SMITH.

Oxford Street, London, W., Oct. 20th.

Thomas Dickson, Esq, Managing-Director, The Scottish Trust and Loan Co. of Ceylon.

Dear Sir,—In reply to your letter of 16th inst. on our estate in the Medoc we use a solution of sulphate of copper for the purpose of destroying the mildew or white fungus which forms on the underside of the leaves of the vines. It is not applied to the roots but solely to the leaves. Other preparations are applied to the roots for the purpose of combating the Phylloxera, which however is an entirely different pest. The method of applying the solution of sulphate of copper was formerly to sprinkle it over the vines by means of a broom, but a more effective way is to use a force pump fitted with a fine rose. A shower of solution is allowed to fall on the *upper* surface of the leaves which gradually spreads over the whole surface of the plant. The solution is prepared in the following manner:—Dissolve 4 lb. sulphate of copper in 3 gallons of warm water. Slake 2 lb. of quick lime, and when cold put the lime into the solution of copper. Add to the whole 20 gallons of water and stir up well. (Pass the lime through sieve to separate gravel, etc., which might choke the syringe used for distributing.) This mixture is called Bouille Bordelaise and is prepared sometimes with cold water, and recently we learn that the addition of 1 lb. of molasses has been found to be an improvement. For vines about 30 gallons per acre are used for the first treatment say, in June, and 40 to 50 gallons for the second treatment 4 or 5 weeks later. Before distributing the liquid should always be well stirred. Sulphate of copper is dangerous to human life and consequently all experiments must be made with care. Applied to the vine in the manner indicated we find that the wine is not affected, but it is quite possible that the coffee berry might retain a percentage of the copper if strong solutions are used. A weak solution only is always applied when the leaves are young and tender. No solution should be applied for two or three weeks before the crop is gathered. If we can give you any further information on the subject we shall be happy to do so on hearing from you, or our friend Mons. Skawinski of Lesparre would no doubt give you full details as to prices of materials, syringes, etc., if you communicate with him. His full address is:—

Mons. Theo. Skawinski,
(Société Medocain)
72, Rue Jean Jacques Rousseau,
Lesparre, France.

—We are, dear sir, yours faithfully,
(Signed) W. & A. GILBEY.

TEA EXPORTS from Japan have this year been very large, amounting (according to native papers), up to the 15th ult., from Kobe and Yokohama to, 6,700,000 catties—the largest total reported in the history of the ports. From Yokohama alone the export exceeded 5,383,000 catties.—*China Mail.*

INDIAN TEA EXPORTS.

Indian Tea Association, Calcutta, Nov. 15th.

DEAR SIRS,—The General Committee have the pleasure to hand you their usual Monthly Return of shipments of tea from Calcutta, and also a Return of Exports of Ceylon Tea for four years up to the 23rd October 1890.

EXPORTS OF INDIAN TEA FROM CALCUTTA.

	1890 lb.	1889 lb.	1888 lb.
Exports to Great Britain in Oct.	15,544,159	14,854,553	12,967,076
Exports to Great Britain from 1st May to 31st Oct.	55,959,410	55,669,073	52,992,558
Exports to Australia and New Zealand in Oct. ...	409,972	149,143	446,734
Exports to Australia and New Zealand from 1st May to 31st Oct. ...	2,703,418	1,956,540	1,791,298
Exports to America in Oct.	10,810	13,200	906
Exports to America from 1st May to 31st Oct. ...	72,882	104,047	64,025
Exports to other places in Oct.	145,456	54,544	40,157
Exports to other places from 1st May to 31st Oct.	671,733	1,116,143	538,587
Total Exports from 1st May to 31st Oct. ...	59,407,442	58,845,803	55,386,463

—Yours faithfully, S. E. J. CLARKE, Secretary.

MR. JOHN HUGHES AND CEYLON TEA ANALYSES.

London, E. C., Nov. 7th.

GENTLEMEN,—Just a few lines to direct your attention to an interesting lecture on tea by Mr. Richard Bannister published in the Journal of the Society of Arts of October 31st which I believe you regularly receive.

After a review of the rise and progress of the tea industry generally in China, India and Ceylon, there are some practical remarks on tea-making, and tea analyses.

Only two complete analyses however are given, which is a matter of regret, inasmuch as these show considerable difference in the proportions of Tannin and Cellulose (Woody Fibre). Thus a sample of Congou gave 16·40 per cent of Tannin as against 27·14 in a sample of young Hyson—while the Cellulose was 34·00 in the former and only 25·90 per cent in the latter.

There are some 19 samples of Ceylon Tea reported upon by Dr. Paul, who however only examined them as regards the amount of moisture and Theine which they contained, and in which the variation was very small and therefore of little practical importance. The highest Theine was 4·54 per cent in a sample from Nahalma estate, and the lowest 3·22 in some Calsay Pekoe Souchong.

When we consider that Theine is an alcaloid which has very little flavour, though possessing powerful medicinal properties, it will be at once understood that a difference of 1 per cent cannot possibly influence the tea taster in his valuation of different samples for market purposes, and that any attempt to estimate the probable commercial value from the percentage of Theine found by analysis would be quite useless. From the two complete analyses mentioned above, however, there does appear to be a great variation in the proportion of Tannin which from my new experience, I am inclined to regard as the constituent which influences the strength of tea infusions more than any other, while we may regard the *quality* and

quantity of the volatile oil as the chief factors in producing a difference in the flavour and bouquet.

It is in reference to these two constituents I submit that more extended information is still required, and with these few remarks I commend the lecture to the careful perusal of the readers of the *Tropical Agriculturist*.—Yours faithfully,

JOHN HUGHES.

PADDY (RICE) CULTIVATION IN CEYLON

MR. ELLIOTT IN REPLY.

Batticaloa, Nov. 18th.

DEAR SIR,—I have read "A."'s letter on paddy cultivation with pleasure; he is evidently a worker in the same field as I am and a professor of the same belief as I hold, viz., that "paddy does pay" and no mistake. He has most opportunely published a very able resumé of what may be called the circumstantial evidence on the subject. The facts he sets out seem to my mind to be consistent with the conclusion he draws and inconsistent with any other rational conclusion. He thus fulfils the requirements legally required of such evidence, but forgets "there are people who are not ready to lend an academic faith to a narration of facts which do not strictly accord with preconceived opinions, mistaken for knowledge. In all ranks and conditions of life, persons of this stamp abound and the errors to which their habits of distrust expose them are at times ridiculous."

So says an eminent authority, and it is because I have found the circumstantial evidence not generally accepted that I have endeavoured to go a step further and see what direct evidence on the point could be brought forward. But "A." (and others) have misunderstood the scope of my subsequent action and the object I have in view in securing the publication of the results of the experimental cultivation I have had opportunities of undertaking. I therefore address you in my own name to set myself right with the public and, I trust, show that my experiences have a more important bearing on the subject than is recognized by your correspondent.

For years the dictum of Sir Charles Layard had been accepted as almost settling the question that paddy did not pay, and this view was supported by the particulars of the cost of production published in a book by the late Mr. Leopold Ludovici and adopted (if my memory serves me right) by "Speculum" who now in another sphere emphasizes the erroneous views he early adopted on an imperfect investigation of the matter. Over twenty years ago, I had reason to arrive at a very opposite conclusion, and as my enquiries showed the data heretofore made public were defective and misleading I ventured to work up the information I had gradually gathered into the paper I read before the Ceylon Branch of the Asiatic Society in 1885. I have every reason for believing that my paper was the first intimation a large number of the community had received that there was something to be said on the other side and that Paddy Cultivation was not the miserable speculation it had been so long represented.

The results then published were founded on enquiries made from native sources and based on *estimates* of working expenses. Since that I have had opportunities of actually cultivating paddy and have published the results of my experience. I do not say that these are on all fours with native modes of cultivation: on the contrary I have always admitted that *ceteris paribus* the "dry ploughing" system introduced by Mr. Green gives a larger crop than the best ordinary native mode of working, and of course the primary object of the experiments has been to "show the way" to our native cultivators. Here and there we have succeeded in influencing a few, and by hammering away we may induce more imitation in time; at present the excuse is "Oh! we cannot afford to work so expensively as you do," and when we point to the larger return as compensating for the additional outlay, the reply still is "Oh! it will not pay us."

The first fact, therefore, established by my experiments is that I am working far more expensively than does any native in the country including all the so-called extortionate rates of interest (which are not so heavy as they appear on paper I may add). The next point I have established is that working on a ready money basis and paying for all services, an outlay of R16 to R17 is the outside limit of the actual *expenses of cultivation* of an acre of land.

With these two points established, we are able to absolutely deny the correctness of the estimates of the expenses in excess of these figures we see put forward continually: such, for instance, as that given by Mr. Panabokka to the Grain Committee when the cost of cultivating two acres of land at Ratnapura is given at R107·96. Another point on which our experiments throw light is that it is possible with the expenditure stated to secure in irrigated land a profit over working expenses of about R20 an acre, to cover interest on the capital outlay, superior supervision and other expenses attendant on extended cultivation. There is no room to doubt that it is quite possible to cultivate the same land twice a year if the water supply is assured.

Such are the facts which I think the experience I have gained actually establishes; and they are I think useful factors in the discussion of the question whether paddy pays. I am also not without hopes that the information I have given may not be without its influence in encouraging capitalists to seriously undertake the extended cultivation of paddy on a money payment basis. I regret I cannot for their sake add from personal experience the cost of converting jungle land into paddy fields, but I may state that my enquiries go to show that a capital outlay of R40 would be sufficient including the purchase from Government at ordinary upset price.

I could write much more as to my views on Paddy Cultivation, but this lies outside the intention of this letter, and so I shall add no more at present.—Yours faithfully,

E. ELLIOTT.

IS FORKING OR DIGGING ABOUT TEA ADVISABLE?

THE RESULTS OF PRACTICAL EXPERIENCE ASKED FOR.

Central Province, Nov. 25th.

SIR,—As perhaps you are aware, there is very great diversity of opinion on the benefit or otherwise of forking or digging tea. It could not but prove very valuable information, if some of the many planters who have forked fields of tea would communicate the results.

My own experience has proved (1) that it is a sure way of checking flush for a good three months, if resorted to when the tea is six to eight months from pruning (*e.g.* in full flush); (2) that there has been no marked improvement at any subsequent period.

Theoretically, forking is a permanent improvement to the soil; but from my own experience of the result, I shall not again have recourse to it except in every other line, say three weeks before pruning (given favourable weather).

Trusting the ventilation of this subject may prove more profitable than my experiments in the ventilation of the soil, I am, sir, your obedient servant,

PERVERT.

[We shall look for an expression of opinion by other practical men who have had experience in "forking."—ED. *T. A.*]

THE WATCH COMPASS.

DEAR SIR,—I think the Yankee who taught us the use of the watch as a compass was a genuine son of his country, and wise as well as 'cute. To dwellers in northern latitudes the sun is always south at noon, hence his selection of the south point. The one thing to be guarded against is—not to hold the watch horizontal, but so that the hour-hand points directly at the sun. In northern countries the sun is never vertical, and therefore *there* the watch could never be "made to point upwards directly towards the sun, and made to revolve round the hand &c., &c." In sub-tropical countries, however, this is possible and renders the watch of little value as a compass in March and April, and in September and October or until the sun attains a sufficient north or south declination to throw a shadow of the hour-hand on to the watch face. It is this shadow which guides the observer in holding his watch, and enables him to find approximately all the points of the compass. The watch will thus adjust *itself* to the plane of the sun's daily path. In Ceylon from April to August the hour-hand should be made to point directly *away from the sun* as indicated by its shadow. At least it is but approximate and does not show mean noon, but so far as it goes it is an interesting fact, and may often be useful. The rim of the watch face, when held as directed, is a small circle concentric to the plane of the sun's daily path; or, when laid flat, concentric to the horizon. Hence, when seeking an "explanation," I imagined the offing reduced to the size of the watch, or the watch face enlarged to the size of the offing. But by keeping the hour-hand pointing to the sun (as it must be for correct results in all latitudes above 25°N) the sun's motion is seen to be quite regular.

ASTRO.

COFFEE IN THE NEILGHERRIES.—The *Madras Mail* article on coffee planting in these hills remarks that the consumption by the natives of India is increasing, and if it becomes general the local price of coffee must rise considerably. It will appear that the prospects of coffee cultivation in India on good soil are encouraging. The only country in which it seems possible to cultivate coffee more economically than in India is Africa, but competition from that quarter must take time.—*Pioneer.*

AGRICULTURE A "MERCANTILE UNDERTAKING."—In connection with the question of a loan under the Agriculturists' Loans Act, which the Collector of the Nilgiris had granted to a coffee planter, the Board of Revenue recently made the astounding statement that the loan had been illegally granted under the Act because "the land on which coffee is planted does not fall within the designation of arable. Coffee-planting is rather a mercantile undertaking than an agricultural operation, and it is obvious that any measure which would tend to make Government a sleeping partner in such a mercantile undertaking is undesirable." It is satisfactory to note that Government does not share this extraordinary view, and is of the opinion that land on which coffee is planted comes within the designation of arable land contained in the Act in question.—*Madras Mail*, Nov. 20th.

SALE OF TEA COMPANY'S SHARES.—We hear today of the sale of 50 shares in the Yatideria Tea Company for R140—a very fine price considering that this Company is quite a young one and has not yet paid a dividend. The shares are R100 fully paid up, and the price paid shows how confident investers are that the position of the company is a strong one. The first dividend is shortly expected, and it will be a good one we believe.—Local "Times."

STARTLING FIBRE STATISTICS.—The American people are no less profuse in clothing than in food. The country is a favored land in fibre production. More than $300,000,000 is the comfortable sum which represents the present fibre product, in the form of cotton, wool, hemp and flax. There is also experimental production of silk, ramie, sisal, jute and many others suited to the climate, some of which will ultimately become the foundation of industries. More than half of the material for the cotton factories of the world is grown here, and a third of that is manufacturod and mostly consumed at home. If 65,000,000 people require one-sixth of the cotton manufactured in Europe and America for the use of nearly 450,000,000 inhabitants of these continents, and of the millions in India, China, Japan and other countries obtaining supplies from the factories of Christendom, the disparity in consumption between this and other countries must be great indeed.—*Agricultural Journal.*

CEYLON EXPORTS AND DISTRIBUTION 1890.

COUNTRIES.	Coffee cwt.			Cinchona	Tea.	Cocoa.	C'moms.	Cinnamon.		Coconut Oil.		P'bago.
	Plan-tation	N'tive	Total.	1890 B'nch &Trunkb.	1890 lb.	cwt.	lb.	Bales lb.	Chips lb.	1890 cwt.	1889 cwt.	1890 cwt.
To United Kingdom	52563	100	52663	74721453	39155593	9588	137566	1020681	237635	85500	103980	142256
,, Marseilles	157	...	157	12500	762	80	...	165960	8500	50	...	...
,, Barcelona	...	...	...	...	1150	...	...	35000	...	...	...	...
,, Genoa	12	...	12	...	2254	...	...	66425	39424	3422	2678	1134
,, Venice	71	232	303	70412	2455	...	...	11100	11200	...	202	...
,, Trieste	7850	97	7927	252	5090	...	7393	...	1148	16177	10229	...
,, Odessa	32	...	32	...	275	...	...	...	...	8062	5415	...
,, Hamburg	296	...	296	...	38071	814	1131	278900	91972	18777	7065	31844
,, Antwerp	17	20	37	217919	1600	...	...	13500	5500	1161	1492	13949
,, Bremen	20	...	20	...	15987	161	...	25096	...	...	...	6201
,, Havre	...	100	100	...	4761	8	...	10000	...	2007	4578	...
,, Rotterdam & Amsterd	8	...	8	...	...	55	...	...	11200	10	...	1616
,, Africa	16	...	16	21384	38082	...	...	5000	...	8	34	...
,, Mauritius and Eastward	277	333	610	...	9135	498	...	28500	...	41265	2508	...
,, India	1041	718	1759	...	111585	...	161504	7220	...	78571	42871	256
,, Australia & New Zealand	10021	1218	11239	...	2104832	9	40	8474	336	1213	1934	406
,, America	1924	...	1924	401893	194158	1653	4956	89228	...	46061	100773	127975
,, Stockholm	...	...	...	...	1703	...	...	...	...	...	...	...
,, Constantinople	...	...	...	...	3122	...	...	...	...	...	...	...
Total Exports from 1st Jan. to 1st Dec. 1890	74280	2818	77098	81972351	41770640	12556	312590	1774938	420615	305594		330727
Do 1889	65629	4388	70356	87267996	30457296	18029	276773	2174793	486320	281943		413970
Do 1888	119207	5499	124706	121319462	20851668	10486	232694	1542480	419560	331557		231987
Do 1887	152691	7781	160720	109984621	11698478	14468	279133	1414301	261672	264006		206531

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis Peat's London Price Current, November, 6th 1890.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White	Slightly softish to good	
	Hard bright	£5 10s a £7 10s
Yellow	Do, drossy & dark ditto	95s a 110s
CINCHONA BARK--Crown per lb.	Renewed	3d a 1s
	Medium to fine Quill	4d a 9d
	Spoke shavings	2d a 9d
	Branch	1d a 3d
Red	Renewed	2d a 1s
	Medium to good Quill	4d a 9d
	Spoke shavings	2d a 5d
	Branch	1d a 3 1
	Twig	1d a 1½d
CARDAMOMS Malabar	Clipped, bold, bright, fine	1s 8d a 3s 6d
and Ceylon	Middling, stalky and lean	10d a 1s 6d
Alleppee	Fair to fine plump clipped	1s 4d a 3s 4d
Tellicherry	Good to fine	1s 3d a 2s 3d
	Brownish	9d a 1s 3d
Mangalore	Good. & fine, washed, bri	1s 6d a 3d
Long Ceylon	Middling to good	6d a 2s
CINNAMON 1sts	Ord. to fine pale quill	7½d a 1s 7d
2nds	,, ,, ,, ,,	7d a 1s 4d
3rds	,, ,, ,, ,,	6d a 1s 2d
4ths	Woody and hard	5½d a 10d
Chips	Fair to fine plant	2½d a 7½d
COCOA, Ceylon	Bold to fine bold	100s a 110s 6d
	Medium	90s a 98s
	Triage to ordinary	55s a 85s
COFFEE CeylonPlantation	Bold to fine bold colory	108s a 114s
	Middling to fine mid.	105s 6d a 107s 6d
	Low mid. and Low grown	100s a 104s 6d
	Smalls	100s a 106s 6d
Native	Good ordinary	92s a 98s
Liberian	Small to bold	85s a 92s
East Indian	Bold to fine bold	105s a 115s
	Medium to fine	100s a 105s
	Small	95s a 100s
Native	Good to fine ordinary	92s a 98s
COIR ROPE, Ceylou&Cochin	Mid. coarse to fine straight	£14 a £20 15s
FIBRE, Brush	Ord. to fine long straight	£15 5s a £28
Stuffing	Coarse to fine	£5 a £18
COIR YARN, Ceylon	Ordinary to superior	£13 a £30
Cochiu	Ordinary to fine	£12 a £36
Do	Roping fair to good	£12 a £15 10s
COLOMBO ROOT sifted	Middling wormy to fine	18s a 27s 6d
CROTON SEEDS, sifted	Fair to fine fresh	10s a 15s
GINGER, Cochin, Cut	Good to fine bold	50s a 65s
,,	Small and medium	26s a 39s
Rough	Fair to fine bold	18s a 25s
,,	Small	16s a 21s
GUM ARABIC, Madras	Dark to fine palo	15s a 55s
NUX VOMICA	Fair to fine bold fresh	10s a 12s
	Small ordinary and fair	6s a 8s 6d
MYRABOLANES, pale	Good to fine picked	10s a 10s 9d
	Common to middliug	8s 9d a 9s 3d
	Fair Coast	9s a 9s 6d
Pickings	Burnt and defective	4s 9d a 6s 3d
OIL, CINNAMON	Fair to fine heavy	1s a 2s 6d
CITRONELLE	Bright & good flavour	11-16d a ¾d
LEMON GRASS	,, ,, ,, ,,	1¼d a 1¼d
ORCHELLA WEED	Mid. to fine, not woody	20s a 33s
PEPPER, Malabar, blk. sifted	Fair to bold heavy	4⅜d a 4⅜d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White	,, ,, ,,	1s 1½d a 1s 2d
PLUMBAGO Lump	Fair to fine bright bold	15s a 19s
	Middling to good small	11s a 14s
Chips	Slight foul to fine bright	9s a 12s
dust	Ordinary to fine bright	5s a 9s
RED WOOD	Fair and fine bold	£4 10s a £4 15s
SAPAN WOOD	Middling coated to good	£5 a £8
SANDAL WOOD, logs	Fair to fine flavor	£30 a £58
Do. chips	Inferior to fine	£9 a £30
SENNA, Tinnevelly	Good to fine bold green	7½d a 8¾d
	Fair middling medium	3d a 6 i
	Commou dark and small	1d a 2½d
TURMERIC, Madras	Finger fair to fine bold	16s a 18s
Do.	Mixed middling [bright	15s a 16s
Do.	Bulbs	10s a 12s 6d
Cochin	Finger	11s a 12s
VANILLOES, Mauritius & Bourbon, 1sts	Fine crystalised 6 a 9inch	16s a 23s
2nds	Foxy & reddish 5 a 8 ,,	13s a 18s
3rds	Lean & dry to middling under 6 inches	8s a 11s
4ths	Low, foxy, inferior and [pickings	3s a 7s

FROM BOMBAY AND ZANZIBAR.	QUALITY.	QUOTATIONS.
ALOES, Socsotrine	Good and fine dry	£4 a £7
Zanzbar & Hepatic	Com mon and good	40s a £5 5s
CHILLIES, Zanzibar	Fair to fine bright	36s a 42s
	Ordinary and middling	28s a 31s
CLOVES, Zanzibar and Pemba, per lb	Good and fine bright	4¼d a 4½d
	Common dull to fair	3¾d a 4¼d
Stems	Common to good	¾d a 15-16d
COCULUS INDICUS	Fair	12s a 13s
GALLS, Bussorah & Turkey ℔ cwt.	Fair to fine dark blue [cwt.	52s 6d a 58s 6d
GUM AMMONIACUM per	Good white and green	40s a 47s 6d
ANIMI, washed, ℔ cwt.	Blocky to fine clean	20s a 80s
	Picked fine pale in sorts, part yellow and mixed	£13 a £15s
	Bean & Pea size ditto	£10 a £13
	amber and red bold	£5 a £8 10s
scraped	Medium & bold sorts	£10 a £12
ARABIC E.I. & Aden per cwt.	Sorts	£5 a £8
Ghatti	Sorts to fine pale	32s a 90s
Amrad cha	Good and fine pale	20s a 65s
	Reddish to pale browu	50s a 87s
ASSAFŒTIDA, per cwt.	Clean fair to fine	25s a 45s
	Slightly stony and foul	26s a s 50
KINO, per cwt.	Fair to fine bright	10s a 25s
MYRRH, picked ,,	Fair to fine pale	25s a 30s
Aden sorts	Middling to good	£5 a £7 10s
OLIBANUM, drop per cwt. ,,	Fair to fine white	62s a 80s
	Reddish to middling	32s a 55s
pickings	Middling to good pale	22s 6d a 30s
siftings	Slightly foul to fine	14s a 20s
INDIARUBBER Mozambique, red hard		10s a 11s 6d
per lb. Ball & Sausage white softish		2s a 2s 4d
unripe root		1s 5d a 2s
liver		1s a 1s 8d
		1s 3d a 2s

FROM CALCUTTA AND CAPE OF GOOD HOPE.	QUALITY.	QUOTATIONS.
CASTOR OIL, 1sts per lb.	Nearly water white	4d a 4¼ 1
2nds ,,	Fair and good pale	3⅞d a 3⅞d
3rds ,,	Brown and brownish	3½d a 3½d
INDIARUBBER Assam, per lb.	Good to fine	2s a 2s 3d
	Common foul and mixed	9d a 1s 8d
Rangoon	Fair to good clean	1s 10d a 2s 3d
Madagascar	Good to fine pinky & white	2s 7d a 2s 8d
	Fair to good black	1s 9d a 2s 1d
SAFFLOWER	Good to fine piuky	50s a 60s
	Middling to fair	40s a 45s
	Inferior and pickings	15s a 25s
TAMARINDS	Mid. to fine *black* not stony	9s 6d a 10s 6d
	Stony and inferior	4s a 6s

FROM CAPE OF GOOD HOPE.	QUALITY.	QUOTATIONS.
ALOES, Cape, per cwt.	Fair dry to fine bright	22s 6d a 24s
,,	Common & middling soft	12s a 21s
Natal	Fair to fine	none here
ARROWROOT Natal per lb	Middling to fine	2d a 3d

FROM CHINA, JAPAN & THE EASTERN ISLANDS.	QUALITY.	QUOTATIONS.
CAMPHOR, China, ℔ cwt.	Good, pure, & dry white	152s 6da 160s
Japan	,, ,, pink	
GAMBIER, Cubes, cwt.	Ordinary to fine free	36s a 6d
	Pressed	Nominal 31s
Block [per lb.	Good	22s 9d a 23s
GUTTA PERCHA, genuine	Fine clean Banj & Maca-	3s 6d a 5s
Sumatra	Barky to fair [sar	2s a 3s 9d
Reboiled	Common to fine clean	4d a 2s
White Borneo	Good to fine clean	2s a 3s
	Inferior and barky	1s 4d a 2s
NUTMEGS, large, per lb.	64's a 80's, garbled	2s 10 1 a 3s 3d
Medium	83's a 95's	2s 8d a 2s 9d
Small	100's a 160's	1s 5½d a 2s 7d
MACE, per lb.	Pale reddish to fine pale	2s 6d a 2s 11d
	Ordinary to fair	2s 2d a 2s 4d
	Chips and dark	1s 11d a 2s
RHUBARB, Suu dried, per lb.	Good to fine sound	1s 3d a 3s 3d
	Dark ordinary & middling	8d a 1s 3d
High dried	Good to fiue	10d a 1s
	Dark, rough & middling	3d a 7d
SAGO, Pearl, large, ℔ cwt.	Fair to fiue	13s 6d a 15s 6d
medium	,, ,, ,,	12s 6d
small	,, ,, ,,	10s a 11s
Flour [per lb.	Good pinky to white	9s a 9s 6d
TAPIOCA, Penang Flake	Fair to fine	1⅞d a 2⅛d
Singapore	,, ,,	1½d a 2d
Flour	,, ,,	9d a 15s
Pearl	Bullet, per cwt.	18s 6d
	Medium ,,	15s 6d a 17s 6d
	Seed ,,	16s a 16s 6d