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THE BARREN SOILS OF CEYLON.

WE have been asked for information as to the nature of any experiments hitherto made with the object of restoring fertility to the soils met with in various parts of this island, which seem to be generally regarded as being in their present condition of no use to the agriculturist. It is unfortunately the case that a very large area of land is to be met with in widely scattered districts that seems for some reason or other to be possessed of that character, and those districts differ greatly in the appearance of their soils, and, also in the constituents composing them. There are the well-known extensive patanas of Uva and our higher lands generally, and there is a very extensive acreage of what is commonly known as the black cotton soil met so largely in the Mannar and other districts of the Northern and North-Central Provinces and in the neighbourhood of Puttalam in the North-west Province. Much of this soil, while of the consistency of soft mud in the wet season, is hard, at least on the surface, and scored by innumerable cracks in the dry season. It is pointed out to us by our querist that, as the population of Ceylon increases—and we know that this development proceeds at a fair average pace—the greater part of these lands now lying waste must come into demand for cultivation. The question raised is, as to what forms of growth these soils may be adapted to and by what means that adaptation may be secured and extended.

Probably the only view that can be advanced in reply to such a query must be an economical one. We should doubt exceedingly if there could be found any soil in Ceylon which, by some forms of treatment, could not be improved to some degree of fertility. We have seen in English experience how even the siliceous sands of lands recovered from the sea have, by the application of sewage, been converted into smiling fields, yielding in due season their plentiful harvests. If such an apparently hopeless recipient can be made the basis for the admixture of fertilizing constituents, it is certain we need not fear that even our poorest soils in this island would be unsusceptible of similar treatment, to be followed by similar success. But the 'drenching' so to speak of long untilled lands with an almost unlimited supply of manurial stimulants, such as has converted as above described the sands of the sea into cultivable fields, is, for very many reasons, of course impracticable with us. We only cite the case as an example to show how needless would be the fear that the barren lands of this island must, all of them for ever remain in their present condition of uselessness. There is more of physical as well as intellectual improvement wrapped up in the future than "has been dreamed of in our philosophy."

But it is suggested to us that—as is well-known to be the case—a good deal of the land that comes within the category we have mentioned has in former times been under cultivation which ceased with the existence of a population adequate to continue it. It is the fact, we believe, that land of a certain character and in certain conditions, which cannot be classed as "virgin," deteriorates rapidly from want of cultivation. This is not the case with soils that have never been disturbed by man, and it is suggested that the deterioration in instances when such disturbance has occurred is due to the cessation of aeration of the subsoil. We cannot profess, of course, to write upon this subject with the authority of an expert in such matters; but it is known to all of us what different results follow deep ploughing, and the consequent free exposure to air of the soil and the immediately underlying subsoil, to those which attend mere surface scratching. The theory advanced, therefore, that these lands of ours which in a hygone time were probably under full annual cultivation now fail of fertility owing to the absence of free aeration, may not be altogether wide of the mark. At all events, as it has been suggested to us, experiments might well be tried by Government Agents and their Assistants in different localities with the object of testing this theory. A few acres of patana, black cotton, and other at present unproductive soils, might be ploughed deeply, and left in that state to aerate for one or two successive seasons, after which some sort of cultivation deemed likely to be most suitable might be tried upon them. Should success follow, a clue might be gained to the secret by which these lands might be rendered serviceable, independently of any attempt—which we

should deem to be, for the present at least, economically impracticable—to restore their fertility by manuring. There are doubtless scientists among us who could say whether the suggestion made to us may or may not be of a hopeful or possible character.

The patana soils are many of them barren from the presence of ironin forms most unfavourable to fertility, while considerable portions are composed of quartzite. Then in such places as Nuwara Eliya and in swamps near Colombo and elsewhere, there are black pseudo-peat soils, which are unproductive from the opposite cause: the absence of mineral matter amongst the humus. In each case improvement might be effected by aeration, as we have already indicated; by a full dressing of lime (especially in the case of the black vegetable soils); and by tillage. The experiment of draining, liming and carefully tilling of some of the Nuwara Eliya swamps, ought to be amongst the measures adopted for the improvement of our sanatorium, now the subject of discussion. Experience thus obtained might be a valuable guide for the reclamation of similar formations elsewhere. In attempts which have been made to cultivate portions of the upland prairies called patanas, we are bound, however, to state that for the first few years at any rate, a perfect plague of cockchafer grubs has had to be contended with. On Meddecumbera, we believe, that even aloe plants were destroyed by these pests, which, we know, played havoc with cinchonas grown on grass land in another part of Dimbula. But caustic lime ought to go far as a remedy for the beetle larvæ.

GAMBIER IN CEYLON.

A planting correspondent wrote to us the other day about an article in the "Magazine of the School of Agriculture" (incorporated with our monthly issue) which, according to him, stated that.

"Gambier (*Uncaria Gambier*) is indigenous to the island and a common plant near Colombo, Galle, Deitota and Dumbara and that the late Mr. W. Ferguson made an extract from the shrnb,—bnt he omits the native name—and I see no mention of gambier in your new book. As this is cultivated so largely in Singapore, it appears strange that it is comparatively unknown here, and now we are told that it is a common plant."

A correspondent favours us with a fuller summary of the Magazine paper as follows:—

The identity of tbe plant which produces the valnable snbstance known as gambier or Terra Japonica has been the snbject of a good deal of discussion and has well illustrated the old adage of doctors (in this case botanical doctors) *disagreeing*. While Dr. Thwaites held that the species of Uncaria fonnd in Ceylon was the *Uncaria Gambier*, leaving it on record in his "Enumeratio" that he cannot doubt that the indigenons plant is identical with tbat of Roxburgh, Dr. Trimen avers that the two are distinct. (No, tbere has been no *disagreement* whatever, only an advance in knowledge.—ED. *T. A.*] Mr. William Ferguson, F.L S., in his interesting notes on Ceylon timber trees, states that the extract from tbe indigenous *Uncaria* is the gambier or terra japonica of commerce, and what is more, be claims to be the first to have prepared the snbstance from the Ceylon tree.

Dr. Trimen, however, says that Sir Joseph Hooker has shown that tbe indigenous species is not *Uncaria Gambier* but is to be referred as a variety Tbwaitcsii to *U. dasyoneura*, and moreover that it affords no gambier, at least that he (Dr. T.) was unable to produce anything like the snbstance. Up to this time then, to gather from Dr Trimen's last report, there is no plant of the true gambier in the island, and all efforts to introdnce it have been unsuccessful

So much for the identity of the plant: bnt if a substance with all the valuable properties of the trne Terra Japonica can be extracted from our indigenons variety, then we may well exclaim "What 's in a name!" and go in for cultivation as hard as ever, for did not Evans of Stackpole Street promise to take 8 to 10,000 tons of gambier from ns every year?

On this subject, Dr. Trimen is good enough to write:—

UNCARIA EXTRACT.—As regards the extract from our wild Ceylon species of *Uncaria* my experience was recorded in the Beport of the Royal Gardens Kew for 1880 (p. 37) as follows:—"Dr. Trimen, Director of tbe Royal Botanic Gardens, Peradeniya, writes (September 24th):—'In the urgent demand for "new products" bere, one of the first things I tried was to make some Gambier for our plant. It grows commonly not far from tbe Garden. I followed the account given in the books bnt could not succeed in producing the correct article. A very excellently astringent extract is easily obtained, but it is black like liquorice or the *acacia catechu* exactly, and not at all like terra japonica.'"

Wbat the extract was like that was made by the late Mr. W. Ferguson (as recorded by bim in 1863) it is not now possible to discover, but in all probability it was the same as that obtained by me. The true Gambier, catechu pallidum, or terra japonica of commerce produced at Singapore is a pale yellowish-brown earthy snbstance.

It should be borne in mind that at the time Mr. Ferguson experimented, no one had any reason to suppose that onr plant was not tbe same as the Singapore one; it was not till 1880 (Fl. Brit. India III. p. 31) that Sir J. Hooker showed the botanical differences.

I may add that I have recently received a case of living plants of the true *Uncaria Gambier* from Singapore, and that young specimens are now growing at Peradeniya and Heneratgoda Gardens.—HENRY TRIMEN.

At the same time it is quite possible that the "black extract" from the local plant might be found of some commercial value, and Dr. Trimen quite agrees that it would be worth while to try the market with it. Here again is a paragraph with some practical information bearing on the subject:—

GAMBIER-PLANTING IN JAVA.—Tbe cultivation of gambier in Java has been tried many times, but although the plant grows excellently, extraction has on every occasion yielded a kind of gambier inferior in quality to that produced by tbe Chinese around Singapore. It is believed that the cause of this inferiority must be songbt in the fact tbat the Chinese during tbe boiling process add a decoction of the poppy, but tbe preparation of this decoction and the parts of tbe poppy used in its manufacture are a secret. As the sale of opium is a strict Government monopoly in the Dntch colonies, and the cultivation of tbe poppy is not permitted there, it is believed that there is no possibility for the Java planters to compete successfully in this industry.

It is quite possible therefore that even when the true plant becomes plentiful in Ceylon we may have to send to Singapore to obtain the secret of the best means of preparation of the extract for market. We may add that gambier cultivation in Singapore has led to almost as great exhaustion of soil as tobacco cultivation in Java has effected.

CEYLON TEA IN LEAD PACKETS.

To the Editor of the "Grocer."

4, Mincing-lane, E,C., June 18th.

Sir,—It may calm the apprehensions of your correspondent, "A Conntry Grocer," to learn that by section 2 of the Merchandise Marks Act of 1887 he cannot be held guilty of an offence under tbe Act, if he proves—

(*a*) That having taken all reasonable precautions against committing an offence against this Act, he had

at the time of the commission of the alleged offence no reason to suspect the genuineness of the trade mark, or trade description; and

(*b*) That on demand made by or on behalf of the prosecutor he gave all the information in his power with respect to the persons from whom he obtained such goods or things; or

(*c*) That otherwise he had acted innocently.

Under these provisions "A Country Grocer," if only he has acted innocently and will give such information as he can about the goods that he sells, need not fear that he will have to rest his case on the evidence of experts as to quality or the country of origin.

The answer to his question, "Whether misdescription—even if purchasers are not misled by it—as to quality and place of origin, without the assomption of the name or brand of any particular estate, is actionable and punishable," is that the Act does not require that the purchaser or the public should have been in fact deceived.—I am, &c., WM. MARTIN LEAKE.

PAPER *V.* LEAD FOR TEA PACKAGES

To the Editor of the "Ceylon Observer."

Kandy, July 17th.

SIR,—At the request of the Chairman I enclose copy of letters regarding Mr. J. Maitland Kirwan's prepared paper for tea packages.—I am, sir, yours faithfully,

A. PHILIP, Secretary.

(*Copy*). Billiter Square Buildings,
London, June 27th.

Dear Sir,—I have now pleasure in sending you by this mail another sample of the prepared paper to take the place of tea lead. Since I last corresponded with you I have had a break of Elkadua tea sent home in this paper, one half of the break being packed in this paper and the other half in the ordinary load, the result of sale being precisely the same.

Neither the trade nor anyone else has made any objection to this paper, and as it will cost about 40 per cent less than the lead, there will be little difficulty in introducing it.

I have had application for samples of the paper from Kangra Valley Planters' Association and other firms. You will no doubt now bring this matter before your Association at an early date. I may mention that I intend entirely substituting this paper for the lead on my Elkadua estates where I have close on 1,000 acres of tea.—I am, &c.,

(Signed) JNO. MAITLAND KIRWAN.

L. H. Kelly, Esq., Chairman, Ceylon Planters' Association.

Copy. Castlereagh, July 16th.

Dear Sir,—In reply to yours of June 27th I shall bring the matter before the Association at our meeting on 8th of next month. You do not give cost of paper or how it should be fastened together. I have asked the Secretary of the Association to publish your letter, as the best means of giving publicity to the merits of the paper.—Yours very truly,

(Signed) L. H. KELLY, Chairman, C. P. A.

P.S.—I may mention that when I received the first samples I brought the matter before the Tea Fund.

DARJEELING PLANTERS' ASSOCIATION.

Proceedings at Committee Meeting of the Darjeeling Planters' Association, held on Saturday 14th June at noon. Present:—Messrs. J. Johnston, F. De Momet, W. Ager, G. G. LeMessurier, J. Calvert, J. Court, G Nash, A. Wernicke, J. D. Gwilt, R. Harrison, Hony. Secretary.

Read letter No. T. A. 3435 dated 27th May 1890, from General Manager, D. H. Railway, offering 7½ per cent, rebate under five years agreement with various Tea Concerns, on all classified goods upwards and downwards over the D. H. Railway, the item of coal being subject to 5 per cent rebate only. Resolved: That these terms be accepted, and be made known to every member of the Association by printed Circular. —*Indian Planters' Gazette.*

NOTES ON PRODUCE AND FINANCE.

A NEW DEPARTURE.

Mr. Lipton, who is in his way a provincial Whiteley, and has shops and stores all over the country, began the sale of tea, chiefly Indian and Ceylon, about a year ago. During the first year his sales have reached 4,000,000 lb., and he is now turning his attention to America. Mr. Lipton is now in Ceylon, where he is purchasing tea estates for the purpose of growing and supplying his own shops direct with Ceylon tea. We understand that in America Mr. Lipton will sell Ceylon tea only, and thus render material aid to Ceylon planters in the campaign in the United States.

CONDITIONS OF PUBLIC SALE.

The dealers have had their way over the question of the new public sale conditions, and future catalogues of tea will contain the new conditions, by which it will be clearly provided that the tea is ready for delivery, excepting packages which may require to be coopered; and, as some chests are on show before the sale, it is only reasonable that a short time should be given for nailing up such packages. Indian importers have objected to the proviso that all tea must be ready for delivery at the time of sale, but the dealers were equally firm the other way. The importers have yielded, and it is hoped that the new arrangement will work satisfactorily.—*H. and C. Mail.*

COOLY LABOUR ON COFFEE AND TEA ESTATES.

In our issue of the 27th ultimo we published a letter from a planter under the above heading and since then we have received several other letters containing the same complaints. The writer, in the first letter, it will be remembered, complained of the difficulty in procuring labour and in dealing with coolies who, having received advances, keep the money and refuse to work. The estates are in consequence eaten up with jungle and weeds, or as our correspondent put it, "our work is all behind, our coffee is all in weeds, which are eating all the manure we have put in for the benefit of the coffee; not a pit has been made for next year's supply," &c. The grievance is one of long standing though the Government is now less to blame for the state of things giving rise to these complaints than it was formerly. The position of the planter at the present day is very different from what it was in years gone by. He is better provided with police and roads, and in the Breach of Contract Act he possesses the means of obtaining summary justice in cases in which advances have been paid without any work being done for them, and for which formerly a remedy could be sought only in the Civil Courts. Nor is he slow in availing himself of the Act, for as was stated in our review of the annual Report on the administration of criminal justice in Coorg for the year 1889, there were in that year no fewer than 1,648 cases out of a total of 3,624—a large increase of prosecutions as compared with the preceding year. Whether this constant appeal to the law is on the whole a wise policy and likely to conduce to the interest of the planters is doubtful. In any case our correspondent should not complain that "help in any shape or form" is denied planters by the Government to whom "we might as well appeal as to the gods of the heathen." What further assistance do the planters need? The difficulty of finding men against whom warrants have been issued is one incident to all legal procedure and not peculiar to Coorg, or any other planting district.

The emigration of the labouring classes is no doubt a thing to be deplored in the interests of planting industry in this country. "Why," asked our correspondent, "should the Government send cooly labour to foreign countries when it is so much needed nearer home?" The Government does not send cooly labour to Ceylon, Burma, the Mauritius, &c., as the emigration is entirely voluntary; all that the State does is to take care that the coolies are not enticed

by false and fraudulent representations, or ill-treated on the voyage to their place of destination. This draining of the population does seriously affect coffee and other speculations in India; but how is it to be avoided? So long as the wages offered by foreign planters are generally so much higher than those that obtain here; so long as the emigrant coolies are also properly housed, bedded and provided with medical aid, and, in a word, treated with every consideration, emigration will continue as heretofore, and labour in India remain scarce. And nothing is better calculated to promote this result than the frequent prosecutions above allnded to. As to the inducements held out to emigrate, the following, from an old issue of a Trinidad paper, will serve as a sample. "The rates of wages for work, which is principally weeding with the hoe, vary from 8 annas to 10 annas for a fixed portion of work, which may always be performed by an adult of average strength in five hours at most. A day's work of nine hours' duration is paid at for the rate of annas 13½ and during the crop (the season for manufacturing the cane juice into sugar) the ordinary work for all employed is paid for at the rate of annas 13½. Those employed in keeping up the fire boiling the juice of the cane, superintendents of work and trenchers, are paid annas 16⅔ as those descriptions of work require greater attention." The Emigration Agent at Trinidad also offers the coolies houses, gardens and medical attendance free of charge, and states that after ten years' residence they will be provided with a passage home, and that thrifty coolies have been known to return with as much as R1,000 to R1,500 each.—*Madras Mail*, July 9th.

COFFEE CULTIVATION IN THE TRANSVAAL.

On Monday afternoon Mr. H. M. Pasteur read a paper upon this subject at the Chamber of Commerce. Mr. Robert Wales, who presided, in introducing the lecturer, stated that the coffee question was one of vital importance. There could be no doubt that the consumption of the article was overtaking the growth, and anyone who could point out a region yet unoccupied, which would produce coffee, was a great friend to the trade.

THE CONSUMPTION OF COFFEE.

In England we did not appreciate fully the extent of the coffee trade, for our portion of the consumption was so exceedingly small that people were apt to think it a very small trade in consequence. England only consumed 15,000 tons per annum; the yearly consumption, however, of the United States and Europe was no less than 600,000 tons. The coffee trade deserved more attention from English traders than it had hitherto received. Mr. Pasteur, who has recently visited the Transvaal, stated that many parts of that State were exceedingly well suited to the production of coffee. The Transvaal was a vast tract of country situated between 22 and 27 degrees of latitude, and the regions of that country in which coffee could be grown, viz., the central and northern districts, occupied 2 to 2½ degrees. These districts were Waterburg, Rustenburg, Lydenburg, and Zoutpansburg. The districts of Waterburg and Lydenburg were surrounded by mountain ranges from 2,000ft. to 2,500ft. above the valleys, which were themselves 2,500ft. above the sea level. Some of the land between these ranges was very rocky, and grew nothing but coarse grass and stunted mimosas; but there were also fine stretches of deep, rich alluvial soil, in which almost any kind of tropical produce would grow. In the course of a journey he had made in the western and northern districts he had seen some very fine coffee trees—large and healthy—from twelve to fifteen years old, without a sign of leaf disease on them, and bearing a heavy crop. The proprietor of these trees stated the average production per tree was 2lb. per annum, and this without any care being bestowed upon them. They were protected from the sun and cold winds by a shadow plantation.

LUXURIANT COFFEE PLANTATIONS.

At a farm belonging to Mr. de Beer, seventy miles north of Pretoria, he had seen coffee trees fifteen to twenty years old presenting a very much more luxuriant appearance, being from thirteen to fourteen feet in height. These trees must have yielded five tons an acre, taking the acre to contain 5,000 trees.* In this instance the plantation was protected from the sun and cold wind by a belt of banana trees. The lecturer also gave several other accounts of luxuriant coffee plantations he had witnessed in the Transvaal. In the future development of coffee, the question of labour was likely to be the greatest difficulty to contend with. Kaffirs were very erratic in their habits, naturally indolent, always talking and laughing, without the least idea of the value of time, and required constant supervision. The best way to obtain sufficient labour would probably be to come to some arrangement with the chief of the locality. If his goodwill was secured, his bold over the people was almost certain to be powerful enough to induce them to work on a plantation instead of tramping to Johannesburg and Kimberley the more so if they found they were paid regularly, and got good food. Coffee had been, and was still, cultivated in Natal, where it had suffered much from leaf disease. The plantations there had been much neglected during the years of low prices, and possibly in this way a good deal of damage had been done. The elevation of Natal, however, from the experience of India and Ceylon, was found not to be conducive to the best cultivation of coffee. In the somewhat tropical districts, where coffee cultivation could be introduced the rains took place in the months of January and April, with occasional showers between October and December.

TEA AND COFFEE CAN BE GROWN.

Mr. Pasteur stated that the remarks he had made respecting coffee applied equally to tea, and he considered there was a fine opening for many of our countrymen who had acquired experience as tea planters or coffee growers in India or elsewhere. The development which was bound to follow the opening up of the goldfields would make it unnecessary for the Transvaal coffee growers to export for many years to come. Sir Frederick Young stated briefly that his experience of South Africa entirely confirmed Mr. Pasteur's remarks. The county was capable of growing anything. Mr. Hume asked if the shadow trees were essential to the growth of the coffee tree. Mr. Pasteur replied, "Not absoultely necessary, but greatly conducive to the well-being of the plant." Mr. A. G. V. Coneyheare, M.P., also stated that in the extreme west of the Transvaal, sugar, oranges, and tobacco, as well as coffee, could be grown in any quantity. Mr. E. A. Rucker moved a vote of thanks to Mr. Pasteur which was seconded by Mr. Parker, and the proceedings then terminated.—*H. & C. Mail*, June 28th.

ENDLESS WIRE-ROPEWAY AND ESTATE TRANSPORT.

We are requested to publish the following description of "wire-ropeway" with reference to the utility of the invention for planting districts in Ceylon. But is Mr. Davis aware how far the system has been already utilised in Ceylon? For instance on Spring Valley estate, Badulla, for many years now, a wire-ropeway worked by a water-wheel has been steadily at work, utilised regularly for the transport of grass and manure and possibly of produce. It may be that "Roe and Bedlington's improved system" may be an advance on that of Spring Valley. It certainly behoves Ceylon tea planters to

* 5,000 trees 13 to 14 feet in height per acre 500, probably, nearer the mark.—ED *T. A.*

give attention to every available means of economising labour. Here is the description:—

Roe and Bedlington's improved system of wire rope way consists of an endless rope from which the load is suspended and by which it is also carried along. The rope is driven by power at one end and is supported along the line of transport by trestles (of iron or wood) the load is carried by buckets or clip hooks: these are attached to the rope by a saddle which converts the weight of the load into the required grip. The sheaves on the trestles are so arranged that there is no danger of the saddle becoming unshipped as it passes over them and to take long spans and varied gradients there are double, treble and quadruple balanced sheaves, mounted tandem wise, which automatically adjust themselves to an equal share of the pressure. The saddles are provided with two grooved wheels at the outside (of the rope-gripping part) which run on to shunt rails at the station and thus remove the load from the rope. Should the required power be available in water (or steam) at some point in the required line of transport, a rope can be worked from either side and the load transferred from one rope to the other by shunt rails. Curves of large radius may be worked, but one of the great advantages of the invention is that the way can be laid in a straight line over rough country (without high and expensive trestles) thereby reducing the distance to be travelled to a minimum.

CEYLON UPCOUNTRY PLANTING REPORT.

CACAO—JAK AND PEPPER—BLACK BUG ON COFFEE—WEATHER—A DISAPPOINTED PLANTER—ARRIVAL OF COOLIES.

July 18th.

The awful gulf between the prices paid for most West Indian *cacao*, and what the Ceylon lots get is awaking inquiry on the other side of the world, as to how the thing is done. It is not a little flattering to Ceylon men and their methods of curing, that an official communication has been received from the West Indies, asking for information on all points connected with cacao curing. It does look like teaching your grandmother to suck eggs, for if experts in cacao culture were to be found anywhere one would naturally look for them in the other colonies, where the chocolate tree has been long a stand-by.

One of your correspondents, referring to what I said in my last as to sturdy jaks being killed out with pepper, seems to think that the jak is coming in for a bad time, and that vigorous trees are not to be seen. All I can say is that I have not seen anything like weakness among jaks, and since I read his remarks I have been particular when going about to specially observe them.

The jak of course won't stand abandonment: and on estates or portions of estates which have gone out of cultivation, and where jak has been growing, there you will see the slow stranglement of the tree by the vigorous undergrowth.

But where the jak is getting anything like ordinary treatment, I find it as sturdy, its foliage as glossy, and its fruit as plentiful, as ever I knew it. So inimical is the jak to utter neglect, that its presence on a piece of land is I understand accepted by our Courts as evidence of cultivation or recent cultivation.

That a pepper vine can kill a jak, I find disputed by one who has a very extensive agricultural knowledge. When a jak dies that has been supporting pepper, he would not attribute that to the effects of the pepper, but would be inclined to look elsewhere for a reason. He has known jaks which have supported pepper vines for a quarter of a century and more and there was no evil resulting from the association. I was glad to get this opinion, for although it goes against my own observation and what other men have told me, it will prevent a too hasty inference, and the total condemnation of a valued auxiliary.

Black bug has within the last three or four weeks come very much in evidence in what little patches of coffee there remain. This is very disappointing, for it has been looking so well for months back, that hope induced one to believe that it had turned over a new leaf. What hecatombs of hopes have been sacrificed to coffee, and are still. I fancy as long as a few patches remain, and a few bushels are to be gathered, the old methods will continue.

The weather has changed to showery, but we want a good twenty-four hours downpour to get a proper soaking. All the same we are thankful for what we are getting, as the longcontinued drought was shutting everything up. A planter calling at a store which was rather famed for "Sorry, but just out of it at present," asked for marmalade. Alas! there was none: and the storekeeper when intimating the fact, and expressing regret, carried with him a stone jar in his hand. "This" he said, "holding the jar up, is the nearest we have." The planter glanced at it, read Day & Martin's Blacking, and then fled. I wonder if it can be true?

Coolies are plentiful and healthy, and arrivals from the coast continue to come in in small batches. But for this abominable exchange we might be happy. It is at present most in our thoughts. A fine dance it is leading us.

PEPPERCORN.

THE WEALTH OF INDIA.

From Mr. Birkmyre's curious pamphlet* we make a few striking extracts:—

Little has hitherto been said concerning the wealth of India. *Prima facie* a country must be wealthy which sustains, without the aid of a poor law, two hundred and fifty millions of the human race. Moreover, a country possessing only a million and a half square miles of territory, and having the ability to support thereupon 20 per cent of the estimated population of the entire world, cannot be otherwise than wealthy. To those who hold fewness of wants, and not extent of possessions, constitute wealth, from such a standpoint India is indeed wealthy. A country which annually receives and pays for, from 20 to 30 per cent of the entire production of the precious metals, and which, in addition to this large absorption,† imports in increasing quantities articles of luxury such as precious stones, spices, corals,‡ &c., cannot by any stretch of the imagination, be considered as becoming gradually poorer.

Judging from the extent of her national debt, India may be said to be wealthy; for, although large, it is balanced by revenue-earning assets, equal in the opinion of many, to the amount of the debt. This is all the more extraordinary when it is considered that India has paid for every farthing of her conquest—that she continues to pay for an expensive military occupation,—that she has borne the expense of many fruitless frontier wars (notably the Afghan war, which cost about twenty-four millions sterling), and that she has assisted the United Kingdom, in some of her military

* The Wealth of India and the Hindrances to its Increase; by William Birkmyre, of Calcutta and Port Glasgow. Glasgow: M'Naughtan & Sinclair, 24 West Nile Street.

† Quanborough's "Primer on Commercial and Economic Education," page 26.

‡ Barbour on "Bi-metallism," page 14.

enterprises. Moreover, when we think of the great pecuniary loss which famines have entailed upon the country, and the unbusiness-like—I had almost said stupid—methods by which she has acquired her assets, when in spite of all these ordeals, the country has emerged from them, almost free of a national debt, it is surely a proof, if not of wealth, yet of an elasticity of resource (with the exception of America) unparalleled in the history of any other country.

That India, in common with other countries, is afflicted with much poverty cannot for one moment be denied. There, as elsewhere, there are, alas, too many who fall in their strife with fortune. It is easy to paint a dismal picture of the poverty of a nation, but to solve the problem is a different matter. I often think it would be well for India, were her officials to devote more of their energies in ameliorating a condition, which India shares in common with every wealthy country, instead of dwelling constantly, in season and out of season, upon her so-called poverty. On the other hand, one cannot but respect the opinion of those, however mistaken, who are profoundly impressed with the poverty of India, and who ascribe this poverty to the expensive foreign organizations which we have imposed upon her. There is no doubt much truth in the contention that the civil and military services might be conducted upon a more economical basis: this may be said of all countries. The hardship with India lies in the fact, that those services are conducted principally by foreigners, and are, necessarily, more expensive. Still, in the face of all this, the broad fact remains, that judged by large and comprehensive issues, such as the increasing consumption of luxuries, &c., &c., India is not a country bleeding to death, as some would have us believe. Were this so, the process has been going on for upwards of two hundred years; and the evidence at which I have had time merely to hint, all points in the direction of increasing wealth.

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At the outset I said, that with one exception, India had in abundance everything which constitutes the wealth of the United Kingdom. The exception I referred to is the weak executive ability of the race; it is this principle, this ever present characteristic, which in my humble opinion is the main hindrance to the development of the wealth of India. The Indian people are admirable administrators, exact copyists, when placed in a groove; but they are lacking in the self-adaptive faculty of suiting themselves to the ever changing requirements of new developments. The individual has his place fixed for him in society by the rigours of caste, and thus his individuality is lost in that of the community, which in its turn is lost in looking to Government. There is a want of self-reliance, of that bold and sturdy spirit which leads individuals and communities to lean upon themselves, rather than upon those who govern them; hence, as stated, the weak executive ability of the race is the main hindrance to the creation of wealth in India. This may be illustrated by the fact that upon our acquiring the country we found it all but destitute of roads, by which the inhabitants could communicate with each other. They were practically shut off from selling to themselves, or to the world, the fruits of their labours; in consequence of their weak executive ability they were unable to appreciate the necessity for roads, so as to give their wealth-creating faculty full scope. Hence, also, the hoarding propensities of the race, and their inability as a nation to associate capital, or to combine and organize themselves as one against an enemy.

The paramount power in India is, and has always been, the centre from which all social and public works emanate. The people look to the Government to see everything, know and provide everything, whereas with the strong executive faculty of the Western races they are themselves the centre, and the Government is but the organ of their wishes.

The good qualities of the Indian people—their patience, their courtesy, their contentment—all serve to accentuate their weak executive ability. In their religion, there is nothing like what we understand by dissent, nor is there the ever restless ingenuity to discover new and improved methods, so typical of Western races.

It is easy to criticise, but not so easy to suggest a remedy. As has been well observed, "You may alter the conditions of the race but never their characteristics." So in the case before us, I fear a remedy is impossible, and to defer the development of the wealth of India until this national weakness is overcome is simply postponing indefinitely all measures for the promotion of its growth. Nor is it necessary in this instance that we should make the the attempt to alter this characteristic, for have we not as a nation, assumed the executive of India? We have assumed the trusteeship of the people, and no country has ever taken upon itself such responsibilities to another as England has towards India. If India has suffered since our possession, for want of proper communications with which to develop her resources, the fault clearly lies with the Executive which we have imposed upon the country, and if we desire India to become wealthy, and to take her place among progressive nations, it is upon this Executive that our attention must be concentrated.

I have attempted to show you wherein the wealth of India consists—namely, in her wealth creating faculty applied to a marvellous number and variety of products. I have tried to interpret to you a few of the national characteristics of the race, the chief one being an innate desire to better their condition. I have endeavoured to show you wherein mainly consists the hindrances to the country becoming wealthy—namely, the weak executive faculty of the people and the feeble Executive which the House of Commons has given to the country. I fear things cannot improve unless this country can be roused to take a more active interest in the affairs of India.

When one thinks of the millions of families in this country, who receive their daily bread in virtue of our connection with India, and how, were the inhabitants of this country, but to take a greater interest in the affairs of India, the number of these families could be indefinitely increased—when one thinks of the millions of the Indian race who receive their daily bread in virtue of our connection with their country, and how, by a more active interess on our part in its affairs, their number could be largely increased. In meditating over these things and the apathy of this country towards India, I am sometimes inclined to estimate such neglect as almost criminal. India ought to be considered as an integral portion of this Empire. It was so viewed a few years ago when Russia threatened her frontier. With how much more reason should it be so regarded in relation to all those peaceable economic questions, common to all progressive countries.

[There is another side to parliamentary interference with India. For instance: Bradlaugh representing as a martyr of tyranny the Maharaja of Kashmir, who was deposed because of his tyranny and oppression. There is another side also to the character of the administrators of India. There are exceptions, of course, but on the whole no conquered people were ever more ably, righteously and benevolently governed than the people of India.—ED. *T. A.*]

GARDENING IN INDIA.

There seems to be a prevalent idea among those who have not been to the tropics, and especially India, that gardening there must be a very simple affair, just in the same way as some imagine that tigers prowl about the streets, and cobras meet you at every turn; but the reverse is actually the case: good gardens, like tigers, are, in fact, not plentiful, and it is possible to live in India a long time without ever seeing a cobra outside a snake-charmer's basket.

Before I went to India, I had similar erroneous notions, particularly as regards Indian vegetation. I fancied I was going to see a Kew Palm-house-like aspect everywhere; mighty Palms, and rampant climbers; in short, just like the choice "bits" of jungle scenery that travellers in the tropics are wont

to beguile us by pen and pencil. It is true that when we entered Bombay's magnificent harbour at sunrise, and I saw the towering groves of Palmyras (Borassus flabelliformis), that stand like giant sentinels on the amphitheatre of hills overlooking the harbour, I began to think that the dream of my life of seeing a tropical jungle would soon be realised. The same day I visited the Victoria Gardens and others among the principal gardens of Bombay, and I was enchanted with all I saw, for though it was November, the gardens were at their climax of beauty; their spring-tide of flower, in fact, after the monsoon, as the long rainy season is termed.

I think it is pardonable in a young gardener if, on first seeing a tropical garden, he goes wild with delight, and otherwise shows signs of temporary insanity. I have a distinct recollection of being in that condition when I entered the Victoria gardens in Bombay, and saw growing in the greatest luxuriance in the open air plants that from childhood I had been accustomed to see cribbed in pot, and confined in a glass-house. So great is the difference between pot-grown plants in a stove and those growing in unrestrained vigor in the tropics, that they are often scarcely recognisable, and I blushed at my ignorance when, on asking the names of certain plants, Mr. Carstenson, the Curator, mentioned the most familiar names. The things that struck me most were such well-known stove climbers as Bougainvilleas, Bignonias, Allamandas, Ipomœas, Passifloras, which send their lissom shoots from tree to tree just as the Traveller's Joy and Honeysuckles do in our hedgerows, and the brilliant colour they give to an Indian garden scene is quite indescribable—it must he seen to be understood. The groves of tall Palms give support to shade-loving Bhilodendrons and other clinging Aroids, and in the shade below grows a multitude of smaller things—Pancratiums, Crinums, Alocasias, various Bromeliads, Begonias, and such-like, while there is a dense lawn-like carpet of the creeping little Artillery plant, Pilea muscosa, or whatever its latest name may he. I could not better describe the Palm grove than by comparing it with the central part of the Palm-house at Kew, supposing the roof was away, and the big Palms spaced out more widely.

What we term "fine-foliage" plants are no less remarkable, especially the higher-coloured shrubs, like Croton, Acalypha, Caladium, Dracæna; for there they develop such rich tints, especially the Crotons, that even the famous Liverpool Croton growers could not approach. I saw a shrubbery of Crotons—a hundred or more—planted in the full sun, close to a wall at one of the railway stations; and I thought I had never seen such a marvellous sight in the way of leaf-colour; and the sorts included most of the newest—all dense, symmetrically grown specimens.

I thought of Mr. Baines and his famous "elephant" specimens, the result of years of patient skill, when I saw in a sample forecourt in the Bombay suburbs some gigantic specimens, faultless in training, and crowded with bloom, of Ixoras, Jasminum sambac, Bignonia venusta, Bougainvillea leteritia, Petrea voluhilis, and others. The owner, a railway man from Lancashire, seemed unaware that he was doing anything very remarkable; he liked flowers, and liked to see the front garden "look a bit smart."

It is not only in the Victoria Gardens that one sees such luxuriant vegetation, but you see it everywhere—in the city gardens, of which the Elphinstone Circle Garden is a noteworthy example; in the Fort where European commercial life is carried on; as well as on the picturesque heigbt known as Malabar Hill where the wealthy natives as well as Europeans have their bungalows, and, in most instances, beautiful gardens about them; but all this is due to the perpetually moist atmosphere and high temperature that prevails throughout the year, so that when you leave the sea-girt island of Bombay and its Coco-nut woods, you enter upon quite different scenery whichever direction you take. Going south towards Madras, you have to climb the ghauts, as the western range of mountains are called, and there you see Nature's gardening in its grandeur, until you reach Poonah, and beyond that city you pass through the trackless wastes of the Deccan. Going up country towards Guzerat, the train takes you through a marvellously rich Agricultural country, where the fields of Cotton and cereals are measured by the square mile. On towards Baroda, you come to what is aptly called the "garden of India," where the rich farm lands are interspersed with magnificent timber trees, where the Tamarind and the Mango give a distinctive feature to the landscape, diversified now and again by natural groves of the Toddy Palm (Phœnix sylvestris) and Palmyras, and this kind of scenery goes on in a more or less varied way right through the vast stretches on to the Punjaub and the North West.

It is thus that the stranger derives his first impressions of India, and if he enters it hy the other great gateway, the opening scene is even more impressive as he goes 100 miles up the Hooghly before reaching Calcutta. The banks of the Hooghly are typical of an Indian jungle, abounding in vegetation of the wildest description, and where the tiger, moreover, is not a stranger.

The further you go inland the less tropical the vegetation becomes, and the more difficult it is to make and maintain gardens, and the difficulties attending gardening, in the sense that we understand the term, accounts for the comparative rarity of fine examples. These difficulties arise purely from climatic causes, the long period of drought and the excessive rainfall spread over a comparatively short period. It is, indeed, not an easy matter to maintain an inland garden in freshness from one monsoon to another, which interval varies from eight to nine months. But by the ordinary native system of irrigation, much may be done; and those who can afford a more costly system, can keep their lawns green throughout the year.

As regards the subject-matter of these discursive notes of gardening in India, I think it best to divide it, as methodical London did in his *Encyclopædia of Gardening*, where he treats on the state of gardening in different countries. His divisions are—gardening as an art of taste and design, and gardening as an art of culture. As regards India, so far as my scant knowledge goes, there is very little to say about one, and a great deal, more than I can go into here, about the other. About the gardens I saw, the majority exemplified very little design, and the tasteful bits resulted more from accident than design. Europeans unquestionably are leaving their marks everywhere about the country in the matter of gardens, as well as on the buildings, and everything else; but the want of intimate knowledge of the principles of design are too apparent. The fact is, that in India, as indeed in this country, too, everybody thinks that he can lay out a garden, a simple matter say they, what is there in it? The results too often show that there is a good deal in it. But in India this is more excusable, because professional gardeners are scarce, and very rarely you find a native capable of designing even a flower plot well. Consequently, you get the military officer or the civil servant with spare time, essaying to do what he knows very little about; but for that matter he would build you a steam-engine or make a fiddle, for a man in India must he more or less a "Jack-of-all-trades." I heard of a German out there who qualified himself for a landscape gardener by being an expert at house-decorating, and sure enough he transferred his elegant scrolls and aimless contortions to the walks and roads of a public garden he designed. Among the gardens that stand out prominently as fine examples, are the great public gardens of Calcutta and Bombay, the botanical garden in the former place being probably the finest in the world; while remarkable also are the Government House gardens at Barrackpore, and the picturesque Eden Gardens. Those in the Nilgherries at Ootacamund and Bangalore, favoured as they are by a delightful mountain climate, are highly spoken of by everyone who has seen them. The gardens at Poonah, which, like the other great centres has been long under the influence of the British, are famous throughout India, for the climate there favours the growth of plants that will not thrive in the plains. I was much

pleased with the Government House garden at Ganesh Khind, which were for many years under the management of an old Kew student, Mr. Woodrow, now Professor of Botany at the College of Science. The Bund garden, too, struck me much, both on account of its design—a series of terraces—and for the high keeping of it by a native superintendent.

At one time the best gardens were confined to British territory, but in future we shall have to go to the native States for fine gardens. Already great progress has been made, doubtless the outcome of the periodical visits to Europe of the native princes, who have seen for themselves what English gardening is. Among States that can boast of famous gardens is Oodeypore, under the direction of Mr. Storey, who has, I hear, done wonders in making the State gardens there what they are now. I have not yet seen them, but a friend who has travelled throughout India tells me that they are really fine, enriched by magnificent tree growth, and embellished in a costly yet tasteful way. I am told that the lakes alone are worth the 70 miles ride on camelback to see, being of great extent, and have delightful surroundings. The view in the Oodeypore Gardens (see Supplement in present issue) shows a fountain of simple yet massive design; and doubtless Mr. Storey has it full of Water Lilies, that give such a charm to water basins in India. The trees in the back ground are Tamarinds, which are among the finest trees in India, as stately and massive as an Oak, yet as graceful as an Acacia. I have measured some with boles 27 feet in circumference. Noteworthy gardens in other States include that of Jeypoor, over 70 acres in extent, designed by Dr. De Fabeck; Durbuugha, which was at one time under the direction of Mr. Maries, but who is now, I hear, doing a great deal in gardening at Gwalior, also a native State. There are also fine gardens at Patiala and Chikalda, while I hope that the various palace gardens and parks that I am designing and laying out for H. H. the Gaekwar of Baroda will in time compare with any in India. I have said nothing about native gardens pure and simple. Judging from what I have seen, there is very little to say about their design; the native idea of a garden is a square plot with his bungalow in the centre of it. The plot varies in extent according to the importance of its owner, but there is no variation from the straight lines and symmetrical figures he delights to portray on the ground. After the diamonds, squares, and trapezoids are cut out and duly edged, he proceeds to plant them with masses of the things he most requires; but the stock things are Limes, Guavas, and such like fruits, and with flowers like Jasmine and Roses, of which a prodigious quantity are required for religious festivals and ceremonies. But there is a good deal of commonsense in all this, for a garden so laid out is easily irrigated and kept in good order. He is not troubled about æsthetics, "breadth of effect," or "picturesque skylines." A garden to him is a place to grow things to eat, or use in some way, and that is all that he wants. In the unregenerated gardens around the palaces, you see much that is absurd according to our canons of taste, but invariably there are fountains, often of beautiful design; but as a rule, out of all proportion as regards size to extent of the garden. I think it was Bishop Heber who said that the natives of India built like giants, and finished their work like jewellers, and this is true of their buildings; but in the matter of gardens they seem to be like pigmies, incapable of originating any broad design, which alone can set off to the fullest advantage their wonderful buildings.

Gardening in India, as an art of culture, is such a wide subject that I will not attempt it here. The methods of cultivation and propagation, which, though primitive, are often highly ingenious, and altogether I have a good opinion of the native mollee. He is skilful, and generally very painstaking, but it takes him some time to get into European ways of doing things. Mr. Woodrow, in his book, *Hints on Indian Gardening* deals with the practical part of gardening in a very thorough way, which cannot fail to influence the future condition of gardening in India.—W. GOLDRING.—*Gardeners' Chronicle.*

PLANTING OF TREES IN STREETS, from a sanitary point of view, cannot be over-estimated. Trees not only afford shade and shelter, but adorn the landscape and purify the air. They improve the heart as well as the taste; they refresh the body and enlighten the spirit, and the more refined the taste is, the more exquisite is the gratification that may be enjoyed from every leaf-building tree.—*South of India Observer.*

CARRIER PIGEONS.—An interesting experiment to test the utility of Pigeons is about to be made in Canada. Ten pairs of birds are being shipped to the Dominion this week, and then itention is to train them for the purpose of establishing and maintaining a line of communication between Sable Island and Halifax. Sable Island lies in the Atlantic Ocean, about 90 miles from Nova Scotia, and in the track of vessels passing between the American Continent and Europe. A station is maintained on the island with provisions and other necessaries for the relief of shipwrecked mariners, but there is no regular communication between it and the mainland. The experiment has been initiated, as likely to be of service in cases of emergency, by the Canadian Minister of Marine and Fisheries.—*H. and C. Mail.*

TEA IN CEYLON.—Mr. John Brown, of the Uva Coffee Company, is well pleased with all that he saw during his long tour in your island, where he travelled fully a thousand miles, having visited every tea district. He has great confidence in the capabilities of the Uva districts for the production of good tea; but, as regards quantity per acre, he believes that in all parts of the island the longer an estate has been under coffee cultivation the slower will be its progress to full bearing, and the less will be the annual yield, especially in those cases where a long course of mamoty-weeding has denuded an estate of most of its top-soil. There is reason in this opinion for, though it is true that tea is a deep feeder, which coffee is not, time must be allowed for the tea roots to make their way down to a good feeding soil, and of course the quality of that soil will always be a matter of uncertainty. Mr. Brown regards the fuel and timber questions as of serious import, and agrees that materials for packages should be imported, and that where water power exists in quantity it should be utilized as a motive-power for machinery. He is thoroughly well satisfied with the averages of his Company's teas, but on many of the old coffee places patience will be needed before ample yields are secured.—London Cor., local "Times."

TOBACCO IN INDIA is thus referred to in the Official Report on Inland Trade in 1888-89 :—

This narcotic is widely cultivated by the agricultural population for domestic consumption and in most provinces for inland export also; but it is only in tracts possessing a moist hot climate and a rich soil that the finer varieties suitable for European consumption can be grown. Such conditions occur in the coast districts of Madras and Bengal: and it is from these tracts that most of the tobacco exported from the country (a small quantity) is obtained. The principal barrier against a larger trade lies in the ignorance of the natives of the art of curing the leaf. A sufficiently profitable market might be found for ordinary Indian tobacco if it were properly cured; but the manner in which the narcotic is usually consumed by the natives themselves does not encourage a knowledge of curing. It is either chewed as a dry powder mixed with lime, or smoked in the form of a conserve or paste mixed with treacle and other ingredients. In either case pungency rather than aroma or delicacy of flavour is the chief desideratum. The best prospect of improvement in Indian tobacco manufactures lies in the steadily increasing consumption among the richer classes of natives as well as the European population, of the country cheroot and pipe tobacco. Measures are being taken to introduce a knowledge of American methods of curing in Madras, and the cigars of that Presidency are gaining in reputation. The area cultivated with tobacco in all India is put down at 800,000 acres; the crop at 406,000 tons, or over ½ ton per acre.

THE PROSPECTS OF QUININE AND CINCHONA BARK.

The figures we published a few weeks ago indicating the steadily increasing exports of cinchona bark from Java, created a very unfavourable impression locally and not a few have been heard to say that there is little use now in anticipating better times or a better price for bark. Without doubt Java is fast assuming the position lately held by Ceylon as arbiter and controller of the bark market. Her richer barks, averaging double those of Ceylon in quinine, are now being shipped to the extent of from five to six million lb. per annum. And if we are to believe our latest visitor, Dr Wilson, there is no prospect of her export felling off for a good many years to come. At the same time, it is quite a question whether the total supply of Bark for the next few years will be equal to the World's demand, unless prices rise sufficiently to warrant the harvesting of bark from indigenous trees in South American forests. The exports from Ceylon are unmistakably falling back year by year; those of India are at best stationary—indeed they have also lately fallen off. Wild bark from America has ceased to come toward save in the better alisayas, apart from the Belivian bark from cultivated trees The total result therefore even making allowance for an increase of Java bark is far from discouraging to cinchona planters. Supposing that Java this year supplies 5¾ million lb. 4 per cent bark, Ceylon 7½ million lb. of 2½ per cent, and India 1½ million lb. of 2 per cent bark, we only get the equivalent of 7¼ million ounces of quinine, while the consumption is likely to be in excess beyond what the American bark can make up, not counting the quantity of bark required for other purposes than quinine.

As regards consumption, Mr. John Hamilton in 1888 estimated that 9 million ounces would be required in 1892, the demand increasing annually by 10 per cent. But last year's experience—owing a good deal to the influenza epidemic and the cheapness of quinine—showed an advance much beyond the estimate. The United States last year increased her imports largely; the figures being for 1888 imports 1,904,206 oz.: 1889=2,245,941 oz., while five months of 1890 saw an import of 1,611,000 oz., or at the rate of at least 3,200,000 oz. for the year. All this apart from over a million ounces manufactured annually at Philadelphia. With the world's consumption at 9 million oz *next year* (in place of in 1892), we cannot see where the bark is to come from for more than 7¾ million oz., unless the price per unit goes up considerably. We believe there is a general impression that before the end of this year there will be a considerable change for the better, and although with Java overshadowing us, there is no room for "great expectations" being encouraged among the Ceylon bark holders, still we cannot but think that at least a better time is approaching and that we have touched the lowest depth in quotations.

So far our view of the near future's on the basis of the laws of supply and demand and a normal market. But what are we to say if the following story published in the *Chemist and Druggist* be correct? It contains, at any rate, a very curious revelation. The contracts referred to are, of course, perfectly legitimate, but undoubtedly the system is one-sided and enables the manufacturer to say, in effect, to the producer:—"Heads I win; tails you lose." The question is, Can any number of the Java cinchona planters have lent themselves to such one sided and damaging contracts? We quote as follows:—

QUININE MANUFACTORIES DEPRECIATING QUININE.

Mr. H. A. Van Overzee, jun., cinchona broker, of Amsterdam, sends us the following notes on the subject of the depression in the price of cinchona bark.

Some years ago, when the Amsterdam market began to gain importance, there were many who prophesied that the average percentage of quinine in the Java barks would become so high (10 to 12 per cent) that one was inclined to question the possibility of placing such quantities of quinine as those barks would yield.

Since then the imports from Java of Ledgers and Hybrids—which two kinds were predicted to be the barks of the future—have shown us that these expectations were greatly exaggerated.

The following quantities of Ledgers and Hybrids have been offered in Amsterdam at the regular auctions.

			kilos.		p. c.
1888	at 10	auctions	about 1,131,000	averaging	4·02
1889	,,	,,	1,688,400	,,	4·12
1890	5	,,	1,220,302	,,	4·20

It is true that some plantations have not stripped as much rich stem and root bark, as they would have done if the unit value had ranged higher—still the above figures show clearly that the fear of overproduction through the increasing richness of the barks is unfounded.

The stock of cinchona is London, according to the official accounts has declined from 99,600 packages in 1883 to 57,181 packages in 1889.

The stock in Amsterdam in first hands only consists of a few parcels withdrawn from the last sales, whilst in second hands there are never any supplies of any importance. Comparing the stock of cinchona with price of quinine, as follows:—

	1883	1884	1885	1886
London bark stock (per kilo.)	99,600	80,500	61,700	62,350
Quinine (florins per kilo.)	135	75	57	24
		1887	1888	1889
London bark stock (per kilo)		59,619	56,754	57,181
Quinine (florins per kilo)		36½	27½	25½

it is evident that some powerful factor must have operated to produce the constant decline of the price of the manufactured product, concurrently with the diminution of the supply of the raw material. What is this factor? I am inclined to think that it is found in the existence of contracts for cinchona between some large plantations in Java and quinine manufacturers direct, in which the price of bark is fixed only upon arrival of the parcels in the factories, according to the then ruling value of quinine.

Such contracts may seem profitable to some planters, as the producer receives the quinine-value of his barks without any expense except the remuneration of a specialist (who, in conjunction with the quinine manufacturer, adjusts the percentage and value of the bark on arrival), taking into consideration a certain fixed figure for the cost of manufacturing. The planters, as a body, may be sure, however, that by such a mode of operation they are digging their own graves, for this reason—such contracts enable the manufacturer to sell considerable quantities of quinine for future delivery at low prices, without loss or even without risk, because he has the guarantee that however low may be the price at which he sells the quinine, when delivery time comes the necessary quantity of bark will be at his disposal at a correspondingly low figure.

The depreciation in value of quinine is thus actually borne by the planters, yet it is a fact that such a contract exists between a German manufacturer and Java planters, and that this has enabled him for years to sell quinine on future delivery with a profit at the lowest figures, causing at the same time a general depression of the article, to the detriment of the producers. Whenever this manufacturer lowers his prices, other makers have to follow suit, should they not wish to lose their customers, and they have therefore to make

lower bids in the bark auctions where their sales are covered.

It is known that this manufacturer receives every year, under such conditions, cinchona bark with an equivalent in quinine of some 8,000 to 10,000 kilos. (280,000 to 350,000 oz.)—a quantity amply sufficient at all times to bring about any desired fall in price. In January, 1889, when London quoted quinine at 1s 3d with a slow demand, this manufacturer could sell "future delivery" at 1s 2d without the slightest danger of being caught by an eventual rise in bark values, being certain of receiving direct from Java the necessary quantity of cinchona to cover his sales. As soon as the price of 1s 2d became known, buyers would not hear of any higher figure, and other manufacturers had to follow suit if they wished to have any chance of doing business. The consequence was that in the following bark sales no more could be paid than the equivalent of a quinine price of 1s 2d for the barks; the unit in London was thereby reduced from 1-$\frac{3}{8}$d. in Jan. to 1$\frac{1}{2}$d in the following month.

When, after this, in February, sales of quinine at 1s 2d were not so easily accomplished, future delivery was again lowered to 1s 1$\frac{1}{2}$d which other manufacturers had to concede, and a further depression of bark values was the result. It was not till some manufacturers paid higher prices for bark to sustain the market that manœuvring was put a stop to, and it became possible to effect a slight improvement.

The holders of bark may try what they like to keep the markets free from abnormal pressure, by judiciously regulating the quantities to be exported: they will always be out done by the power of manufacturers who hold contracts as described above. It is evident that the bark statistics give no reason whatever for a position such as exists at present, and it is only the finessing of a few manufacturers which since 1883 has driven down the prices of quinine and the value of cinchona to the loss of the planters, whose care it should be to render such things impossible for the future. In the long run, a sound state of affairs can only be brought about by free competition, which under present circumstances cannot possibly exist

OTTERS AGAIN:

TOBACCO SMOKE *v.* HOUNDS, &c. &c.

Nuwara Eliya, June 30th.

The graphic reminiscence of an orthodox *otter hunt* in the *Observer* of the 26th inst. was interesting. The "tailing" of the otter at the ford, however, and the throwing him on to the bank, to be torn to pieces by perhaps some 10 or 15 couple of hounds, savours to me uncommonly like foul play. Why! "*tobacco smoke and brimstone*" could not be much worse than this, though far be it from me to defend such a mean device for the destruction of an animal which affords such excellent sport.

I have been familiar with *otters* and *otter hunting* from my boyhood, and in this connection I can't help relating, how I once closed with one whilst a *barley rick* or *stack* was being removed, and which notes I am sure will bring to the memory of many of your readers some similar scenes of boyhood days. 'T was on a winter's frosty morn, when several inches of snow lay on the ground, and I had just been round my rabbit hutches feeding my pets on green kailand carrots, and admiring the last litter of beauties, nestling in their cosy bed of fur. The sparrows and finches, half tamed with cold and hunger, were hopping about all around on the crisp white snow, and robinredbreast was begging in sweet low notes for his morning repast of crumbs. Looking towards the stable yard, I see James Johnstone (a fine specimen, by the way, of the old proverbial minister's man, so well described by Dean Ramsay), and Davie the "loon," yoking the horse to the cart. The barn-door opens, and the forks are got out. Hurrah! thinks I, they are going to take in a stack of barley or oats, a rare occasion of rejoicing with Snap the terrier and myself. The news spreads, and some of the boys from the village collect for the *rat* hunt. Sheaf after sheaf is forked into the cart in quick time, and as the stack goes down, down come the rats, to be caught in our hands, as the cricket ball is caught by the wicket-keeper.

A squash and a dash on the ground, and the varmint is no more; an occasional bite is nothing; that only adds zest to the sport.

But see—the rick is getting lower, and it is not *rats* alone that frequent the stacks, for a home or a shelter. At times, weasels, stoats, otters, and semi-wild cats, &c., find snug retreats there. Snap and I as usual take up our station at the ventilating flue of the stack all attention and ready for any comer. Out bolts a great brown thing, right bang on to my chest; Snap has him by the ear, and I by the throat—over we go—heels over head—down the slope—a bundle of dog, otter and humanity, James Johnstone bawling out from the rick "Haud laddie, haud, if ever ye haud i' y'r life." And faith the "haudin o' 't," is rough and tough work!

But Davie, my staunch henchman, is off the cart and down the incline like a lamplighter. Just as I am pretty well out of breath Davie collars him by the scruff of the neck and plants his knees over the chest of the otter. I follow suit, and get on behind with all my weight. You may rest assured it did not take us 3 hours to polish off our otter! I should say we had him carried into the back kitchen, within 15 minutes from the bolt, and where we had our wounds dressed. But what cared we for bites or bruises, wounds and contusions? Davie and I had the stomachs of cassowaries in those days, no such things as nerves I believe, and stout hearts. Davie went to Canada and prospered there, and, if still above the sod, will no doubt remember as well as I do the tussle we had with the "water dog."

Now, Mr. Editor, this is what I call legitimate otter hunting—no tobacco smoke or brimstone here; no pulling of a poor half-winded thing on to the bank of the stream to be torn to pieces by a pack of strong hounds!

By all means, as you suggest, let us go at the otters in an orthodox way. We have got the men, and there is no great difficulty in getting the dogs. How many right worthy successors of Palliser, Downall, and Baker have we not got all around us? One of the new improvements or attractions to Nuwara Eliya, our lovely Sanatorium, will undoubtedly be the *pack of otter hounds*, and, if spared, we hope to read the announcement:—"Otter hounds will meet at the Bridge, Rosebank, 5 a.m., 1st Jan. 1891."

DECREASE IN CANE SUGAR.—The *Grocer* in calling attention to the decrease in the supply of cane sugar, says:—The principal feature in the existing supply of sugar in this country now is the diminished imports of cane as distinguished from beet descriptions, as, whilst consignments of the latter predominate to a greater extent than ever before, arrivals of the former have been lighter up to the present period of the year than they have been for many seasons past. It is years since the London market was well supplied with sugar from the East Indies, consisting of various useful kinds suitable either to grocers or refiners, when public sales of Mauritius, Bengal, and Penang were regularly held, and passed off with readiness at better prices duty paid than they would now entirely free of a customs' charge if any of the same sugars were to be offered.—*H. & C. Mail*, June 6th.

REMARKS ON THE STATE OF BOTANY IN CEYLON.

WITH REFERENCE TO THE KNOWLEDGE OF IT IN APRIL 1843, AND AN ATTEMPT AT ARRANGING ITS FLORA AS KNOWN TO MOON AND RESIDENT BOTANISTS ACCORDG ING TO LOCALITY AND ELEVATION, COMMONLY CALLED GEOGRAPHICAL DISTRIBUTION OF A FLORA.

By Captain Champion, 95th Regt.

GEOGRAPHICAL DIVISION OF PLANTS IN CEYLON.

(*Continued from page 112.*)

Table 4th.

GENERAL FEATURES OF CEYLON VEGETATION.

Capping the Hills, facing Kandy and Peradenia.

The Flora of Table 3rd is intermixed with :

1st. On the under features and lower Hills about 1,900 feet.

Memecylon Sp. Eugenia Sp. Cyminosma pedunculata, Mezoneurum cucullatum, Holigarna Sp. Litsæa trlnervia, Solanum verbascifolium, Solandra oppositifolia, Cerbera parvifolia, Strychnos Sp. Tylophora panciflora and Sp. Carissa carandas, Zizyphus Sp. Artabotrys odoratissimus, Miliusia Indica, Annona Asiatica, Gyrinops Sp. Pothos gracilis, Cæsalpinia paniculata, Epidendron pendulum, Wendlandia Notoniana, Heyneana, Exserta, Bicuspidata, Stylocoryne densiflora, Tradescantia paniculata, Achimenes sesamoides (Wild.) Torenia asiatica, Rosca santaloides, Rubia cordifolia.

2nd Slopes of the highest hills, about 3,000 feet above the level of the Sea.

Rubiaceæ, many good Sp. Grumilea vaginans, Psychotria curviflora, and 2 other Sp. Anonaceæ Sp. Myristica Iriya (Moon) Clypea hernandifolia, Xanthochymus ovalifolius, Rhus decipiens, Convolvulaceæ Sp. Begonia Malabarica (red & wh. fld.) Mar.ynia lanceolata, Didymocarpus Sp. Solanum decamdentatum, Ferox, Giganteum, Curculigo pauciflora, Arum pentaphyllum, Huge forest trees (Echinocarpus?) Ternströmiaceæ? Caryota horrida. Ammannia Sp. Elæagnus latifolia, Cissampelus Sp. Dianella nemorosa and graminifolia, Asparagus falcatus, Smilax latifolia, Arum camparulatum, many tree Orchidaceæ, Filices and Lycopodii, Limodorum Sp. The Wana Rajah, Pavetta hispidula (W. & A.) Maba buxifolia, Convolvulus Learii, Ophiorhiza tomentosa (Roxb.) The Nilla (Plectranthus Sp. stunted Impatiens 2d Sp. Geophila reniformis, Hedyotis Leschenaultiana, Acrotrema Sp. Boragineæ Sp. Arum 2d Sp. Gymnopetalum Sp. Nauclea cordifolia, Æginetia bicolor, Vernonia Sp. Capparis grandis, Medinilla Sp.? Curcuma 2d Sp. Zingiber cylindricum, Alpinia sericea, Malaxis Rheedii,? Sterculia guttata? Elæocarpus Sp. (entire leaves).

3rd, Grassy knolls on the flanks ;

Are covered with Lemon grass—Careya arborea, and Phyllanthus Emblica (the only trees); intermixed are Impatiens oppositifolia, Gnaphalium Indicum, Hedysarum triquetrum, Cassia angustissima, Crotalaria anthylloides (var.) and Sp. (type of C. Hirsuta) Polygala Sp. Stemodia lutea? Tetranthera cauliflora? usually borders the jungle in such places.

4th, On the very summit of the highest hills.

Grassy knolls with masses of Osbeckia Sp. Hedyotis fruticosa, Vernonia?, Evergreen shrubs and trees with small leaves such as Eugenia Sp. Sethia Indica, Salacia Prinoides, creeping (Rawana's Broom) Rubiaceæ, Ardisia humilis, Ternstrœmiæ, Memecylon ramiflorum, Bambusa Sp. Solandra oppositifolia (both a tree and creeper)—The Nilla shrubby.

Table 5th.

Localities of some good plants as given by Moon

Saffragam.

Liriodendron (Sphenocarpus Wa.)liliifera, Begonia rupestris, Elæocarpus oblongus, Soymida febrifuga, Cluytia collina, Indigofera hirsuta, Ficus stipulata, Dorstenia radiata, Bassia latifolia, Ceropegia juncea, Curculigo recurvata, Areca dicksoni, Bambusa spinosa.

Wallasse.

Grewia tiliæfolia, Melia pumila, Acalypha betulina, Butea frondosa, Rottboellia, muricata.

Walapane.

Psoralea corylifolia, Knoxia corymbosa, Sycas circinalis.

Katragam.

Hugonia mystax, Pavonio zeylanica, Dichrostachys cinerea, Gyrocarpus Asiaticus, Acanthus Maderaspatensis.

Maturata.

Grislea tomentosa, Crotalaria tenuifolia, Alysicarpus monilifer ,Solanum giganteum.

Oowa.

Terminalia Chebula, Psidium pyriferum, Myrsut tomentosa, Viola hastata, Impatiens bigandulosa, Pterocarpus marsupium, Andromeda flexuosa, Anagallis esculenta, Campanula zeylanica, Rubia secunda, Premna procumbens, Martynia nervosa, Dracontium pinnatifidum, Andropogon cymbarius, schœnanthus, Agrostis diandra, Cynodon ciliaris, Avena sativa, Hordeum vulgare, Triticum æstivum.

Doombera.

Jonesia pinnata, Galaxia tenuiflora, Desmodium gyrans.

Bentotte.

Mucuna gigantea.

Table 6th.

Flora of Nuwera-Ellia, July and August, 6,000 feet above the level of the Sea.

The Flora o Table 1. disappears.

1st, Marshes and Margin of the Nuwera Ellia River.

Exacum tere's, Orchis 2d Sp. terrestrial, Neottia Sp. very like N. spiralis, Drosera peltata, Monotropa Sp.—Thalictrum glyphocarpum, (Meadow-rue) Ranuorculus 2d Sp. Rhinanthus Indicus, Butomus Sp. Xyris Indica, Gratiola Sp. Smithia Ilanda? Dipsacus inermis, (var) Roxb. Valeriana Hookeriana, Utricularia Sp.

2nd, Meadow lands.

Rhododendron nobile and its parasitical Loranthus, Campanula zeylanica? and 2 other Sp. (one tetrandrous) Justicia repens? Bupleurum virgatum, Celsia Sp.? Tradescantia axillaris? Commelina nudiflora, Potentilla Kleiniana and Sp. Bidens Chinensis, Hypericum mysurense, Japonicum, Andromeda ovalifolia? Oxalis corniculata and Sp. Polygala Sp. Viola mysurense, Serpens Euphorbia Sp. Cynoglossum decurrens, Piper Sp. Crotalaria anthylloides and Sp. Vernonia Sp.? Sida rhomboidea? Ruta angustifolia, Arum pentaphyllum, Thunbergia fragrans, Lobelia excelsa, Lysimachia 2nd Sp. Hypdyotis fruticosa and Sp. Anemone dubia, Exacum sulcatum? (var. wh. and light blue fld) Alchemilla Sp. (Lady's mantle), Galium asperifolium, Osbeckia truncata, Gnaphalium, Indicum, Aristatum, Wheilgherryanum, Æchmandra rostrata, Eupatorium zeylanicum, Physalis flexuosa, Parochetus major.

3rd, Borders of the Jungle.

Berberis tinctoria (var), Ceropegia acuminata, Rubus rugosus, Lasiocarpus, Gowreephul, Photonia

Sp., Osbeckia Sp. Agapetes Sp. Crotalaria Sp. (type of C. Notonii) Crotalaria Sp. Euphorbia Sp. Hedyotideæ tree Sp. Phyllanthus Sp. Polygonum Sp.

4th, Jungle.

Undershrubbery of Nilla and a creeping Bamboo: also Curcuma Sp. Æginetia Sp. Polygonatum Sp.? (Solomon's seal) Solanum Indicum, Nigrum, Ferox Giganteum, Smilax Sp. Orchideæ, a handsome terrestrial Sp. Cerbera parviflora, Piper Sp. Toddalia aculeata, Ardisia humilis, Eugenia laurina? many Rubiaceæ and evergreen shrubs, Biophytum sensitivum, Forests of the Red and White Kino, Croton Moluccanum, the trees of the mountains of kandy and many unknown Sp. Magnificent Filices, Epiphytal Orchideæ, Hedychium angustifolium and flavum, Medinilla Sp. a creeper, Hedyotis Lescbenaultiana, Geophila reniformis.

TABLE 7TH.

Flora of Adam's Peak—March Summit of the Peak.

Rhododendron Nobile, Hedychium flavum or coronarium, Gnaphalium hypoleucum, Utricularia Sp. Exacum sulcatum (Roxb)? (wh.) Valeriana hirsuta? Moon, Cynoglossum decurrens, Calyptranthes densiflora? (Arboreous) Orchis (N. E.) and Sp. Sinapis capsella, Viola serpens, Osbeckia truncata, Magnolia 1st. Sp. Lobelia excelsa, Sonerila 1st. Sp. Hedyotideæ Sp. (shrub.) Scutellaria Sp.

Lower down Cone.

Osbeckia buxifolia, Monocera Sp. Osbeckia Sp. N. E) Sonerila 2nd, and 3rd, Sp. Scutellaria Indica.

From the Cave, over the lower features, Ambegammowa side.

Sonerila 3rd Sp. Ardisia humilis, Magnolia 2nd Sp. Dillenia dentata, Vaccineæ Sp. (white fld.) Begonia tenera, Impatiens biglandulosa? Moon.

Runs into the flora of the Kandyan Mountains.

From Moon's List.

Agrostis panicea, Impatiens serrata, Nauclea triflora. Martynia crenata.

TABLE 8TH.

Remarkable Plants, near the source of the Mahavillaganga.

Acrotrema costatum and Sp. Borragineæ—N. Gen? Plants of Table 4 and probably many other good ones—

Didymocarpus Sp.

TABLE 9TH.

Road from Kandy to Nuwera-Ellia.

The lower Kandyan vegetation to Gampolla; add Melastoma Malabathricum and Hedyotis fruticosa. Vegetation of the lower Kandian hills towards Pusilawè add—Lobelia excelsa (river), Hedychium coronarium a[illegible] angustifolium.

Vegetation of Lemon grass tracts in Table 4 add, —Hopea zeylanica and Impatiens Balsamina and Sp.

Pusilawe to Ramboddah.

Burmannia disticha, Æginetia bicolor, Pedunculata, Physalis flexuosa, Gnaphalium Indicum? The rock plants of Table 4 abundant.

Bambera-gaha.

The lower Kandyan vegetation has entirely ceased —Palms and Plantains not found. Forests of evergreen shrubs with small coriaceous leaves, Undershrubbery of the Nilla add—

Myristica Iriya, Hernandia sonora, Callicarpa lanata, Croton Moluccanum still sparingly, Impatiens 4 Sp. Hedychium angustifolium Lobelia excelsa and Solanum giganteum very prominent in the vegetation, Bohmeria alienata, Mussænda frondosa, Rubiaceæ, Cynoglossum decurrens, Epiphytal Orchideæ, magnificent Forms.

To Nuwera-Ellia.

Medinilla? Sp. on trees, Impatiens 4 more p. Sone forming the undershbrubery (top of the Pass) Osbeckia Sp.

Runs into the vegetation of Table 6th.

MAY, 1843.

CINCHONA CULTURE IN CEYLON AND JAVA.

We have been a good deal surprised to see the following deliverance in a contemporary :—

"Cinchona is an unfailing resource, in respect to which we feel our pride touched whenever we think that Ceylon is beaten by our neighbours in Java, who have endured all our troubles and disappointments, but have risen superior to them, not, we think, by virtue or a better soil or climate, but by means of better methods of propagation and selection. The fact that these are as available to the planters of Ceylon as to those of Java causes us to chafe over the first and only defeat Ceylon men have suffered in their enterprise."

We believe we have the advantage of the writer in having visited Java and seen its cinchona culture, as also its deep, rich soil of volcanic origin. Of course the Dutch colony started with the advantage of having obtained by purchase from Ledger the very best species of cinchona, to which attention was directed by the researches of Moens and his experiments in grafting the delicate *C. ledgeriana* on the more robust *C. succirubra*. As time went on plants and seeds of *C. ledgeriana*, showing high analysis, became readily available in Java, and the culture spread. But we feel confident that, with all the circumstances mentioned in its favour, Java would not have so far excelled Ceylon in the culture of the cinchona richest in quinine, had not a suitable, rich, volcanic soil been available to the planters of the Netherlands Indian colony. In the matter of soil, it is only the part of candour and truth for us to confess that Java has, undoubtedly, the advantage over Ceylon, except, perhaps, in regard to some exceptional localities in our island. In climate, on the other hand, Java, which is in the corresponding latitude south which Ceylon occupies to the north of the equator it is quite true has no advantage over Ceylon. The case is rather the other way, for in Ceylon we know but little of the severe droughts with which Java planters have so frequently to contend. Insect pests, too, bear heavily on the Java planters. With us in Ceylon *helopeltis* has principally affected the cacao culture. We are not aware that this destructive juice-sucker has ever meddled with the leaves of our cinchonas; and only in a few isolated instances, and that not recently, has tea in Ceylon been affected by "mosquito blight." In Java, however, cinchonas suffer much occasionally from *helopeltis*, while on tea plantations the insect is even a greater curse than it is in India. We recorded what we saw on the occasion of our visit to Mr. Kerkhoven's estate at Sinagar in the end of 1881. The tea bushes had been cut down within a few inches of the ground, and still bevies of children were busy collecting masses of the destructive insects. This fact, and the exemption of tea in Ceylon from insect and fungoid pests, with the discouragement induced by the low prices of our bark, may account for the absorbing attention paid to tea and the comparative neglect of cinchona culture in our island. If the prospects of cinchona became more encouraging, we cannot doubt that the care and skill of our planters

would largely overcome such inferiority as exists in our soil of gneissic origin as compared with the volcanic soil of Java; but it would be wrong as well as absurd to contend that in soil suitable for the growth of the best species of cinchona Java has not a real advantage over Ceylon. It is the undoubted fact that she has.

PAPER LINING FOR TEA CHESTS.

An Assam planter writes:—"I see someone advertising *paper* for lining tea chests, instead of *lead*. A man in Darjeeling called Linbury (I think) patented this years ago. Mackinnon, Mackenzie and Company tried it on 'Sookim-barry,' but they found the glue a bother and gave it up. The other Ceylon patent, lead and paper combined, is *the* thing if it can be produced cheap enough."

GEMMING AND MINING.

We are glad to learn that the work begun by the Everton and Barra Company is being actively prosecuted. Mr. Baddalay has come on the *illan* in his Everton mines, while the Barra plumbago deposits are being elaborately developed and very fine samples of what seems to be large deposits have been valued at £12 a ton on the cart.

It will probably not be long before we hear of the Company for whom Mr. Barrington Brown reported. The London Syndicate has by no means lost heart, but is rather more interested in the work before them. They have secured by lease extensive plumbago lands and there can be no doubt of their Company being floated and work being commenced in Ceylon.

ARTIFICIAL PRECIOUS STONES.

We wonder if Mr. Charles Bryant, whom we assume to be the well-known mineralegist and jeweller, is quite as confident as in his letter, published in Monday's *Standard*, he proclaims himself to be. However sincere he may wish to be, we should doubt it a little. It was recently announced as most of our readers will have seen, that Mr. Greville Williams had actually made real emeralds out of the refuse of a gas retort, and could, if he thought it worth while, make other gems—not imitations, be it understood, but the real articls—with all the qualities by which experts usually test the genuineness of precious stones. That was rather a shock to the buyers of emeralds, and accordingly Mr. Bryant steps forward to say that the process costs a great deal more than a stone purchased from a jeweller would, and that experiments of the kind have during the greater part of this century been occasionally successful. As long ago as 1837, Gaudin the chemist produced artificial rubies; sapphires have been made repeatedly; the spinel ruby has been evolved in such perfection as to deceive the most experienced buyers; while even diamonds have been manufactured—if that is the right word—though in sizes too small to be of any practical value in commerce. Nevertheless, the market for precious stones has never been affected, and it will not be, Mr. Bryant thinks, by Mr. Greville Williams's very interesting experiments. That is true, and will doubtless be comforting to jewel-owners; but, as Mr. Bryant is much too clever a man not to perceive, it does not quite cover the whole case. Mr. Williams may not have solved the great problem, which is, of course, to produce precious stones by artificial means at a profitable rate; but surely every successful experiment is a step forward towards the realisation of the ideal? The usual course of inventions is for the man of science to discover a method, for the practical chemist or mechanician to apply it, and for the trader by gradual pressure to secure any needful reductions in the cost; and we do not know any reason why precious stones should escape the law which is at this moment, if we may believe prospectuses, operating in the case of the rarer metals, such as osmium. With all respect for Mr. Bryant, we should say, judging merely as outside observers, that the danger to jewel owners, though not pressing, was both real and considerable, and that a bad quarter of an hour was for them quite within the limits of possibility. They may suffer as landlords have done, and will probably make more fuss. They have rather a serious stake in the matter, too. No one, not even Mr. Bryant, would venture to offer a serious estimate of the value of all the precious stones in Europe and America—we purposely exclude the enormous quantities scatered over Asia, the "buckets of jewels," for instance, known to be in the possession of the Shah—but guessing by the light of the diamond statistics, a hundred millions sterling would be far too low a figure to assume. That is a large mass of property, and a great chemist who happened to understand mineralogy, and devoted himself for a few years to the manufacture of precious stones, might seme fine morning run its value down to a quite unexpected degree. He would try, we dare say, to keep his processes secret, and would avail himself of the Patent Laws; but this is the nineteenth century, nothing remains secret long, patents do not last for ever, and the cost even of a premature panic in the jewel market would be represented by millions. We may be told that such a discovery is impossible, even by an Edison of mineralogy; but we should like to know more precisely why. The constituents of every precious stone are perfectly well known, and are all obtainable; and the writer in the *Standard* who points to the difficulty of ascertaining the exact proportions in which such constituents should be used, underrates the patience of scientific analysts. If they were at work on the subject with a great object, and with the sort of passion with which electricians and mechanicians are now working to overcome the last difficulties in the way of the electric motor, they would find the right formulas seon enough. Mr. Williams has found them, according to the *Standard*, for making emeralds, and there is nothing to make the manufacture of emeralds more easy than that of other stones. The only active agency wanted is transcendent heat, and the chemists and electricians between them are now, we fancy, in full possession of the means of producing that. We bow to experts at all times on their own subjects, but it is not clear to the lay mind why, as jewels are already made, they should not be made in quantities, or why the processes should be so enormously costly as they are invariably, and to our minds rather too eagerly, represented to be. Wherein lies this element of inordinate cost, if the process is once so well known that ordinary manufacturing chemists can venture to attempt it? We are inclined to think that the great obstacle is not that, but the idea that the manufacture of any precious stone must be useless, because if once it could be manufactured readily, its value would disappear. Nobody, it is supposed, would want made emeralds, any more than they would want those often really wonderful imitations which sometimes perplex even experienced jewellers. Now, is that fancy quite well founded?

The question is a curious one, for it involves a good deal of human nature. Is the value of a precious stone wholly dependent upon its rarity, and the consequent proof it affords that its owner is possessed of unusual wealth, or, at all events, of wealth which he can afford to waste? That is a nearly universal assumption, especially with those to whom wealth is in itself an offence, and it has this support at least, that many a woman who would despise pretence thinks, if she actually has the diamonds at her bankers', she may wear their copies in paste. We venture, nevertheless, to question its entire correctness. The enormous market price of precious stones, as compared with their bulk and utility, is no doubt due to their rarity, and the consequent gratification to vanity which their possession affords; but their whole value does not consist in that. The desire for them is provoked also by their inherent beauty, as of flowers gifted with an attribute of permanence, and possibly also by that instinctive taste for shining things which has made dewdrops strike all races as exquisitely beautiful—nobody ever paid for a dewdrop—and which, as many doctors know, rises in some men and women to a well-marked kind of insanity. Many kleptomaniacs can control themselves against their temptation so long as the coveted article does not glitter. No possible case of manufacture can make an eternal dewdrop other than beautiful, or take away the ruby's gift of setting off flesh, or dim the strange flash of the opal, so utterly unlike anything else that Nature has produced. [By-the-way, the reference to the opal may be a mistake, for the beauty of that jewel, being the result of Nature's failure and not of her success—for she can hardly have intended those hiatuses which yield the iridescence—may be wholly beyond even the ablest chemist's art.] The taste for jewels would be universal, if only the people ever thought of them as possibly procurable; and if they sank heavily in price, they would be universally worn, as, indeed, the cheaper jewels and the imitations are already. What would happen, we believe, therefore, if jewels became cheap, is that the rich would abandon them in their present form, which tends more and more to a costly simplicity,—the stones being, as it were, bared of all other ornament—and that whole populations would take them up, thus constituting them once more a great article of commerce. Every woman above the poorest would use the stones for ornament. It is Birmingham jewellery that would die, not the real article. The rich, moreover, would defend themselves by calling art to their aid, and we should see not only a wonderful improvement in goldsmiths' work, now often devoid of even a pretence of art-feeling, but a sudden and splendid revival of the art of the gem engraver, now so nearly dead. The ruby collar of the Marchioness would be almost as costly as ever, as a triumph of design and workmanship—even Socialists could hardly make the first designer in Europe use his gift with a willing heart for a pound a week—while diamonds would become with the women of the people what pearls used to be in some parts of Italy, ornaments with which it was almost indecorous, certainly quite bad form, on high occasions to dispense. The jewel trade would be destroyed as it is, and all jewel-owners would feel as if they had bought Irish land or the bonds of a repudiating State; but there would be a new jewel trade embracing entire populations. Plain people would be too wise for such folly? That is not quite so certain. Plain people now are very like the select people of a century ago, and it is the picked "classes" of earth, the first in wealth and taste and the means of enjoyment, who in all ages have admired the flash apparently so self-derived, though it is as much a reflection as if it came from a mirror, that makes the first beauty of precious stones. We do not believe that the enlightenment of mankind will alter the taste for them much—it has certainly not done it yet,—nor do we see why, when the Smith of tomorrow has been raised to the level of De Vere of today—a consummation still some way off—Smith's tastes and De Vere's should be so utterly unlike. The jewel trade will not die; but we do not feel quite so certain as Mr. Bryant apparently does, that it may not be totally transformed, to the pecuniary injury of present holders. Fortunately, if science should produce such a catastrophe—and since, though usually favourable to the capitalist, is not invariably so—the area of ruin and misery would be comparatively limited. Dealers now rich would be pauperised; but the mass of those who possess precious stones would lose only potential wealth. Their gems produce no interest, and if destroyed in value, would still in one way remain as valuable as they are now. They are only gold in the mine so long as they are locked up.—*Spectator.*

IMPORTATION OF ADULTERATED TEA.

A bill (H. R. 10,720) has been reported to the House of Representatives as substitute for H. R. bill 8,744. It is to amend the act entitled "An Act to prevent the importation of adulterated and spurious teas," approved March 2nd, 1883. The bill prohibits, after July 1st, 1891, "the importation of the article commercially known as 'tea dust' in seperate packages * * * and all 'tea dust' so imported shall be destroyed under the direction of the Collector of Customs." We will publish the full text of the bill in our next, it having been received too late for the present issue. —*American Grocer*, June 18th.

[We fear this will shut out genuine tea dst which is really wholesome and good tea.—ED. *T. A.*]

COCONUTS.—It must be gratifying news to coconut estate proprietors to note advices received by wire of coconut oil being quoted at £28·10 per ton, the price having been a long time at a standstill has £25. This, together with the fact that two mills preparing nuts for confectionery purposes utilize about 20,000 nuts per diem between them, must be considered good news by all those interested in coconuts. The shipping of husked and unhusked nuts seem to be steadily increasing, but in this particular line, owing either to ignorance or dishonesty of many entrusted with the choosing and buying of ripe nuts, complaints often reach the shippers of the bad quality of the nuts when they reach their destination. I see the Tamil member is utilizing the time when Council is not sitting to frequently visit his different allotments of coconut land in Western Province and to put on a spurt to work them up.

A VERY INTERESTING PAPER has been published in the Burma official *Gazette* from the Deputy Commissioner of Bhamo, Mr. G. W. Shaw, on the Myauk Kudoung division of Momeik, a tract some 50 miles long and 30 broad, unknown until the other day when our troops were acting against Kau Hlaing, a noted outlaw of those parts, and his following of Kachins, Shans and others. Mr. Shaw describes the tract as a mass of hills some 7,000 feet above sea-level. The only flat ground consists of elevated valleys found here and there between the hills. Rice is cultivated and a little tea. The tea, however, is said to be bitter and of small value, fetching only one-fifth the price of Taungbaing tea of the same kind. The people say they are sufficiently occupied with growing rice for home consumption and have not time to look after improving their tea.—*Pioneer*, June 21st.

PATENT STONE IN PENANG.—A Penang paper says: "We understand that the floor of the General Hospital has been recently laid with Indian patent stone by a representative of the Indian Patent Stone Co., Ld., of Calcutta. This new material, which is being largely used in India, is composed of iron slag mixed with a small quantity of cement, and is especially suitable for flooring purposes, having a smooth surface and being very hard and durable. Among its other advantages are its non-absorbent properties, which is so very desirable from a sanitary point of view."—*Indian Engineer*, July 5th.

THE HEIGHT OF AN OLIVE TREE is usually twenty feet, but it is sometimes as high as fifty feet and it reaches an almost fabulous age. One lately destroyed at Beaulieu had a recorded age of five centuries and it was thirty-six feet in circumfsrenee. The olive tree is exceedingly prolific under cultivation; tho fruit yields about 70 per cent of its weight (exclusive of kernel) in oil. Italy is said to produce 33,000,000 and France 7,000,000 gallons of oil annually. The tree does not vegetate readily beyond 2,000 feet altitude or 45 degrees of latitude.—*South of India Observer.*

CEYLON TEA USED IN THE HOUSE OF COMMONS.—Mrs. Florsnce Fenwick-Miller, writing in the *Illustrated London News* of 28th June, says:—

An interesting little pamphlet on the culture and preparation of tea has just been issued hy the United Kingdom Tea Company, of 21, Mincing-lane, who have recently received the appointment of Teamen to H. R. H. the Prince of Wales. Incidentally it is mentioned in the pamphlet that tea as supplied to the House of Commons refreshment-room, a mixture of Ceylon and Darjeeling, can be had for no more than two shillings the pound. What a change from the prices within the memory of most of us, and yet more from those of a century ago! It is hard to realise how our ancestresses existed without that delightful beverage, which, as Mrs. Frank Leslie says, "the English woman regards as a panacea for all ills, from headache to heartache." Yet it is quite certain that when the same tea that we now get for two shillings was sixty shillings per pound, only millionaires could afford to have "a good cup" every afternoon.

JAPANESE LACQUER.—The wood used in Japan for lacquer work is a light coniferous one known as *hinoki*, and is prepared to receive the lacquer in various ways. For inferior work it is covered with paper, but in the finer qualities of lacquer work paper is not used. The wood is first carefully smoothed, all joints and imperfections are filled, as with putty, with the raw tough lacquer mixed with rice paste, which soon hardens so that it can scarcely he cut with a knife. The whole, is then covered with a mixture of interior lacquer and coarse yellow powder, and is left a few days in the open air to dry, after which it is placed in a moist-air closet to harden. A hard, gritty suface is thus obtained for the next coat. The next process is to cover the whole with two evenly spread coats of lacquer mixed with a fine ochre powder, so as to get an even, smooth-grained surface for the subsequent work. This is rubbed down with a stone and the parts which are not to receive any decoration, are ready for the finishing application of the lacquer. The other parts are covered with two coats of black lacquer the first, applied with a broad brush, dries, with a brilliant, reflecting surface; when this is quite hard the second coat is applied, and on this the designs are impressed. In Wakasa-ware there is no painting or drawing; the white decoration is applied by dropping egg-shell powder skilfully by hand here and there, and other designs are produced by pressing various forms of leaves on the soft surface. To get the surface completely smooth again is the next operation, and then a transparent lacquer, coloured yellow, is applied with the object of affording a yellow ground for the gold which is to follow. This is covered by successive coats of the same lacquer until a smooth surface is again obtained, beneath which are the gold and decorations. —*Indian Engineer.*

CULTIVATION OF EGYPTIAN COTTON.—The cultivation of Egyptian cotton is to be tried in the Ludhiana district in the Punjab. The Executive Engineer of the Division will superintend the experiment.—*Indian Egineer.*

A NEW BARK FOR CLEANSING WOOL, &c.—At a recent meeting of the Linnean Society Mr. T. Christy exhibited specimens of the hark of *Quillaia saponaria* from Chili. An extract of this hark has been used for some time for cleansing silk and wool, and in special preparations for cleaning gloves, &c. It is however, stated that it will solidify the hydrocarbon oils, even benzoline, and thus insure safe transport on a long voyage. The addition of a small quantity of citric acid renders them liquid again.—*Public Opinion.*

THE SUGAR TRADE OF MAURITIUS.—In his report on the Mauritius Blue Book for 1888, just issued, Sir J. Pope Hennessy remarks that Mauritius is, as far as he can judge, the most flourishing sugar-producing colony of the British Empire. The total value of the exports of the produce of the Colony in the year in question was R30,335,545, showing an increase of R6,000,000 against the provions year, and of the total sum R28,754,798 represented the value of the sugar exported, including R15,000,000 the values of the sugar sold in India, R7,000,000 in Australia, R2,000,000 in Cape Colony, R2,000,000 in the United Kingdom, and R1,000,000 in the United States. The relative greater prosperity of the sugar trade of Mauritius compared with that of the West Indian islands is partly owing to the Manritius planters having the command of the Indian and Australian markets, which are too remote from the West Indies for competition by the planters there. The greater facility for obtaining cooly labour from India is also probably an advantage. The most important economic difference between Mauritius and the West Indies, however, is the fact that nearly all the owners and managers of the sugar estates are natives of the island in the former case, absenteeism being much more characteristic of the West Indies. The great fall in the price of sugar in recent years has been met hy the Mauritius planter, to some extent, hy means of a prudent reduction of expenses and the adoption of improved processes so as to increase the yield of sugar from the cane.—*H. & C. Mail.*

MANILA TOBACCO.—The American Consul at Manila in the course of a recent report on tobacco cultivation in the Philippines, remarks that the abandonment of the Government monopoly in 1882 gave the trade a great stimulus by the investment of private capital in it and a more equitable system of dealing with the native cultivators. There has therefore been a marked increase in the production. Formely each unmarried native was required to set out 4,000 plants a year, and each married man 8,000, the crop to he delivered to the officials at a standard price, which was just 50 per cent, below that now paid. The gross revenue received from the manopoly was about £800,000 per annum. At present there is a licence tax of about £20 a year for manufacturing tobacco. The principal company engaged in the trade now is the Compania General, which owns large tobacco estates, has a capital of about three millions sterling, employs 10 000 hands, and produces 80,000,000 cigars, 400,000,000 cigarettes, and 5,000,000 lb. of cut tobacco annually. It is a Spanish company; there are also two large German firms, six Spanish, and a number of Chinese. The best tobaccos come from the provinces of Cagayan and Isabela, in Luzon, the annual produce from these being 60,000 to 100.000 tons. The method of cultivating and curing differs but little from that followed in other tobacco-producing countries. All Manila tobacco is made into cigars and cigarettes, plug, fine cut, or pipe tobacco being unknown there. It is classified in six grades according to the size and quality of the leaves. The total area of land under tobacco is about 60.000 acres. Last year the total export of cigars was 112,074,000, of which 26,715,000 went to Spain and 17.871,000 to Great Britain and the British possessions. In 1887 the total export amounted to 121,350 tons, and in 1888 to 184,548 tons.—London *Times.*

CINCHONA BARK was exported from Java between 10th June and 12th July as follows:—

369,630 lb. for Holland.
24,821 lb. for London.
4,302 lb. for Marseilles.

398,654 lb. total.

THE INTRODUCTIOG OF THE SUGARCANE INTO CEYLON is, in Dr. Lippmann's great work, credited to A.D. 600, or nearly thirteen centuries ago, the authority being "Ritter." The introduction of the sweet cane into those portions of India beyond the Ganges is fixed so early as 327 B.C., on the authority of Nearchos. To our surprise China (whence our native term *sini* or *chini*) has a later date assigned it, B.C. 250.

IMPORTANT DISCOVERY IN THE RUBBER TRADE.—A M. Morellett has made a discovery which is of considerable importance to those engaged in the rubber trade. He has found that when vulcanised indiarubber is dipped suddenly into boiling glycerine it acquires the character of non-vulcanised rubber —*i.e*, its parts can be readily united, and it dissolves in the common solvents of caoutchouc. The glycerine must be boiling at the moment of contact.—*European Mail*, June 13th.

FLOWERS AS AN ARTICLE OF FOOD.—The new Kew *Bulletin* contains a memorandum by Mr. Duthie, botanical director for northern India on the use of the flowers of the *Calligonum* for food in North-Western India. The use of flowers such as those of the lily in China as a condiment is not uncommon, but it is quite unusual to find them used as food. In the present case they are hardly the poorer classes only, and are either mixed with flour or are eaten separately with salt and condiments, to which a little ghee is added by those who are able to afford it. The flowers are swept up from the ground, and are kept for a night in a closed earthenware vessel, so as to fade. They may be kept for a long time. Usually they are eaten as a vegetable, but sometimes they are kneaded with thin alta and baked in cakes. An analysis of the flowers which has been made shows that their chief peculiarity from a dietetic point of view is their richness in nitrogenous compounds, and consequently their importance as an addition to foods which are poor in nitrogen. There is said to be a close resemblance in composition between phog and the seeds of the edible amaranths and buck wheats, only sugar replaces starch.

PRESERVING FISHES.—When Prosessor A. C. Haddon visited Colombo in passing through from Torres Straits, he was much struck with the success of the Director of the Colombo Museum in preserving fishes in a way to display their natural colours. He considered the result would interest home scientific men and arranged for an exhibit where it would be certain to attract attention. Accordingly at the Conversazione of the Royal Society held on the 18th ult. under the presidency of Sir Geo. Stokes, in the descriptive Catalogue which only covers 40 exhibits, we find the following:—

"*Exhibited by Prof. A. C. Haddon, M.A., on behalf of Mr. A. Haly, Director of the Colombo Museum* :—

"Teleostean Fishes preserved in a mixture of gum and glycerine, as a means of displaying their natural colours.

"The fishes were bisected and eviscerated, and they are mounted, for exhibition purposes, in pure glycerine. Specimens thus treated have been observed to remain unchanged after two years' exposure to the light."

Since this exhibit was sent home, however, we believe Mr. Haly has been experimenting with a different preparation and with the prospect of even greater success than was considered so noteworthy by Professor Haddon.

CALIFORNIA is a rich honey country, and the fact is largely owing to the cultivation of the *Phacelia tanacetifolia*, a plant with a blue flower of which the bees are fond. Experiments on a practical scale have recently been made with it by a German beemaster, and the results are given in the *Bienen Freund*. Some six weeks after the seeds are sown the *Phacelia* blooms, and it is then rifled by the bees. But it also serves as fodder for cattle, either before it flowers, or in a dried condition afterwards. When used for green fodder it is necessary to reserve a portion for the bees, and the production of seed grain. The roots as well as the stems and leaves are devoured by cattle.

HOW TO DESTROY BUGS IN PLANTATIONS, &c.—By a curious coincidence, immediately after writing the concluding lines of the article which appeared in yesterday's issue, about soil and tillage generally, we came upon a paragraph in "Garden and Forest," an American periodical, describing a method of destroying the cockchafers, which are known in the United States as "May bugs." We quote as follows:—

It is well known that the larvæ of the May-bug or Dor-bug do an immense amount of damage by eating the young roots of grasses, Strawberry and other delicate rooted plants. In France, especially, their ravages have resulted in great losses, and energetic attempts to destroy them are made. The destruction of these beetles is a matter of such importance that a word, "Hannetonnage," has been coined to express the action of hunting them. It appears, according to the *Revue Horticole*, that during the year 1889 the Department of Seine-et-Marne paid no less than 113,000 francs in prizes for the destruction of the beetles, which were collected to the amount of more than 500,000 pounds. They are trapped by suspending lights over shallow vessels of water. The beetles fly against the glass covering of the lamps and drop into the water below, and are then collected and destroyed. The experiment has been tried in this country with success, and it is worth doing on a large scale wherever these insects abound. As the presence of the larvæ is not known until the damage which they inflict is completed, the only way to attack them is to trap the beetles. A little kerosene-oil poured on the water placed in the vessels into which they are intended to fall will deprive them of all chance of escape

TREATMENT OF CATTLE.—We have to acknowledge the receipt of a pamphlet on the treatment of cattle in Sinhalese, by Mr. W. A. de Silva of the School of Agriculture. The work is dedicated to Sir E. Noel Walker as President of the Society for the Prevention of Cruelty to Animals; and the author says in his preface:—

In presenting this pamphlet to the public, the Author begs to state, that he has endeavoured, as will be seen to draw up short, simple and explanatory facts, on the improvement of the condition of the native cattle of this Island, which would recommend themselves, to the means and requirements of the village cattle owners. It is well known that the prosperity of a country where agriculture is the main industry of the inhabitants, depends to a great extent, on the number and nature of the cattle of that country; and it is a matter for regret and apprehension, that the native cattle of this Island are both degenerating and decreasing in number. * * * The individual efforts which are being made by such as those who have the welfare of the people at heart, to improve the condition of cattle, are only partially successful or sometimes totally fail, to their great disappointment, owing to the comparative ignorance on the subject of the villagers. I am far from claiming for my pamphlet the merit of effecting a radical reform, but I shall be satisfied, if my feeble attempt in the interest of my countrymen would at least tend to a *more humane and considerate* treatment in health and disease of the *most useful animal* in this country.

We hope that this pamphlet will be the means of effecting the improvements which its author desires.

THE ORIENTAL BANK ESTATES COMPANY, LIMITED.

Authorised Capital ... £566,700.

DIRECTORS.—Alex. William Crichton, Esq., Andrew John Macdonald, Esq., William Cotton Rohde, Esq, Grant Heatly Tod-Heatly, Esq.

Report of the Board of Direotors for Thursday, Jnly 17th, 1890, at noon:—

The Direotors have much pleasure in submitting to the Shareholders their report of proceedings dnring the fonrth year of the working of the Company. The net profit as shewn in the andited accounts annexed hereto amounts to £26,628 11s 6d (inclnding £159 2s 4d brought forward) as against £25,803 16s 11d last year. An interim dividend of 3s 6d on the Preferred Shares and of 6d on the fnlly paid Ordinary Shares, and of a proportionate amount on the partly paid Ordinary Shares was paid in February last, and the Directors now recommend the payment of a similar further dividend making a total payment of 7 per cent per annum on the issued Preferred Shares, and of 5 per cent per annum on the Ordinary Shares, in proportion to the capital paid up thereon for the year ended 31st March, 1890. The further dividend now recommended as above, will, if assented to by the Meeting, be payable on the 1st August, 1890, at the London Office of the Company's Bankers.

The estimated yield of Tea from the Company's Estates has been fully realised, bnt owing to the low ranges of prices ruling dnring the first three months of the year under review, purchase of leaf was restricted during that period. The average price obtained for all tea sold has been the same as in the previous year—viz., 11d. The expenditure on mannring and otherwise improving the plantations has been continued, as results obtained from these works have proved most satisfactory. The supplying of vacancies has been carefully done, but during the past season it has not been deemed advisable to extend the area of land planted with tea. The increase of the yield of coo a dnring the past year from the Company's Estates has been considerable. The crop has been harvested in good condition, and the prices realized have been snch as to indicate its good quality and the care taken in its preparation. The Directors have sanctioned extensions of this cultivation in snitable localities on the estates, which additions, when they come into bearing, will materially increase the valne of the properties. As the Directors anticipated last year, the price for cinchona bark has ruled throughont the year above that obtainable at the last meeting of the Company; bnt the supplies, although considerably smaller, have not yet sufficiently diminished to impart a sound tone to the market. The crop of coffee has been larger than last year and good prices have been obtained for the same.

In Manritins a satisfactory crop of sugar has generally been secnred on the estates in which the Company is interested, and, notwithstanding the decline in the value of this prodnct in the Enropean markets, good prices were obtained by the Company for its sugars. The cost of labonr and snpplies for coolies has been somewhat higher during the past year than previously experienced, but it is expected that the increased cost, if it should continue, will be met by the results to be obtained from the improvements in cultivation and in the manufactnre of sngar.

Shareholders will be interested to learn that five prizes were awarded at the Dunedin, New Zealand, Exhibition for sngars made on estates under the management of the Company.

BALANCE SHEET TO 31st March 1890.

Dr. LIABILITIES	£	s	d
Paid-up Capital—			
226,816 Ordy. Shares £1 each fully paid	226,816	0	0
1 446 Ordy. Shares £1 each 1s paid	72	6	0
40,902 Pref. Shares £5 each fnlly paid	204,510	0	0
	£431,398	6	0
4½ per cent Mortgage Debentures	150,000	0	0
Sundry Creditors—Acceptances ...	14,000	0	0
Accounts Payable ...	19,183	18	8
Balance (as per Profit and Loss Account)	13,803	0	9
	£628,385		5

Cr. ASSETS.	£	s	d
Cost of Estates, Claims, Shares, &c., held by the Company as per last account	431,973	1	5
Additions since £3,029 4 2			
Less Sales and amount written off Machinery and Buildings 2,200 6 5			
	828	17	9
	432 801	19	2
Stocks of Sugars in hand	7,832	3	0
Stock of Tea, Cinchona, Cocoa, Coffee and Cardamoms in hand ...	33,324	6	7
Office Furniture ...	71	7	6
Stores in Ceylon and Mauritius ...	7,374	7	3
Sundry Accounts receivable, &c....	10?,917	5	0
Advanced on Mortgage ..	13,037	2	6
Suspense Accounts (Stamps on Share Warrants)—			
Balance brought forward £3,000			
Less written off £1,000			
	2,000	0	0
Cash in hand or on deposit	28,383	14	5
	£628,385	5	5

PROFIT AND LOSS ACCOUNT TO 31ST MARCH, 1890.

	£	s.	d.
To Expenditure:—			
Upkeep of Estates and Charges in Ceylon, Mauritius and London (including amount written off Suspense account and Allowance for depreciation on Machinery and Buildings)	99,777	2	8
Interim Dividend paid in February, 1890 ...	12,825	10	9
Balance	13,803	0	9
	£126,405	14	2
By Income:—			
Balance of profit from last account after payment of the dividend	159	2	4
Produce in hand estimated to realize net .	41,156	9	7
Proceeds of Produce realized to 31st March, 1890. and profits arising from Agency Business, &c.	85,090	2	3
	£126,405	14	2

COCONUTS AND CINNAMON.

VEYANGODA, June 18th.—The effeots of the season are rather serious on cinnamon crops, as harvesting has ceased. The harvests are dnring the two monsoons, or to be more accurate dnring the continnance of the monsoon rains, for it is only then that there is a free flow of sap between the bark and wood. No rain, no crops is the almost universal cry this season.

The prospects of coconuts are very much brighter. This is the season for big crops, and big prices are netted for them. The demand for coconuts is very brisk, as there is much competition between the local and Colombo Dessicating Mills. That this may continue is the earnest wish of coconut growers. The consnmption at the local Mills, judging by the strings of carts that wend their way thitherwards, cannot be far short of 200,000 nnts per month. If report speaks true the Colombo concern consumes an equal quantity, though I am inclined to think it consnmes more, judging by the fact that its agents come so far afield as Veyangoda to bny nuts, while they have the run of the districts clnstering round Colombo to draw supplies from. It cannot be that the nnts on that side are converted into copra, for the price offered for the nuts precludes such a possibility. I have heard that one of the coconut contractors of the Colombo Firm intends going far into the famous coconut district of the Maha Oya Valley for nuts. Hnrrah! may the demand for nnts grow. The Oil Mills in Colombo I suppose will continue to draw their supplies of copra mainly, as hitherto, from Negombo and the Districts North of it and by water, while the bnlk of the trees South of Colombo will be devoted to toddy drawing.—Local "Examiner."

PAPER is made in France from hop vines; and it is claimed that the fibre secured is the best substitute for rags yet obtained, as it possesses great length, strength, flexibility and delicacy.—*American Grocer*, June 18th.

EARLY PLANTING DAYS IN UVA.

The following was written by a Badulla correspondent some seven years ago, the MS. getting mislaid. We have put some notes correcting what is out of date as far as possible:—

The first estate opened in Badulla district was Ridipane* by Major Rogers, and it still goes by the name of "Major Totum." It is on the old Batticaloa road and only a couple of miles away from town. It afterwards passed into the hands of George Boyd Tytler, the brother of our good friend the late R. B. T. He died in Badulla, and his remains awaited his brother's arrival from Kandy nearly three days before they were buried. He came up by the Lower Badulla Road. There was only one European beside the brother of the deceased at the funeral, Mr. Mercer, the Assistant Government Agent. This estate is now the property of the big native firm of Annamalay Chetty who own several other estates in the district. Maryland and Ooduwerre were opened by Mr. Galland the Swiss doctor,† who was induced to it, by the success of Major Rogers in coffee planting. The former is now called Kottagodde; much of it is abandoned. These were afterwards taken up by Mr. Anthony Bertlin, who is still hale and hearty in the old country. Ooduwerre keeps up to the front. It is admirably situated, having the facility of transport, as the Ratnapura-Batticaloa road passes through it. Wewesse and Debedde were opened by Dr. Sortain. These estates at one time seemed to have been neglected, but coming under the able management of Mr. George Morice, the "Patriarch of Uva," they became very valuable, and some years ago fetched a large sum. They have come back again to the Parsees and Mr. Morice. With Spring Valley the name of Sir William Reid is connected, and afterwards with Mr. Bannatyne who would not proceed further than Nuwara Eliya, when he came to see his property, thereby very nearly causing a split between himself and his very independent manager, the late Mr. Thos. Wood. Of Nahavilla and Gourakelle, much need not be said: the name of your senior is associated with the former, and the names of Mr. William Walker Shand and Mr. John Reid Shand are also connected with them. The waterfall on Nahavilla is still there. Gonakelle, or rather Pallagalla, was opened by Geo ge Bogue, a brother of John Morris Bogue, a partner of the late firm of Brodie, Bogue & Co. The names of Bertlin, Byers, Linton, Morice, Wood, Irvine, and Knowles come up later on when Glenalpin, the remainder of Spring Valley, Ballagalle, Grahamsland, Kenakelle, Narangalle, Hindegalle, Unagalle, Koskelle, Gongaltenne and others were opened. There is rather a rich story told of Major Rogers. He nrged on Government that a road shonld be cut from Ratnapura by way of Haputale to connect with Badulla, but the Government declined on the plea that the Major would be the principal beneficiary as he had two estates on the Pass, viz., Haputale and Sherwood. It was reserved to Sir Hercules Robinson to make this line on to Batticaloa, thus connecting the west with the east. The produce of Badulla in some instances was conveyed to Hambantota to be shipped to Colombo.*

In the account of the building of the Badulla church, it was Rambukpotta Disava who brought out the idea of a Christian place of worship in memory of the late Major Rogers. He and his fellow chiefs—all Buddhists—the Ratemahatmayas of Udukanda, Bintenna, Wiyaluwa, Kandapolla, Kandukare, and Wellassa contributed each a month's salary towards the object, and the minor headmen also according to their means. The Disava, besides his subscription, gave nearly all the timber for the building. Pakeer Tamby constable, as the head of the Muhammadans, got large subscriptions from that community, and the chetties also followed suit liberally. The foundation stone was laid in 1846, and in the bottle was put in a coin of the date of 1750 by the late Mr. Solomons. The various officials who were connected with the building of the church were Messrs. Mercer, Braybrooke and Bailey. The first churchwarden elected was Mr. G. H. Orloff. It was distinctly understood that the church was to be open to all Protestant denominations, but how it went over to the Episcopal Church this deponent sayeth not, and it was convenient that no questions should be put. The contributions to the church being principally heathen, it is rather rough on them to be told that "thus far shalt thou go, and no further" into the church, if they intended to pay their last respects to the dead.†

* The following are the present proprietors of the estates mentioned by our correspondent, as given in the "Ceylon Handbook and Directory, 1890-91:"—

Redipane	...Anamaley Chetty
Oodoowere	...F. R Sabonadière & Heirs A. Bertlin
Wewesse } Debedde }	...Mrs. Cowasjee Eduljee
Spring Valley	...Spring Valley Coffee Company, Ld.
Nahavilla	...Hormusjee Bhomanjee Jeejeebhoy
Gourakelle	...G. S. Duff & Mrs. Ogilvie
Gonakelle } Pallagolla }	Colonel J. R. Dawson & G. S Duff
Glen Alpine } Graham's Land } Ballagalla } Narangalla } Hindugalla }	...Onvah Coffee Company, Ld.
Unugallla	...E. P. Thornton
Kecnakelle	...Baring Bros.
Koskelle	...E. C. Byers
Haputale } Sherwood }	...Haputale Coffee Company, Ld.
Gongaltenne (now Serendib) }	P. F. Hadow.—ED. *L. R.*

† Staff Assistant Surgeon Galland was not a Swiss, but a Maltese, who, when Sir Walter Scott visited Malta, in his last and vain pursuit of health, acted as interpreter between the great writer and some Arab chiefs. Our authority was Dr. Galland himself, who was in medical charge of the detachment of Ceylon Rifles stationed at Badulla, when, in December 1840, the senior editor of the *Observer* first visited Uva, examining forest and cutting boundaries until May 1841. Capt. Rogers, the great elephant hunter, was Commandant, with Lieut. Hodges as second in command. Dr. Galland's brother-in-law, Mr. Bertlin, was living in charge of the estates.—ED. *T. A.*

INDIAN TEA COMPANIES: THEIR PRODUCTION AND EARNINGS.

Messrs. Barry & Co. have compiled a "Summary of Audited Accounts of Joint Stock Tea Companies registered in Calcutta; Seasons 1885 to 1889." A note explains that

Expenditure includes cost to grow and fetch to market, account sale charges, interest on the season's outlay when incurred, depreciation on machinery and buildings when charged. But commissions on profits, income-tax, and interest on debentnre capital are excluded. Income is given gross, *i.e.*, the auction-room price. Debentnre Capital is not included in the Capital column.

The Assam Companies rose from 18 in 1885 to 23 in 1889, and the paid-up capital from R5,568,000 to R10,248,000. The crops began at 2,740,000 lb. and rose to 6,406,000. The realized gross average per lb. went down from annas 10·9 to 9·2. The oost per lb. also diminished from 8·7 to 7·10. Tho profit per lb. went down from 2·2 to 1·3.

* The late Mr. Alex. Brown took an active part in this operation.—ED. *T. A.*

† Allusion is made to a rule that non-Christians were not to enter tho church.—ED. *T. A.*

The Cachar and Sylhet companies began with 23 and ended with 19, and the profits per lb. went down from 2 annas to 0·7.

In Darjeeling and the Dooars 37 Companies rose to 40 and went down to 31. The profit per lb. began with 3·1 and went down to 1·9. In Darjeeling alone 31 Companies in 1889 realized annas 1·4 per lb. profit; 9 Companies in the Dooars having the same experience.—In the above we have left out fractions which, however, we give with reference to the total results. These show that the average profit per lb. of 78 Companies in 1885 was annas 2-5·75 which, for 82 Companies went down to 1-1·80 in 1889. Our readers will more readily appreciate the figures for dividends: the average in 1885 was 5·21 per cent, going down to 4·18 in 1889.

With all the improvements introduced, therefore, and all the economies practised, profits have diminished with enhanced production and lowered prices, until returns are not equivalent to the interest which money in India ought to command. The acreage cultivated by the Companies included, had risen in the five years from 42,700 to 53,500 and the crops had increased from 12,154,000 lb. to 17,512,000.

The results are not very encouraging, but the capital expenditure had in many cases been heavy. Our Ceylon Companies seem immensely more prosperous. May that prosperity continue and may it be shared by individual planters.

PUBLIC COMPANIES.

LIBERIAN GOVERNMENT CONCESSIONS AND EXPLORATION.

Mr. A. C. Ponsonby, chairman of the board of directors, presided yesterday afternoon at a meeting of this Company, which was held at the Cannon-street Hotel. The Chairman said that the Company had 350 shareholders on their list, and he hoped, whether the stock went up or down, they would not dispose of their shares, because he believed there was good business to be done. He believed the East Coast of Africa was more healthy than the West Coast, but the latter was more wealthy, and many people were willing to go and work for the company. Some gentlemen who held Liberian bonds of 1871 had approached them with the object of purchasing their indiarubber concession: and an Indiarubber Estates' Company had been successfully put before the public, the Liberian Company having some part of the payment in shares and a considerable portion in money. They hoped to make arrangements with Sir John Pender, by means of which they would obtain direct telegraphic communication between Liberia and England, and this would greatly tend to facilitate an interchange of commerce. Apart from the indiarubber there was every reason to believe that the territory would yield large quantities of cotton available for the English markets. Some alterations in the articles of association were adopted on the motion of the chairman, seconded by Mr. Johnson.—*Daily Chronicle*, July 11th.

THE TEA LEAF.

There is in my mercantile nature nothing so entirely and absorbingly interesting as a tea leaf, and I trust I may be forgiven for considering this alien subject worthy of a few lines of sentiment. I must confess to begin with, that to do this subject the justice it merits would require the fine poetic genius of a Shakspeare and the delicate word-painting of a Howells, and being only an ordinary everyday grocer intent on seeing that the multitude is supplied with pure and unadulterated goods (and plenty of them) I trust my stumbling lines will not ruffle the feathers of the literary jays too much. In the words of the aged, but repentant sinner, "Them's my sentiments, anyhow."

"The poets sing of beauteous flowers
In sweet and touching rhymes,
They sing of Love and lovers' bowers:
Of wars and peaceful times.
They sing of Nature's princely gift,
Of Sorrow, Grief, and Pain,
They sing of vales and mountain rifts
Of Power and Wealth and Gain
They chant their songs and hymn the praise
Of Ocean, Earth and Sky,
Of Lethe's stream and Pluto's realm
And of Parnassus high.
And yet their Muse, the partial jade!
Withholds her smile from thee,
And leaves to me of plebeian trade
To chant the praise of Tea.
And though my lame and limping lines
Be void of finished Art,
They still, though rough-hewn, bear the signs
Of all that's in my heart.
Thou meek, mild herb, man's humble friend,
Thou fragrant, soothing flower
That cheer'st the world from end to end
And comfort bring'st each hour,
From China's fields and India's hills
And Ceylon's humid shores
Thou com'st to ease our earthly ills
And ope Contentment's doors.
Of Heaven's many gifts to man,
And myriads though they be,
There's none so all divinely great
As thou, oh wondrous Tea.
Thy little, twisted curly leaves,
Thy fragrant, balmy breath,
Thy soothing, cheering, gladd'ning touch
Robs half the fear of Death.
The prince, the pauper, rich and poor,
The great, the strong, the weak.
The learned men of mighty minds
Thy cheering cup must seek.
The soldier worn with warring cares,
The sailor on the deep,
The humble delver, with thy aid
Obtain refreshing sleep.
The patient watcher by the side
Of fever's fitful bed
Would surely find her task too great
But for thy blessed aid
The weary seamstress, evening come,
Her humble home regains.
And in thy strengthening fluid finds
Great solace for her pains.
The ladies, Fashion's fluttering birds,
Dear gossip-loving dames!
How round thy post-meridian board
They sip—and ruin names.
Oh! wondrous leaf, oh, beauteous flower!
Thy virtues are untold—
From immemorial time, each hour,
New joys thou does unfold.

Accept these humble lines from me—
And know I love and worship thee
Oh, Tea!!

WILLIAM HENRY SEYLER, in *Canadian Grocer*.

THE TEA TRADE OF FOOCHOW.

A LAMENTATION.

The following 'communicated' article appears in the *Foochow Echo*:—

It is with an ever-deepening regret that we watch the decay of the principal trade of this port—Tea.

There is no blinking the fact that each season sees a smaller business in our staple, and that even with the lessened receipts of the leaf, there is annually more trouble and difficulty in the purchase of it at this side, and shall we say—loss in its sale at the other. The reasons for this gradual falling off of what should be one of the best, most remunerative, and cleanest of trades, are not far to seek. They have been again and again brought to the notice of those most concerned in the business, they have been made as public as print can make them, and with what result?—absolutely none. Is the case then hopeless? We answer unhesitatingly, Yes, whilst present conditions last. Let us first look to the quality of the article now exported. It compares most unfavourably with what we were accustomed to see, say 15 to 20 years ago. The 'make' is not so good, more brown and withered leaves are left in the bulk, less trouble is expended over the twisting, and more dust is found. The firing, formerly performed with great care, is now hurriedly done, and to please

the 'nose' of buyers, is frequently left little more than half done. The result in the 'cup' can be easily guessed.

We are told by the native Tea Hongs that it is now impossible to perform the various manipulations through which the article has to pass before it reaches the foreign buyer, at the same cost as in years gone by; that, as we find it in civilised Europe, so it is in this country, the cost of living and of work has increased much in the last two decads, and with the usual shrug of the shoulders we are informed as a final argument, 'no can help.' Another cause of the falling off in quality is, from the native view, the uncertainly of the foreign demand, and strange as it may seem, the introduction into the Tea districts of the telegraph. Before the wire reached the garden districts, the native buyer knew his instructions, and bought such leaf as he approved of, conveying it to his central factory, where it was speedily turned into the 'fragrant herb'—now—what is the case! He goes up with instructions, it is true, but the 'telechit' controls them. No sooner has he commenced his purchases, than the result of previous seasons shipments to London, or elsewhere having been received by the foreigner, with anything but satisfaction, (or some other cause or alarm) is at once either directly conveyed to the 'Hong,' or filters through our own native staff to it, and—a little message flies up country. 'wait while,' or the equivalent of such words. The recipient of the message obeys—his purchases up to the time of its receipt are too small to make a chop—whilst he is waiting for permission to buy further, what becomes of the leaf so bought?

So far as we can learn, it is half rolled and half-fired, and laid aside for a few days, until the first alarm having subsided, the requisite permission is accorded, further leaf bought, and a 'chop' is made. We readily concede that we may be somewhat in error over the '*modus operandi*,' but some such process occurs and is partly responsible for the falling off in quality. Of course the utter neglect of the plantations is one of the primary causes of this falling off, the excuse for such neglect, in the mouth of the grower, is the small price received by him for his leaf, which makes the growth of the succulent sweet potatoe quite as remunerative, and less precarious. Of the causes affecting the cost of laying down Tea from the country at this port, it is unnecessary to speak at length;—to the tale of 'lekin' and subsidiary squeezes, often told the Chinese Authorities are deaf as adders, and their deafness and blindness are increased by the utter, or might we say, *intentional* stupidity of their foreign adviser. When one so highly placed refuses to see any possible amelioration of these causes, and consoles himself, and the Native Authorities with a shrug of the shoulder, and the consoling remark, that *if the duty receivable on Tea 'is' falling off, that on silk &c. is increasing*, what hope is left? As to any such suggestions that the 'Lekin' being a war tax, should long ago have been withdrawn, and that the export duty is now ridiculously in excess of the percentage intended at the time of its imposition, our own high officials are much too suave, and much too tender of the friendly relations of the two Empires to hint at any such disagreeable items.

Again, why so much dust and broken leaf should be found in every package of Tea brought to this port we fail to understand. We believe we are right in saying that the percentage found in Teas at Hankow and Kiukiang is smaller than at this port, whilst to compare either with that found in Teas from Ceylon is interesting, and——instructive. To praise Ceylon Teas, and to laud their cleanly manufacture, and the cheapness with which they are made, and to instance their fast increasing consumption not only in Europe but in our stronghold, Australia, is nothing to the point and only calls up envious feelings, may even sometimes makes us cast a malevolent glance at the 'figures' relating to the increased export from the 'spicy isle,' which are so persistently set before us in the *Echo*; and indeed we have an idea that the worthy purveyor of those figures may occasionally cast a wary look around him when returning from some festive board to his lair, lest perchance the 'bitter cup' may some day overflow and he—the most approximate cause, be——but we forbear.

Bitter it is to see—certain it is to predict the continued decay of our trade and our living, unless—what? Unless a miracle happens, the floodgates of Chinese restriction removed, foreigners permitted to own, or at least to superinted Tea gardens, and generally, this portion of the globe of most interest to us, to make a complete somersault. Is it at all likely in *our* time? —*China Mail.*

PLANTING IN NETHERLANDS INDIA.

(From the *Straits Times*, July 9th.)

The sugar cane disease in Java still defies the experts, who find all the suggested remedies break down. The importation of plant cane from abroad has proved utterly unavailing to stay the evil. The nature and causes of the disease baffle inquiry, and appearances point to no more satisfactory result in the near future. The *Surabaya Courant* gives particulars of the sugar yield in Java of late years, which shows that the outturn in 1887—375,000 tons—has not been exceeded since. This year's crop is likely to fall four per cent short of those figures.

In the Java ports, the supply of estate managers, assistants, and overseers largely outruns the demand, and applicants swarm when chances of employment as such even in other lands offer themselves. British North Borneo, especially, has proved so attractive that it draws a steady flow of the unemployed. For instance, by last advices, several Europeans had started from Java for that country to fill situations on coffee and sugar estates.

The island of Engano, near the southern end of Sumatra, has been applied for from Government by a Mr. Van Gogh on lease. Recent legislation has simplified applications for concessions of whole islands by dispensing with the need for preliminary survey.

CEYLON BOTANIC GARDENS.*

By Professor Harvey of Trinity College, Dublin.

Royal Botanic Gardens,
Peradenia, Ceylon, October, 10th, 1854.

I propose sending you a short account of the present state of the Ceylon Botanic Gardens, now under the able management of G. H. K. Thwaites, Esq. These gardens are situated at Peradenia, four miles from Kandy, on the high road to Colombo, and at an elevation of about 1600 feet above the sea. They cover an undulating surface of 140 acres, a considerable portion of which is occupied by an arboretum, into which, from time to time, the native forest-trees are introduced, and where eventually will be brought together most of the arborescent plants of the island, and such valuable forest trees as will stand the climate. The river Mahawelle Ganga flows round three sides of the garden. The opposite banks are steep, gradually rising into wooded hills of various heights; some reclaimed and planted with coffee, others still covered with the jungle.

The approach to the garden, from the Kandy road, is through an avenue of tall India-rubber trees (*Ficus Elastica*), hung with various creepers, such as *Bignonias* and *Ipomœas*, and nearly opposite the entrance gate, a remarkably fine specimen of *Bauhinia scandens* (jungle rope) throws its strangely compressed and twisted rope-like stems from branch to branch, and stretches fairly across the road. Immediately within the gate the broad gravelled road divides round a circular bed of palms, such as at some future day the new Crystal Palace may exhibit, but which, for luxuriance, is as yet unrepresented in England. The group comprises the talipot (*Corypha umbraculifera*), *Livistona chinensis*, *Caryota urens*, dense clumps of *C. horrida*. *Borassus flabelliformis*, *Areca catechu*, *Seaforthia Dicksoni-*

* From the "Literary Gazette and Journal of Science and Art" of 26th November 1853.

Cocos nucifera, *Oreodoxa oleracea*, *Phœnix dactyli*, *fera*, and *Ph. farinifera*, a fine unnamed Malayan palm, two species of *Calamus*, and very large specimens of *Cycas circinalis*. Some of these are twenty, some forty, some sixty feet high; some have fan-shaped, some pinnate, and some much divided fronds: and being brought together into a definite clump of gigantic foliage, forcibly arrest the stranger's attention, particularly when his glance also falls on the beds at either side, where large *Scitaminea* and *Yucca* are overtopped by two huge traveller's trees (*Ravenala speciosa*) with palm-like trunks at least 35 feet to the base of the leaves and fully 50 feet to the extreme top. The specimens of this noble plant in English stoves, where the caudex is either not at all, or scarcely formed, give no adequate idea of the *port* of a full grown plant, with its fan of 40 or 50 distichous leaves, each leaf 12 to 15 feet long, mounted on a column 30 to 40 feet high, as formally as if the whole had been cast in bronze. I can think of no better comparison for this grotesque, and yet noble object, than the great fans of peacock's feathers which are borne on each side of the Pope on festival days. The leaves, like those of the banana, are usually torn to ribbons, which makes them look still more like feathers as they wave to and fro in the wind.

On passing the group of palms you enter a straight road, running through the garden to another palm-circle recently planted at the farther end. This road has wide side-borders well furnished in front with flowers and small flowering shrubs, and in the rear with larger shrubs and trees, among which, here and there, are scattered palms and *Pandani*, the latter conspicuous for their snake-like stems and branches, terminal screw-like tufts of sword-shaped leaves, and abundant ropes and cables. These borders are at all times gay with bright-leaved plants and flowers. Among the former, *Dracæna ferrea* and *Poinsettia pulcherrima* supply the brilliant pinks and crimsons, and a variegated form of the mop shaped *Croton longifolium*, the bright yellows. The flowering shrubs and trees are much too numerous to mention; a few, now in flower, must suffice. Many fine species of *Cassia*, particularly one, recently imported from Trinidad, every branch of which bears a panicle of bright golden flowers at least 15 inches in diameter, and *C. alata*, with its large fern-like foliage, dense, erect racemes, and orange bracts; *Allamanda cathartica* and *A. Schottii*, ever displaying a profusion of golden bells; *Ixora coccinea* and *I rosea* *Hibiscus rosa-sinensis*, *Plumbagos*, several *Clerodendrons*, *Bauhinias*, *Gardenia florida*, *Crossandra*, *Eranthemum*, and other *Acanthaceæ*; *Bignonia stans* and *Tecoma capensis*, several *Ardisiæ*, more remarkable for handsome foliage and fruit than for showy flowers; these, and many others, with abundance of roses and small flowers, keep the borders perpetually sweet and gay, *Lagerstroemia Regina*, here a tree, bearing superb panicles of purple flowers has just shed its leafy honours; *Barringtonia racemosa* still displays a few of its pendent crimson tassels, *Dillenias* and *Wormias* 20 to 30 feet high, with dark plaited leaves and white flowers; *Astonias*, *Poinciana*, *pulcherrima* and *P. regia*, the umbrageous *Solanum macranthum*; *Jonesia Asoca*, laden with rich bunches of orange flowers; *Humboldtia laurifolia*, *Calosanthes indica*, now hung with great sword shaped pods, &c. are among the larger border shrubs and small trees. *Beaumontia grandiflora* climbs the tallest trees, flowering among the upper branches; and *C. apparis Mooni*, a fine Ceylon creeper, almost covers one large tree with its glossy leaves and white flowers. Two fine trees of *Phyllanthus Madagascariensis*, planted at a crossing, diffuse the *smell* (rather than the *fragrance*) of boiled potato-skins, while well grown cinnamon and camphor trees, not far distant, remind you that you are in the land of sweet spices and gums.

There is no Banyan tree in the garden; but there are several fine examples of the larger species of *Ficus*, particularly of the epiphytic fig trees which abound in the lower jungles of the Island. These species, though not necessarily epiphytic, often vegetate either at the base or in the crevices or hollows of old or half decayed trees; and in either case, the fig, growing rapidly, adheres to the supporting tree, at first modestly, like an ivy, but at length completely encloses the trunk and larger branches in a thick wooden coffin. The attacked tree, now hidden under a dense conglomeration of adnate branches and adnate ærial roots, which compose the false trunk of the fig, languishes, while the fig grows proportionably luxuriant, and at length far exceeds in size the tree, to which, as an humble parasite, it had at first affixed itself.*

But perhaps the most remarkable isolated figs in the garden are two fine India-rubber trees (*Ficus elastica*) at least 80 feet high, planted apart, one on each side of one of the walks. The girth of the largest is nearly 30 feet at the base, but it soon divides into three trunks, each 10 feet round. Its most remarkable feature, however, is not the height or girth of the stem, but the grand display of exposed roots which radiate from its base, stretching, like the spokes of a wheel, ten or twelve yards in every direction. Where they issue from the base of the trunk they form vertical plates, from 2 to 3 feet high, and from 3 to 5 inches in thickness, but they gradually diminish in height to the extremities. They are connected, here and there, by cross plates, which anastomose in a tolerably regular manner; and the whole display of roots reminds you (comparing great things with small) of the under surface of the leaf of the *Victoria regia*, if you take the trunk of the tree for the leafstalk, and the radiating and anastomosing roots for the ribs and veins.

Among the ornamental or remarkable trees the various species of *Artocarpus* deserve particular notice. *A. incisa* (bread-fruit) is sufficiently known in England by the fine specimen at Kew, which imagination may easily carry into a tree 40 to 50 feet high. *A. integrifolia* (the jack,) a tall-forest tree, 60 to 80 feet high, with excellent wood resembling coarse mahogany, dark polished oval leaves, dense well-covered branches, and large fruits hanging on short shoots, from the trunk or principal limbs; and *A. pubescens* (wild bread-fruit,) with plaited leaves of large size, are very handsome. A native species of *Antiaris* (or upas) from whose tough inner bark excellent sacks are made, has recently been introduced into the garden. Other ornamental trees are—*Schleichera trijuga* (Ceylon oak,) which at a little distance strikingly resembles *Quercus Ilex*; *Carallia ceylanica*, *Careya arborea*, *Kleinhovia ceylanica*, *Michelia champaca*, &c.; but none exceed in beauty the fern-leaved *Nephelliums* and the *Rhus decipiens*.

In a country where few trees are deciduous, a sameness of tint in the forest is to be expected; and to a considerable extent this is the case in Ceylon, if we confine ourselves to the fully formed leaves. But though distinct seasons, affecting all nature at once and strongly, are here wanting, the change of leaf often exhibits colours as bright as those which tinge the autumnal woods of America

* Professor Harvey forgot to add that the parasite, grimly named in Ceylon "the Colombo Agent," ultimately exhausts the life out of the supporting tree. —ED. *T. A.*

with broad washes of crimson and yellow. Here, however, it is not the old, but the young leaves which are highly coloured; and as the older leaves are still freshly green on the body of the tree, the ends of the branches clad in clear tints of white, pale yellow, pink, crimson, or purple, appear to support clusters of showy flowers. If all trees changed their leaves at the same season, these tints would be as famous as these of America. The most beautiful are exhibited by *Mesua ferrea* (bright crimson), the *Eugeniæ* (crimson), *Nephelium Mora* (deep red), the *Semecarpi* (bluish purple), the *Lauri* (rich sienna brown) *Symplocus* (rich brown), *Garciniæ* (fulvous), *Ingabigemina* (very pale), a *Mesua* (whitish), *Aleurites Moluccana* (white), &c., &c.

The commonest of the indigenous palms in this neighbourhood are the kittool (*Caryota urens*) and the *Areca catechu*. Both grow almost as weeds in the garden, and nothing can be more dissimilar than their aspect,—the one bold and massive, the other all grace and beauty. The *Caryota* must not be judged by the attenuated specimens seen in English palm-houses. Here its decompound fronds are peculiarly dense and heavy, forming an oblong, compact head of drooping, sad-coloured plumes, like gigantic hearse-plumes. Its trunk is from 40 to 60 feet high, thick and columnar, strongly contrasting with the slender *Areca* by its side, which nevertheless rears its glossy plumes to quite as great a height. The largest talipot (*Corypha umbraculifera*) in the garden has a trunk upwards of 60 feet high to the base of the leaves, and measures 12 feet at the butt, and 9 or 10 at five feet from the ground. It looks exactly like a column of solid masonry supporting a leafy crown.

Several fine clumps of bamboos, like tufts of ostrich feathers, 40 to 50 feet high, exhibit the family of grasses in their grandest form. The close-shaven lawns of England must not be looked for, but the grassy slopes of the arboretum, intersected by broad gravelled walks and ornamented with scattered trees, may well be compared to English park scenery. The grounds themselves are naturally of beautiful shape, and have been well laid out. Particularly to be admired is a new road, recently opened along the river banks, from one point of which is caught a charming view of the Peradenia Bridge, spanning the Mahawelle Ganga with a light open-work arch of *satinwood*, the garden affording a foreground, with wooded hills for a middle distance, and the eye ranging, beyond the bridge, far away into the open country.

But it is high time to speak of the more important departments of the garden—namely the nursery, the spice-ground, the orchard, and the experimental garden.

In the *nursery* a stock is kept up of all useful and ornamental plants suitable for distribution in the colony; and young plants and seeds are sold, at very moderate prices, to the colonists, the proceeds being paid regularly into the public chest. Flowers and flowering shrubs are in much request, both by natives and planters, and the introduction of a handsome novelty of this description attracts many purchasers. Annual plants of the warmer parts of the temperate zone generally succeed well, but shrubby kinds are apt to form leafy branches only. Sweetbriar grows long and lanky like a dog-rose, and rarely blossoms: *Fuschias*, unless care be taken to destroy the lateral leaf buds, do not blossom; but the apple-tree is perhaps the greatest caricature, existing merely as a root stock, which throws up tufts of slender twigs like those of a raspberry-bush, like which it is propagated by division of the roots. Of course it never flowers.*

* Half-a-dozen really nice apples were recently gathered from a tree on Abbotsford, at 4,700 feet altitude.—ED, *T. A.*

The *spice-ground*, about a quarter of an acre in surface, is planted with nutmegs, cloves, allspice, cardamoms, and pepper, all of which succeed well. At present the nutmeg-trees are laden with fine ripening fruit, and are also fragrant with a profusion of flowers.

Six or eight acres are set apart as an *orchard*, and a considerable number of fruits grown with more or less success. Among these are the mango; the hog plum (*Spondias dulcis*); the rambootan (*Nephelium longan*); the litchi (*Nephelium litchi*); the durian; the bilimbi; limes, citrons, oranges, shaddocks, lemons, and wampi (*Cookia punctata*); the star-apple; sour-sop, custard-apple, and bullock's-heart; the rose-apple, jambos, guava, and pomegranate; the loquat; the numnum (*Cynometra cauliflora*); avocado pear; bread-fruit and jack; mulberry; granadilla and papaw; pine apples; bananas of many kinds; lovi lovi (*Flacourtia inermis*), which makes a good preserve, Ceylon almond (*Terminalia catappa*), and *Canarium commune*, &c. Melons have been frequently tried; but though the plant grows freely, and the fruit swells well, the latter rarely comes to perfection. Pumpkins succeed much better.

In the *experimental garden* new objects of colonial culture and new varieties of fruits are raised and propagated for future dispersion. The tea shrub (*T. Bohea*) succeeds well, and might be grown to any extent at 1000 feet higher, if sufficient labour could be cheaply had. The chocolate (*Theobroma cacao*) bears abundantly, but almost every fruit, as it ripens, is destroyed by squirrels, which are extremely numerous. The Shiraz tobacco, a recent introduction, through the garden, to the colony, has been grown with much success, and bids fair soon to supplant the bad varieties in cultivation. Cotton has been long, and is still, under experiment here and in other parts of the island; but it does not flourish, apparently owing to an insect which attacks the ripening pod, destroying the seed, and greatly damaging the wool. The Manilla hemp (*Musa textilis*) grows well, and may eventually become an important item in colonial export. Arrow-root and tapioca, judging from the specimens grown in the garden, might be raised to any desired extent and of the best quality. Mr. Thwaites has recently introduced, and is carefully cultivating, the best West India ginger, that commonly grown in Ceylon being of very inferior quality. There have also been procured from Mauritius, and recently from Kew, the best varieties of pine apples, and great improvement in this fruit may consequently be anticipated.

So far for the Peradenia garden out of doors. But this notice would be very imperfect were I to omit to mention what is doing by Mr. Thwaites in his study, and, under his superintendence, at his office and in his house. Here a herbarium of Ceylon plants commenced by his predecessors, but arranged and greatly enlarged by himself, now contains about 3000 species; and novelties still come in, and must be expected, till the southern provinces of the island in particular have been fully explored. Two native draftsmen, in Government pay, are constantly employed in making coloured drawings of all the plants, as they flower in the garden, or are brought in from the jungle.

Their work is confined to representing the plant of the size of nature; for all the magnified portions are drawn, and all the dissections made by Mr. Thwaites himself, who devotes the best hours of almost every day to this most necessary, but laborious task. Many hundreds of carefully prepared and acurate drawings show what has been done in less than four years, and are a promise

of still greater things to come. Should they be published (as is much to be desired) they will not only form an enduring monument to the author's fame, and also to that of the Peradenia Garden where they have been prepared, but they will be a most valuable contribution to botanical science.

Their great value, above most other similar botanical plates will consist in this, that the floral analysis has been in all cases made either from the living plant, or from specimens preserved in spirit, by the author himself, and not by his draftsmen. The errors incident to making dissections of dried specimens are hence avoided.

W. H. H.

BARK AND DRUG REPORT.

(From the *Chemist and Druggist.*)

LONDON, July 10th.

ANNATTO.—Fifty-two bags Ceylon seeds sold at very low prices indeed; bright at 3s, dull to ordinary low at from 1d to ½d per lb.

BAEL FRUIT.—A parcel of 94 packages partly mouldy and shelly fragments was shown today, and bought in at the nominal price of 2d per lb. There is very little chance that that price can be realised.

COCA LEAVES.—No South American leaves were offered today, but there were two parcels from the Kelvin estate in Ceylon, together 784 lb. The quality was excellent, and the leaves (of the dark-green Huanuco variety) were beautifully cured, and of fine taste and flavour. One-half found buyers at the comparatively cheap rate of 1s 2d per lb.

ESSENTIAL OILS.—There is very little alteration in any of the essential oil quotations this week. Several lots of Citronella oil in bottles, tins, and tanks (the latter holding about 9 cwt. each), mostly mixed with petroleum were offered today, bought in at nominal prices.

QUININE.—Lower: early in the week a sale of 15,000 oz. second hand Brunswick bulk at 1s per oz. was reported. Today there do not seem any further sellers at that price though we think there would be buyers at the figure named.

THE AMSTERDAM CINCHONA AUCTIONS.

Amsterdam, July 10th.

At today's public auctions 2,843 packages cinchona were sold at unit prices ranging from 8c to 8½c per ½ kilo, equal to 1⅝d to 1½d per lb. The following were the prices paid:—Manufacturers' barks: Quills, broken quills and chips 6c to 7½c, equal to 1d to 12⅜d per lb.; root 15c to 50c, equal 1⅝d to 9d per lb. Druggists' barks: Quills, broken quills and chips 11c to 57c, equal to 2d to 10½d per lb.; root 12c to 21c, equal to 2¼d to 3⅞d per lb. The principal purchasers were the Auerbach, the Amsterdam and the Brunswick factories.

NORTH BORNEO PROSPECTS; A VISIT TO TEA BONDING WAREHOUSES; TEA BOXES; MR. MAITLAND KIRWAN AND HIS PATENT TEA PACKING.

So many Ceylon men have left you at various times to try their fortune in Borneo that information as to the progress of the British North Borneo Company will certainly be possessed of interest to those of their friends whom they left behind them in your island. Sir Rutherford Alcock, K.C.B., occupied the chair at the half-yearly general meeting of this Company on Wednesday last, and he told his auditors that the revenue had gone up by £14,850, or nearly 60 per cent, the total income—apart from land sales having risen from £24,986 in 1888 to £39,850 in 1889. Besides this revenue they had sold land during the year to the amount of £39,836, this amount having been received for 202,800 acres. The expenses, however, had mounted up, chiefly because of the cost of two expeditions sent out. This was an extraordinary expenditure, and would not be of frequent recurrence, Sir Rutherford said; but the directors thought it advisable not to add to the dividend which had been paid *ad interim* in January last. They hoped great things from the tobacco planting, which was going on vigorously and with most satisfactory results. The chief difficulty of their planters was scarcity of coolies, but steam communication with China had now been established, and the Chairman said he had no doubt an ample supply could be drawn from that country by its agency. He told his audience that a scheme for the construction of a railway across their territory under the land grant system was under consideration, but that until matters were more advanced he held it would be premature to enter upon any details. There was much to be hoped for from mineral products, and mainly as to coal; in the development of the sources of which last, considerable advance had been made. The closing of Sir Rutherford Alcock's address was followed by a good deal of rather warm discussion, the proprietors being anxious that power should be obtained enabling dividends to be declared upon land sales. This course the auditors decline to permit, and insist that receipts from such sales should be placed to and retained as a special reserve fund. You will recognise the important relative bearing this decision has upon the course hitherto adopted by the Ceylon Government in considering its receipts from land sales as revenue applicable to the most general purposes, an error the gravity of which, now that the end of your tether as regards available land is being rather closely approached, has come to be fully acknowledged.

My regret was expressed when last writing that space was not available for me to make some remarks upon what was observed by me during my visit to Mr. Maryetti's Tea Bonding Warehouses. On that visit I was enabled to realize for the first time that there might be some justification for the heavy charges which home agents make upon teas shipped to them from Ceylon. These have repeatedly been made the subject of complaint in your columns, and I with others have always had to acknowledge that they seemed to constitute a great and justly complained of grievance. But really, when one comes to see what has to be done with respect to tea before the chests are issued from the warehouses, the same disposition for acknowledgment does not remain. In the first place, the handing out of samples to the trade is a most laborious job, and however great may be the care exercised to escape loss it cannot be altogether avoided. Dozens of boys were constantly rushing in and demanding samples for this or that broker, their employers. To each of these an ounce of tea was carefully weighed out, and they were expected to return the same weight. Just fancy, however, what it must mean in the way of labour to work such a system so carefully as to guard against serious loss through non-return of samples! Turning to another department of the work one is confronted by the heavy charges for labour involved in unpacking the chests,—and this is particularly heavy in the case of the metal chests—turning out the contents, a job involving much delay if there be any obstruction such as framing *inside* the chest; weighing before the Customs officers, and refilling to the exact weight mentioned on the chests. By the way, I may tell you here that with some chests of Ceylon tea recently turned out their contents wighed two pounds *more* than the figures shown they should contain! Who is responsible for this out with you? The idea is here that too much reliance is placed on the boxes holding exactly a given weight, and that they are filled

without any weighing at all. This should be seen to if such a practice prevails, for two pounds excess in a quarter chest is a serious one for your shippers and planters.

After this digression by way of warning statements, I may get back to the third heavy item of expenditure to be incurred by the bonders, and that is the repair of broken boxes. When a bad voyage has been experienced, probably a dozen out of every hundred of metal or wooden boxes receive injury and require repair before being issued to the trade. I saw some of the metal boxes so bulged as to crack, and others with the lids so dented in, that, if left out in the rain, water stood in a pool on the surface and gradually leaked through the disturbed joints to the tea. As for the China wooden boxes, some of them scarcely deserved the name on arrival, and all of these had to be made good by the bonder's staff. So you can realize that the charges made on tea received here are not representative by any means of clear profit, though very probably some agencies manage to add considerably to the warehouse charges when their accounts of receipt and expenditure are made up for consignment to their constituents.

My reference to tea boxes reminds me to make mention of the fact that all the tea received ex "Carthage" in the Stanley-Wrightson chests has been sold this week at full prices, it being in "real good condition." This fact being ascertained, and confirmation to it having been afforded by the price paid by experts for the tea, the next step the Syndicate will take will soon have to be decided upon. You have already had sketched out to you by me an outline of what is contemplated by it, viz., the establishment of a factory for the manufacture of the board required from mana grass in order to avert the existing uncertainty attending the importation of the board from Holland. To carry out this programme efficiently, more capital than is possessed by the present Syndicate will of course be required, and the first step for consideration must be how this money is to be obtained.

We observe that you have been noticing lately the use of a lead paper introduced—so we understand you to say, to the Ceylon planters by Mr. Kirwan. When reading your observations upon this new material, I felt desirous of learning if anything was known about it by the tea trade here. As the result to my inquiring I found that this lead paper is well-known and freely sold in London, and that it is the same as that in which the tea arriving home in the Stanley-Wrightson chests was packed. My examination of the paper of those chests proved to me that it was an admirable substitute for lead, and of course far less weighty and costly, while to those advantages it adds that of economy in space occupied. An expert who examined the chests with me told me he believed the days of the use of lead for packing tea to be fully numbered.—London *Cor.*

THREE SAMPLES OF TOBACCO, grown in Madras, were recently submitted for the opinion, in regard to their quality and value, of the leading tobacco brokers and manufacturers of the United Kingdom. The reports of the 14 specialists to whom the samples were sent, including among others Messrs. Sales, Pollard and Co., and Messrs. Charlesworth and Austin of London, Messrs. Cope of Liverpool, Messrs. Lloyd and Son of Exeter, and Messrs. Thomson and Porteus of Edinburgh, seem to afford encouragement to the efforts which are being made to improve the cultivation of tobacco in the Madras Presidency.—*M. Mail*, July 24th.

INDIAN, CEYLON AND JAVA TEAS IN LONDON.

Owing to differences of climate, Ceylon tea has appeared in the Mincing Lane markets, since the commencement of the tea season, in larger quantity than Indian, while the increase this season in Java has shown well in proportion to the increase in Indian. The figures for Indian from 1st June to 11th July were :—

		Packages.
India :—Season 1889-90	...	40,118
Do 1890-91	...	51,325
Increase	...	11,207

		Packages.
Ceylon :— 1889-90	...	68,429
1890-91	...	93,111
Increase	...	25,682

In absolute quantity Ceylon shows not far from twice the number of packages of Indian tea, while her increase on last year is considerably more than twice the increase which Indian tea shows.

Java is advancing, the comparison being :—

		Packages.
1889-90	...	5,001
1890-91	...	7,751
Increase	...	2,750

The exports from Britain of Indian and Ceylon teas are increasing, but as yet the vast proportion of teas exported are China kinds. The deliveries of tea in June were 8,630,000 lb. of Indian and 5,163,000 of Ceylon,—the aggregate being 13,793,000 lb. against 6,059,000 China. The change since June 1888, three years ago, has been remarkable. The deliveries of China, then, instead of being less than half those of its two competitors compared thus :—

		lb.
Deliveries of China tea	...	8,438,000
	lb.	
Indian...	5,360,000	
Ceylon...	1,594,000	6,954,000
Difference in favour of China	...	1,484,000

The difference against China in June of this year is indicated by the following figures :—

		lb.
Deliveries of Indian and Ceylon teas		13,793,000
China	...	6,059,000
Difference against China	...	7,734,000

There has seldom been so complete a revolution in a trade and in public taste.

SUGAR IN FIJI.—Among the passengers who left Suva for Sydney by the S. S. "Waroonga" was Mr. Wm. Good, Sydney manager for the Fiji Planters' and Fruit Growers' Co-operative Association and Agency Company, who returns to the scene of his operations. Mr. Good takes with him some splendid samples of an accidentally obtained variety of cane which he has cultivated recently to some extent, and which is called the Muanawini (after the plantation). This new variety shows remarkable strength and vitality, united to good density, and is so straight in growth as to render less expensive many of the operations of cultivation and subsequent handling during conveyance to the mill. Doctor Kottman, Chemist in Chief to the C. S. R. Co., also returns from a visit of inspection to the scene of the Company's operations in Fiji, in reference to the disease which has appeared among the 'Honolulu' cane. The new Muanawini variety, referred to above, may meet the difficulty.—*Fiji Times*, June 21st.

PUMICE STONE.

The Belgian Consul-General in the Canary Island states that a very important mino of pumice stone exists on the Teneriffe Peak, of which the working was only started in 1888. The stone is found in that part of the peak called "the Canadas," at about 2000 feet above sea level, which has an area of some 6000 hectares, out of the middle of which rises the highest part of the peak. The Russian Consul at St. Croix bought this property of the Spanish Government in consideration of an annual payment for the pumice stone working. The Russian Consul has associated himself with a Belgian, and they under the firm styled Aguilar and Valcke, commenced operations in 1888, but it was only last year exportation was really started. At the Paris Exhibition the Consul-General states that this stone obtained a silver medal, and in view of the requirements of England, France and America, he believes it will develop a trade of great importance before many years. So far the Lipari Islands have practically furnished the world's supply of this product, exporting about 100,000 tons per annum. The Teneriffe stone being recognized as of excellent quality and its extraction being a much more simple matter than in the Lipari Islands, it follows that the price is much less. More capital will, however be wanted to extend the working operations. —*Chamber of Commerce Journal*, July 5.

TEA PACKING, BULKING, &c.

(By a Very Old Colonist.)

THE MINCING LANE TEA MARKET AND PROSPECTS—WEIGHING, BULKING AND PACKING OF TEA—TEA LEAD—MR. DENSHAM'S FACTORY—WHEAT PROSPECTS—RISE OF EXCHANGE.

London, July 5th.

Naturally, the first thing I did when I got to London was to visit Mincing Lane to see our brokers, Messrs. Gow, Wilson & Stanton, and learn from them all about the tea market and what was thought about its future prospects: at present the feeling is "bullish" and in favour of a steady market for some months to come. On inspecting some samples of tea after it was bulked in London, which I had seen before shipment, I was very much disappointed with their appearance: they did not look like the same tea at all they were much more dusty and broken than when they were shipped. On inquiring the cause, I was told, it was owing to the rough way in which tea is repacked in the tea warehouses after bulking. Mr. Wilson suggested that I should go to the warehouses and see the process of working a parcel of tea from beginning to end. Accordingly accompanied by Mr. Davies, who has taken much interest in the matter, I went to Cutler's Wharf to inspect the working of a parcel of our own tea ex "Chyebassa." It was first weighed gross, package by package, the weight being chalked on each; the boxes are then opened and a sample of each taken out for inspection. If they run even in appearance, at this point bulking might be saved, but in this case the samples did not run even in appearance, so the parcel was taken into the bulking room: there the top lead cover, cut up in sampling, was torn off and the tea turned out on the floor. The lead lining of the box generally comes out too, and is shoved back into it in a very crushed state. The tea on the floor is turned over several times with shovels—this is the method of bulking, machines have been tried for mixing the tea, but they have not been found to facilitate the work and have been given up. The empty boxes are then taken back into the weighing room and the tare is ascertained, by weighing each package. All the weighing is done in the most careful way, and the scales were tested several times whilst I was there!

Whilst the lot of tea weighed out well, there was a loss of about 1 per cent in the tares from inequality of the weights of the boxes. The tared boxes are then taken back into the bulking room. The tea after being again turned over is shovelled into them; and if possible inside the lead lining. When the box is nearly full a piece of gunny is placed on the top and a man tolerably heavily shod got on to it and stamped the tea in the box with all his energy. What wonder, then, that crisp tea is broken in the process and much dust made?

We adopt a similar process in packing in Ceylon, but it is done more carefully and gradually. By this way of packing we get more tea into the box than the warehouse laborers can without stamping it in. The stamping operation has generally to be done twice. There is no doubt in my mind that in packing the tea as we do in Ceylon, we are penny wise and pound foolish: we save a trifle in freight and lose a penny per lb. in price, owing to the deterioration in appearance from crushing. Unless we bulk on the estate I think no more tea should be put into the boxes than can be got by thorough shaking, then the warehouse people can get the same quantity into the boxes without stamping. No care can be taken in repacking to adjust the lead lining: if it slips into its place well and good; the tea goes into it, if it does not, it is crammed in; the tea on the top of it; and its want is supplied by sheets of paper placed next the wood and as the torn lead cover is useless, its place is also supplied by paper. The lids of the boxes being prized open with a chisel are generally much broken and are nailed on again anyhow. We are told that our tea does not keep well. How can it keep exposed as it is to the effects of a damp climate? I should say now that in my opinion the rough usage of our tea and packages in the warehouses is unavoidable. It is impossible to give the time necessary to repack as carefully as we pack: the remedy I think is in our own hands—either let us bulk on estates or pack in such a way as to admit of the tea being repacked without treading and stamping. With such enormous quantities of tea to be handled in the way I have described, time cannot be given to do the work carefully. The mischief, I should say, hurts us most with exporters: how can we expect them to buy and ship our tea with all the chances of deterioration from imperfect protection from the damp atmosphere? What is the use of packing tea in lead at all, if it is only for the voyage? The sooner some other way of hermetically packing tea can be devised or some method of making the tea lead adhere to the boxes when the tea is turned out the better.

Messrs. Gow, Wilson & Stanton gave me a piece of their tea lead laid on thick paper, which has been used by Mr. T. C. Anderson and is much approved of by the dealers.* If I can find out where it is made I will send out a supply, because it could be pasted on to the sides of the boxes before they are made up and then it could not be rendered useless by the men in the warehouses.

After seeing the bulking and repacking process, Mr. Davies took me to see Mr. Denshaw of Mazawattee celebrity. He kindly took us through his factory from top to bottom and showed us the whole process of blending and packing from beginning to the end. I was much pleased and interested in what I saw. All the tea is now, I believe, honestly described on the packages, and I think he has done much to push the sale of Ceylon tea. The quantity he buys and sells is very large: he has about 4,000 agents, and packs tea as directed for a large number of retailers who have their own names put on the packages. I was particularly struck with his blending machines and especially with his cutting and sorting machine: it cuts and sorts more evenly than any of our machines. The establishment is a very large one. The steam engines to work the machinery are at the top of the warehouse which is some six stories high.

This letter is intolerably long, but I do not care to apply the pruning knife to it or to rewrite it: so you must just try and make commonsense out of it. If the weather does not change very soon for the better

* A sample sent to us by Mr. Anderson some time ago was very favourably reported on by Messrs. Somerville & Co. We are not aware of the cost compared with ordinary tea lead.—ED. *T. A.*

the farmers will have a bad time of it and there will be very dear money before the end of the year to pay for corn, &c.—Yours truly, C. S.

P. S.—The price of silver is creeping up again. People are predicting a rise to 60d, which means a par exchange. It will be for a time a bad thing for the East. Capital invested there during the last ten years will be called up and sent back, and people will be afraid to send out money at an exchange of 2s., which they may have to get back at 1s 5d when the production of silver increases or when the demand for American currency is satisfied. Remember me kindly to all inquiring friends, especially those at the Mount. This climate is at present simply detestable. C. S.

QUININE, &c.

(From *C. F. Boehringer & Söhne's Report.*)

WALDHOF NEAR MANNHEIM, July 1st, 1890.

QUININE during the greater part of last month was very quiet and second hand holders accomplished the resolution to sell at 12¾d per oz. In course of last week however, the market improved.

In 1880 Dr. Laveran of Paris reported that in Algiers he had constantly observed peculiar protozoeic organisms (Plasmodium malariae) in the blood of patients suffering from malaria fever. This discovery that was much disputed at the time has recently been confirmed by Dr. F. Plehn at the Moabit Hospital in Berlin, who in proof of it adduces the treatment of patients with quinine, the organisms in question gradually disappearing from the blood, and the patients therewith becoming convalescent.

COCAINE.—Just as in civilised lands general prosperity is accompanied by increased consumption of spirituous drinks, so in Bolivia and Peru the natives under such circumstances indulge more largely in coca chewing. Such has been the case this year. Having got much better prices for their wool, the natives have consumed coca very freely, and the surplus of leaves for manufacturing purposes has consequently been small, and commanded high prices. Raw cocaine and cocaine hydrochlorate have nevertheless fallen. In face of the fact referred to, this decline cannot be expected to last, and either coca-leaves, must become cheaper, or cocaine quotations must be and of the former eventuality there is no prospect thatever at present.

A report in the Révue Chir. Thèr. recommends in case of croup the followiug solution :—

Cocaine hydrochlorate ..	...	I part
Solution of Perchloride of Iron	...	8 ,,
Water	...	1000 ,,

A tablespoonful to be taken every two hours. For children the quantity of cocaine should be reduced by two fifths, and a teaspoonful administered every two hours with ice. This remedy removes the membraues and renders any operation (cauterisation,) unnecessary. —.

In course of the series of articles summing up the observations of European and American physicians concerning the subsidiary effects of the new remedies, and to hich we referred in our April report, Dr. Falk of Berlin has since dealt with Antifebrine, Phenacetine and Methacetine.

ANTIFEBRINE (Acetanilid) the most frequent effect is cyanosis that occurs sometimes even after the smallest dose. The fall of temperature is often unexpectedly great producing even collapse, especially in typhus patients and children. Antifebrine frequently causes violent perspiration, and in many cases shivering fits. Unlike antipyrine it does not often affect the digestive organs, but on the other hand with children produces diarrhoea and inclination to vomit. Dr. Falk notices eleven cases of acuto antifebrine poisoning the symptoms of which are faintness, giddiness, dread of death, palpitation of the heart, abdominal pains, vomiting, shivering fits, unconciousness and in some cases delirium.

PHENACETINE.—Judging by the comparatively few recorded observations, the occasional subsidiary effects of phenacetine are rare and unimportant. The most frequent appears to be excessive perspiration sometimes accompanied by shivering. Cyanosis and exanthems also often occur. By prolonged treatment with phenacetine, the patient grows so far accustomed to it that large doses become needful, and these are by no means free from danger.

METHACETINE is closely related to Phenacetine, but its subsidiary effects are much more disagreeable. It occasions most violent perspiration, and as often remarked at the same time also collapse and cyanosis, and great caution should therefore be observed in prescribing it.

THE NEW JAPANESE MINISTER OF AGRICULTURE AND THE TEA-MEN.

Mr. Mutsu has made it very plain to the teamen who were so fortunate as to obtain a subsidy of 200,000 *yen* from the late Minister of Agriculture and Commerce, that he is not at all disposed to pursue the policy of official interference with trade. These gentlemen, probably feeling doubtful about the permanency of such a favour, sought an interview with Mr. Mutsu and asked what opinions he entertained on the subject, whereupon, according to the *Jiji Shimpo*, the new Minister told them that he was entirely opposed to official meddling with tradal concerns, and that, entertaining such views, he proposed, if not to cancel, certainly to greatly alter the Tea Company's charter. Subsidies and bounties were all very well, he explained, as means of giving a vigorous impulse to some particular enterprise and putting money into the pockets of favoured persons. But the impulse could only be temporary, while the inevitable consequence of such a system was to interfere with and check the sound development of trade, since the enjoyment of official assistanee and protection by one set of traders effectually strangled competition on the part of men not similarly favoured, and thus, instead of encouraging private enterprise, official aid was ultimately fatal to it. With respect to the sum of two hundred thousand *yen* which had been granted to the Company and lodged for the uses of their business in the Bank of Japan, Mr. Mutsu explained that of course no question could be raised. But he told them that he should not disapprove of their placing the money with some sound bank where good interest was procurable. The tea-men have accordingly decided, we read. to transfer the money to the First and Third National Banks, where 7 per cent. is given on fixed deposits. They will thus be in receipt of an income of 14,000 *yen* annually, which, they expect, will meet their requirements.—*Japan Weekly Mail.*

MR. A. SCOTT BLACKLAW ON BRAZIL.

São Paulo Revisited.

DOM PEDRO SEGUNDO RAILWAY STATION—FASHIONABLE DRESSES—EMANCIPATION—DEPARTURE OF TRAIN: LEAVE-TAKING—COFFEE—BEAUTIFUL RESIDENCES—WANT OF CULTIVATION—GRAND SCENERY OF THE SERRE DO MAR PASS—A 100 MILE NAVIGABLE RIVER—COFFEE DISEASE IN THE CAMPOS DISTRICT—METRE GAUGE LINES—LEOPOLDINO RAILWAY COMPANY—EXPRESS TRAIN—SÃO PAULO TRAIN—MINAS AND RIO RAILWAY COMPANY—IN CACHOEIRA—CANE AND COFFEE—FROM BROAD TO NARROW GAUGE—COMFORTABLE RAILWAY CARRIAGES—BROAD AND NARROW GAUGE LINES—ABANDONED COFFEE ESTATES—A CENTRAL SUGAR FACTORY—JAWBREAKING NAMES OF STATIONS—A CONCESSION FOR A RAILWAY LINE—BITUMINOUS SHALE—SÃO PAULO STATION—HÔTEL DE FRANCE—CONVERSATION ON "GOOD OLD TIMES."

One reasou of my long silence is that I have been for some time almost out of the bounds of civilization in the interior of Minas Geraes.

I started from Rio one cool September morning —the day just breaking when I got on to a tramway car which was to convey its load of passengers to the Dom Pedro Segundo railway station, for a train which was to leave for the Capital of the Province of S. Paulo at 6 a.m.

Arriving some half-an-hour before the time for the train leaving, one had time to enjoy a cup of warm black coffee, made with a strength which one only finds in Brazil—milk there was in abun-

dance, but such is the force of habit—after a long residence in these parts—coffee with milk seems a tame drink, compared with the black enervating beverage well-sugared—which is the "eye-opener" for everyone, rich and poor senator and beggar, in this part of the world.

While seated in the refreshment-room one is visited now and then by well dressed young men, who seem of the class employed during the day as clerks in wholesale houses or retail dealers' assistants—and is asked in a whisper to buy from the visitor the unexpired half of a return ticket to São Paulo. The ticket lasts for a month and has date of issue stamped on it. Negotiations are continued in a whisper, and the ticket may be bought for some ten or twelve shillings less than one can buy a single ticket for. From the numbers of those who present themselves afterwards one is inclined to think a better bargain could have been struck by exercising a little patience. The clandestine nature of the transaction leads one to believe that it is illegal. This however those who benefit by the affair do not care to inquire into. Tickets are not given out until a short time before time of train leaving, and the gates leading to the platform are not opened until that time. The waiting-rooms seem ample, but as the approaches are well covered, most of the passengers prefer waiting about the doors, no doubt looking for those whom they expected to accompany them or to see them off. There is not much pushing and crowding. The newsboys and shoe-blacks are kept outside, and your business with them is done before you enter. Luggage is a thing that does not bother the passenger much, for the day before the passenger intends to leave, it can be sent to an office of the railway department in the centre of the city of Rio de Janeiro and by giving particulars as to destination, and paying according to weight, he has only to present the card or receipt received at the end of his journey. Small parcels or such as do not inconvenience other passengers are allowed into the carriage.

While waiting for the train to leave, one is struck with the costly fashionable dresses of both ladies and gentlemen of the better class, but all are well protected from dust while travelling, the science represented by Worth is even exercised in the formation of ladies' "dusters" from unbleached linen or silk. Gentlemen protect their French-tailor-made suits by long over-coats of a material similar to the ladies',* and they put a white washable cover on their felt hats. Only 1st and 2nd class carriages are run; this being a fast train there are few of the latter, and what there are of varied colour, position, and dress.

Emancipation does not seem to diminish the retinue of coloured people of both sexes, which those included in the upper ten require when travelling in this country; a few German, Portuguese and Italian girls are seen accompanying families, but the bulk of lady's maids and children's nurses are taken from those who were formerly slaves. The dresses of some of these which before the 13th May 1888 were supplied by their masters and mistresses are not much inferior in either cut or material to theirs, and more costly than those of the same class in Europe.

No one seems to be allowed to enter by the regular platform entrance without a ticket, and I cannot explain why before the train leaves so many people are there to take leave of friends and these seem as many as the passengers, the carriages get filled up, and the stranger thinks he cannot get a seat, but the checking of the tickets soon undeceives him. Then the parting! Ladies give a kiss to each other on both cheeks and gentlemen embrace each other, some tears are shed by those on the platform, by-and-by the whistle of the locomotive blows, the train begins to move, white handkerchiefs are waved from carriage windows in reply to those on the platform, the speed increases, the beautiful suburban villas are passed, we pass through the wide expanse of fodder-grass fields, and off we are at forty or fifty miles an hour, and but for the splendidly convenient carriage arrangements we have here, one might fancy he was on one of the London and North-Western, the Great Northern, or Midland fast trains.

Gradually all settle down to our seats and morning newspaper. A great many small stations are passed, but the train does not stop until it has run for more than an hour, and this it does at a place called Belem (pronounced Bé-leng*). Here one can get coffee and some passengers stretch their legs on the platform. There is a refreshment-room; all take coffee; ladies and those who had not slept enough before leaving get it handed in at the windows. So as not to have to mention it again I may notice that this custom of coffee drinking is repeated every time the train stops: boys come with the cups on trays, the passenger helps himself and pays two-pence-halfpenny for a cup.

After leaving Rio the country is flat. The hills to the south of Rio where the Tijuca, the Corcovado, the Gávea, on the sides of all of which up to near the summit are some beautiful private residences, hotels &c. are gradually left behind, and in front we see the lofty ranges forming the Serra do Mar through the defiles of which the train has to pass. In this low country there is very little cultivation. Here and there are to be seen cane-fields, but the juice is turned into rum. The costliness of machinery for sugar-making prevents the farmer with small capital from making anything else of it, and the low price ruling for sugar for some years past prevents large capitalists from assisting by means of central sugar factories. Patches planted with mandioca, maize and beans are also seen. Land seems in the hands of people who do not care to rent it, or to sell it, else a great deal of it could be covered by market gardens, and small farms worked by European colonists, who could find a ready market for their produce in the city of Rio de Janeiro. With the exception of a few small dry looking knolls covered with grass, the soil looks as if it could grow anything suited for a latitude of 22½ degrees and a country having an average supply of rain distributed more or less all the year through of 120 inches. At Belem the ascent of the Serra do Mar commences. The gradient of the line is one in fifty, some thirteen tunnels cut out of solid gneiss are passed through. I am not poetical enough to offer to describe the grand views to be seen from many parts of this pass, but steep hills covered with virgin forest amongst which are trees of enormous size, and smaller shrubs showing flowers of every hue and filling the air with their fragrant scent, grassy hills, and grassy valleys, near and far are to be seen; while silvery streaks of waterfalls rushing over high rocks and disappearing, as if ending in spray, in the forest valleys below, and these brightened up by the sun; streaks of cloud showing pieces of mountain below and pieces above; showing a tremendous height for a short time to the Peaks, but these snowlike masses are soon to be dispersed by Sol's influence. These and a great deal more are to be seen and enjoyed, and then, as enjoyment heightens,

* In Melbourne there is an enormous consumption of "China silk" for male and female "dust coats" in summer time. The protecting dresses look, in the case of ladies, almost as nice as the dresses they cover.—ED. *T. A.*

* And meaning Bethlehem: compare the English form 'Bedlam.'—ED. *T. A.*

how delightfully cool and pleasant the air gets, as one gradually ascends to a height of 2,000 feet. After the last tunnel has been passed through and the train has gone sounding through the last rocky defile, a descent is made to Barra do Pirahy. Here we come to the Rio Parahyba which takes the drainage of a large tract of country; that on the north side of the Serra do Mar from near Santos 200 miles south of Rio to Campos 150 miles north. The Parahyba has also a large watershed on the north, as it receives the drainage of the high hills which have a *water parting* on the north towards the large river San Francisco, and also to those rivers which go to supply the river Paraná which goes to form the River Plate. The river Parahyba is navigable for about 100 miles from its mouth, and by it some of the coffee from Cantogallo, and St. Fedelis districts, and sugar from the Campos district find their way to a seaport. The hills on each side of it are covered with coffee plantations, and it is principally on these where the coffee disease has been playing havoc for the last few years. This is a disease or insect which attacks the roots of the coffee tree, in old districts. Government has tried what it could by sending specialists to study this pest, but as yet no cure or preventative has been found. Fortunately it has not as yet visited the new coffee districts in São Paulo and Minas Geraes. Barra do Pirahy, means the *bar* of the river Pirahy where it enters the river Parahyba, This first section of the Dom Pedro 2nd railway ends here, the trunk line goes north to the province of Minas, and receives traffic from many small lines of metre gauge formed by companies whose shareholders are, or at least many of them, people who live in the localities through which these pass. The main line is opened to the capital of Minas Geraes—OURO PRETO—altogether it has an extension of some 900 kilometres—750 kilometres (465 miles) of which is broad (5 ft. 3 in.) gauge, and 150 kilometres (97 miles) narrow 1 metre say 3 ft. 3½ in.* The gauge was broken after reaching so far (750 kilometres) into the interior for reasons which satisfied the Government, and which I do not care to enter into at present. It was the old question of "the battle of the gauges," and the narrow was victorious.†

From the Dom Pedro line about 3 hours' ride from here strikes off a metre gauge line worked by a powerful Company called the Leopoldino Railway Company. This line has a larger mileage than its parent the Dom Pedro 2nd, which is a Government line, and forms a network all through the northern part of the Province of Minas. It now threatens to take away a great deal of the traffic from its progenitor, having bought the Cantogallo Railway (gauge 3' 6") and made a branch to connect its old line with the latter, which has its initial station and terminus for unloading coffee and other produce at Rio de Janeiro, thus securing to itself all the goods traffic with which it formerly fed the Dom Pedro 2nd. Surmounting hills and crossing deep ravines seem nothing to the engineers of this Company, who do not hesitate on their metre gauge to locate on gradients of one in thirty-three (3 per cent) and lay down curves of three chains's radius.‡ The Leopoldino Railway has 900 miles open—cost of construction &c., £5,000,000.

The express for the main line passengers—those going towards Minas Geraes—and for the small feeder lines I have mentioned above leave Rio de Janeiro at five in the morning. The train with São Paulo passengers leaves at six: there is thus not the same scrambling and pushing for breakfast at Barra de Pirahy as formerly. The main line train leaves Barra de Pirahy before the other arrives. The distance of Barra de Pirahy from Rio opened 1858 is 67 miles and height above level of the sea 1,200 feet.

It is 8-30 a.m.; the refreshing air of the hills gives everyone a good appetite; there is a beautifully clean refreshment-room, and the table is loaded with good things hot and cold to eat, of which one may eat his fill, and wines &c. are for the ordering—the charge is moderate, and sufficient time is given to finish up with a cup of black coffee.

The line for São Paulo branches off here towards the west, but it is still the Dom Pedro 2nd or Government line the same gauge (5 ft. 3 in.) and passengers do not change carriages here, nor until they change into a metre gauge at the end of this line. The railway now follows the right bank of the Rio Parahyba, the train passes the small stations, and with few stoppages reaches Cruzeiros—where there is a junction with a railway (metre gauge) made and worked by a British Company, called the Minas and Rio Railway Company. The Minas and Rio line goes due north until it reaches a river, the Rio Verde, in Minas Geraes which is navigable. The districts through which it passes are more pastoral than coffee producing. Other lines are being made as feeders to it, and if it do not pay, it very soon will. The Company enjoys a state guarantee for the line at present open, and a provincial guarantee for some 200 kilometres of extension tills to be made. After leaving Cruzeiros and continuing on the side of the river Parahyba for other 14 kilos in due time we reach Cachoeira, which is the terminal point of the Dom Pedro 2nd on this side. We are now 165 miles from Rio, altitude 1,720 above sea-level—opened 1876. Passengers and goods have to be changed to the São Paulo and Rio railway, a metre gauge line. The valley of the Parahyba from Barra do Pirahy offers little variety: first we pass through some cane-fields for half-an-hour or so, the bulk of these canes are grown for a large central sugar factory which has a guarantee of interest from the Government of 6 per cent per annum. This ought to do good to the district, for the most of the coffee seems dying out and cane is growing very well on what were coffee plantations. Further up the valley there are fewer cane-fields, and the coffee fields, although not looking fresh and young, are not reduced so far as not to be able to pay their way. Nearer Cachoeira, but up on the hills, we pass some very well arranged coffee estates said to be bearing fair crops the present year, with plenty of young wood for the next. Being nearer some very high hills—one Itatiaiha said to be the highest in Brazil—6,600 feet, the climate is more moist, and has not suffered from the late drought, which has devastated whole provinces in the north and from the ravages of which few districts in the south have escaped. On the lands near the river cane is planted where coffee-fields were—more or less all along the valley. I may also mention that several metre gauge lines branch off to the left but on the right bank of the river. These lines go south towards the Serra do Mar and into a second valley of the Rio Parahyba which lies parallel with this some 30 miles to left and south of us and some of them have concessions from Government to enable them to extend to the sea port towns situated between Rio and Santos. The

* There have been spent £12,000,000 on the 465 miles of broad and £1,200,000 on the 150 miles of narrow.

† The highest station on the Dom Pedro railway above the level of the sea is Barbacena say under 3,700 feet and distant from Rio 235 miles.

‡ Three chains radius! This means very slow speed or danger and rapid wear of rails from the effects of super-elevation.—ED. *T. A.*

cost of construction, as they get near the sea, must be heavy, as all along the coast from Rio to Santos the steep sides of the Serra seem to come right down to the coast. There are at present three of these lines working off the Dom Pedro 2nd—their milage is not great as yet, but all are being extended.

At Cachoeira we leave the nice roomy carriago of the broad gauge and enter that of the narrow. There is a difficulty at first in finding places for the small parcels, and convenient seats. As it is now afternoon the old hands look out for the side the sun will beat least on. We cannot venture on a cup of coffee until these arrangements are made. The new hand had better not ask the time for the train starting: if he do and be guided by his watch he will have some time to sit in an empty carriage. From Rio we have come on Rio time, here now we have São Paulo time, which is somewhat later,—some 15 minutes. Better for him to ask "How long do we wait here?" and he may look at his watch when the train starts, he will have time enough to look about, for changes of everything at break of gauges, even with the most improved railway systems, take time. Time! that is nothing to compare with the annoyance.

From here to São Paulo the metre gauge line belongs to a company having its head office in Rio de Janeiro, and the capital was raised in this country. It was opened in 1876 and has paid fairly well to the shareholders.* For goods traffic from Rio to São Paulo it has to compete with the line of steamers between Rio and Santos. Passengers, even those to Santos, who have by steaming this route to stay a night in São Paulo, and go by train some three hours' journey to Santos next day, prefer it, for in some seasons the sea voyage between these two places Rio and Santos is far from pleasant.

We have come out of luxurious carriages fitted up with all sorts of comforts for the traveller which our American cousins can invent, and we enter others less roomy no doubt, but clean, neat and comfortable. The extra heat we experience is not *all* owing to the lowness of the roof, but the sun is beating right down on us, and it is the hottest part of the day, and the small windows which only open half-way would not inconvenience us much, if we had entered the carriage at 6 o'clock in the morning. There is width enough in the seats, for the broad gauge held two on each seat with a passage down the centre, making four passengers in the breadth of the carriage; here you have two passengers on one seat at one side, and one passenger on one seat at the other, the single seats extending one half-way down the carriage on one side and half on the other, the double *vice versa*, and although the passage in the middle has a quick turn half-way down the carriage to suit this arrangement of seats, there is room enough for seats for gangway and all. The facility with which the backs of the seats can be turned to enable two people, if on the single, and four on the double, to have a quiet *tête-à-tete*, is a good arrangement; if you don't like your face to the engine, turn the back of your seat and you have your back to it. The lavatories are kept as clean on one line as on the other. On this line where curves do not seem to be less than six chains radius they could easily have higher roofed carriages which would give better ventilation, and enable windows to be open their full height.* They could be opened by pulling down instead of pushing up. Do not let us growl: in a new country a metre gauge railway is not to be despised. The metre gauge has been such a success that here they will have no other, but I do not say that it is right to have *two* gauges in any country [The question of gauge is largely a question of traffic, but break of gauge means increased cost of working, with inconvenience and danger.—ED. *T. A.*] For through traffic the break of gauges is the greatest annoyance imaginable, and the saving in cost of construction does not compensate for loss of time—*first* in the slowness of the trains, and *second* in the time required for changing from the waggons of one line to another, entailing risk of damage to goods, delays and discomfort to passengers. The 5 ft. 3 in. gauge lines run up to 60 kilometres per hour, while the narrow 3 ft. 3½ in. seldom exceeds 30 kilometres, and it is a very fast train that will run 40 kilometres: indeed I think there is a regulation which makes it punishable for a driver to exceed the latter distance let his train be ever so late. They tell me the express on this line runs 40 kilometres per hour. With the exception of the Government line in the Province of Ceará, constructed under directions of Engineer Charles Morsing, this is the best made metre line I have been on in Brazil. Although your 5 ft. 6 in. is an enormously wide gauge, now that you have a good extension of it, and through the most difficult part of your country, you should stick to it. [No fear of that. Apart from all the inconveniences of break of gauge, experience in India has conclusively proved, that any gain on construction is rapidly lost in the higher proportionate cost of working narrow gauge lines.—ED. *T. A.*]

Economy in the construction of metre gauge lines here has reached a point as fine as it is possible to cut it. £3,000 a kilometre is the maximum on which guarantee is given by the Government, and the applicant for a concession must prove that it will pay 3 per cent, *i. e.*, if the line should not pay 3 per cent the quota to be paid by Government would not exceed 3 per cent on capital guaranteed.

A pretty long stretch of line to connect the city of Rio and that of Campos along ground similar to your lowcountry and a gauge of 3 ft. 6 in. was contracted for at £1,920 per kilometre; the work included everything but rolling stock. Gradients not over 1 in 100 and minimum radius of curves 200 minimum or 10 chains radius. Bridges above 12 feet to be of iron, stations of stone or bricks, and covered with tiles platforms of cement, &c. Rails steel 45 lb. to a yard—all was finished to the satisfaction of Government, and it is said the contractor made a fortune on it.

But to return to our journey towards S. Paulo. Leaving Cachoeira, we pass through what had at one time been an important coffee producing district, for we see numerous abandoned coffee estates, and cane struggling to give a fair crop from the already washed and exhausted soil. Government have tried to improve agricultural matters, by giving a guarantee to a central Sugar Factory beside the Lorena station. The factory has been working for three years, but the Government have had to assist in paying the dividend to the shareholders. This will gradually be remedied, as it was owing to the planters' not planting sufficient cane; they being uncertain if the price the Company offered would pay them for cultivation, and they not being sure if means for transport would be provided when the cane was ready for cutting,

* Length of line 232 kilometres—146 miles—7 per cent guarantee from State on £1,000,000.—All was spent on construction,

* Since writing the above I have been told the low roofed carriages are few in number, the others have high roofs with double ceilings, 7 windows opening full, and downwards.

judging by the number of tramway lines seen, one would suppose this fear on their part no longer existed. The factory is a large building close to the railway, and is fitted with first-class French machinery and appliances, for the turning of the produce of the cane to sugar and rum.

After Lorena we pass some stations with names quite as "jawbreaking" as the designation and title of some of your Sinhalese nobles. We have first "Guaratingueta," pronounced G-wara-tinge-tah. We pass the stations Apparecida, and Rozeira, suggesting the formerly devoted labours of the brotherhood of the Society of Jesus, and then we have Pindamonhangaba—pronounced Pinda-monyan-gah-ba. The name might be associated with the last two as having reference to the lower regions, but it is not so. It is an Indian name and looking at its termination has something to do with the nsme of a tree. The next station is Taubaté: here there is a considerable town, and no fewer than two hotels close to the station, and as the *down* train passes about breakfast time, and the *up* during the afternoon, passengers are notified in ornamental lettering on the walls, that they may enjoy a "square meal' at reasonable rates, and the railway arrangements admit of those who are inclined to take breakfast or dinner." We did not avail of the invitation so prominently offered to us to dine on paying, first because we did not wish to altogether destroy the enjoyment of what would be provided for us in the Hôtel de France in San Paulo—now *run* by an old accquaintance, Guilherme Lsbeis, a German by birth who was a particular friend of our lamsnted G. A. C., when he made his pleasure trip here in the seventies, and second we had been presented—handed into the carriage window—from the platform in Rio with a sandwich loaf by a friend who is a partner in the large confectionery and dinner supplying establishment of Pascoal in Rio. Now this is not the sandwich loaf you mean—made of the closegrained material the product of fermented flour and water only, but a loaf which had been made like a roly-poly, the dough had been rolled out and beautiful slices of legitimate copeland applied formed into a loaf and cooked or fried all in one piece in the oven. This was simply delicious, and it had been broken on several times before we reached Taubaté.

An English gentleman has a concession for some 250 kilometres of railway line—on metre gauge and guarantee of 6 % on the capital—which is to connect this town with that of Ubatuba on the coast between Rio and Santos. Already the line has been surveyed, and he expects soon to raise a company to carry out the construction. Another has a concession for a line to go direct north from here into the Province of Minas Geraes. By this means the produce of a large tract of country which has to find a seaport by going a roundabout way to Rio or to Santos, and suffer knocking about and delay at each change of gauge, will be immensely benefited.

Here also at Taubate are layers close to the surface of bituminous shale, from which, if properly worked, paraffin and lubricating oils could be extracted. This has not altogether escaped the attention of some enterprizing British and American gentlemens, and it to be hoped that after it has passed the experimental stage a large Company may be formed to develop this industry.

We stop in passing at a large town called Jacarahy with a large bridge in the middle of the town crossing the river Parahyba. The line continues on the right bank of the river, but some 10 kilometres farther on near the station Guararema we cross to the left, and passing through some heavy cuttings we enter on the watershed of the Tiete, which runs westward towards the tributaries of the River Plate.

As I have already mentioned we have been running parallel with another valley of the Parahyba separated from us by a range of hills on our left to the south of us and north of the Serra do Mar. This valley has its commencement north-west of the range of mountains in which we passed through the 13 or 14 tunnels, which I have mentioned on the Dom Pedro Segundo line after leaving Rio. Its sides are formed on the south by that southerly extending barrier the Serra do Mar, and on the north the south side of the range of hills which jointly with the river have been our companions for some sight or nine hours.

The head waters of the noble river are collected in this rugged valley. The river which they form runs north in a winding and rocky course, catching up the dark waters of many a mountain stream, draining thousands of acres of black and impenetrable looking virgin forests on the north side of the Serra do Mar, whose steep and rocky sides do not admit of cultivation of any kind; then it takes a bend to the north, issuing through many ugly-looking gorges and near where we are, Guarerema takes its eastern and southerly windings along which we have been passing since we had breakfast at Barra do Pirahy.

There are not many more stations to pass, soon the lamps are lighted in the carriages and São Paulo is reached about 7 p. m. The station is large, commodious and well lighted up with gas, from the supply furnished by an English company which has a concession for the lighting of the town, for a number of years. But the station is at an out-of-the-way corner of the town, and there are no good hotels near. The passengers who have no luggage rush to the tramway cars, and many of the knowing ones who have join them after giving their despatch note to some known porter. I and my companion are not so sharp, for by the time the parcels are all on the large table, and we notice all ours are in one heap by themselves, the tram-cars have got filled up and are gone. The cabs here can take only small things, so we have to engage a porter whose number we note. Cabby knows Hôtel de France well, and behind a pair of beautiful trotting mules we rush through well lighted streets past brilliantly illuminated shop fronts. The cab has scarcely time to stop when the door is pulled open, our bundles are seized, and before we have time to collect our wits the retiring appropriators of them are disappearing up a large staircase; but on our alighting in the porch a polite waiter informs us we are at the Hôtel de France, that our rooms are ready, and that on our intimating dinner will be served.

Guilherme Lebeis the present proprietor had not seen me for some eight or nine years, but he was prompt to recognise an old customer. He had been "mine host" for some years on pretty frequent occasions in the provincial town of São João do Rio Claro—generally known as Rio Claro,—now an ornamented and flourishing town some 120 miles farther into the interior. The regular dinner hour had passed, and there were very few who had come here of our fellow-passengers; the hotel owner was thus free to entertain us in conversation on "the good old times," on the changes which had taken place, the comings and the goings, and alas we had to mention the names of a good many who had gone to another place. Then railways had now spread themselves over the large elevated plateau which forms the Province of São Paulo. The number of coffee trees on a large plantation could oftener at that time—1873 to 1880—be re-

presented by five figures. Now nearly all fazendeiros count their hundreds of thousands and some exceed the million. Calculate ye old hands three hundred trees to the acre, calculate the high price of coffee and most of it cultivated by slave labour assisted before 1887 by only very few European colonists' families, and you will not be surprised that many who were formerly reckoned poor are looked on now as millionaires, and many who were then the most obstinate of slaveholders had latterly been amongst the foremost of emancipators who has given unconditional liberty to their people before the law of 1888 compelled them to do so. One can scarcely believe the rapid strides the Province has made in such a short number of years. Hear it oh ye stubborn use-and-wont permanent Secretaries of the British Colonial Office, and wait-a-bit Dictators of British Crown Colonies: the moving cause is Railways.

It did not require the wine to inspire our "after dinner" chat, but by-and-by, I am nudged by my companion, who reminds me that this is his first visit to São Paulo, and he wants to see some of the town. Unfortunately it was past 8 o'clock and all shops were shut, the streets were lighted only by the gas lamps, and as we had to leave by train in the morning early, we soon returned to the hotel. We could not spare a day for sight seeing and visiting old friends, as the other members of the Commission on which we were engaged had preceded us into the interior some days before, and were waiting us there.

The rest of our journey must remain to be described in my next. A. SCOTT-BLACKLAW.

THE ORANGE GROVES OF FLORIDA.

There are many beautiful things amongst the wild plants and shrubs, some of which are occasionally seen under cultivation, and are known to English gardens also. These include Lantana crocea, Ipomea Quamoclit, two or three species of Opuntia; three kinds of Fan-leaved Palms, one of which resembles Chamærops Fortunei very closely, and is very abundant; the others grow to heights of 20 feet and upwards, and are very pretty when seen growing in large clumps. Callicarpa purpurea forms a fine object, laden with its purple berries, when seen in quantity. Magnolias form large trees, but none was in flower at the time of my visit. Yucca filamentosa is occasionally found. Oranges grow wild in some parts, but they are sour and worthless. Quercus coccinea (the Scarlet Oak) is very fine in December, when its leaves put on their bright tints; and two or three other species, which are evergreens, make very fine trees in some parts of the country, but where the sand is of very poor quality they are generally found only as low bushes, while underneath them the sand, if too poor to grow grass, is covered with a finely cut leaved species of Lichen, similar to what we sometimes find on Apple trees in England. Opuntias also grow in these places, and their roots extend 10 and 12 feet horizontally a little below the surface, while the whole plant may not be more than 6 inches high. In the more moist parts some of the grasses are very pretty, but they were all dried up when I saw them, and in this state they are often mischievously set on fire, causing wholesale conflagration. A few acres of a Pine forest when on fire forms at night a weird and strange sight, but it is not often the trees take fire from the burning grasses, unless they have been previously injured or are decayed; but the grass and herbs are cleared off for a time only, to spring up again after the first shower. These forest fires do a great deal of harm by consuming all the decaying vegetable matter that would otherwise go to enrich the sandy land.

Many of the wild flowers of Florida are pretty, and belong chiefly to Compositæ. Very few plants wild in Britain are found, but Pinguicula vulgaris is abundant and beautiful. Two Ferns similar to Pteris aquilina and Osmunda regalis, a Drosera, which I believe to be D. rotundifolia, a Rumex resembling R. acetosa, a Polygonum, perhaps P. persicaria, and Sphagnum Moss, were all that I observed. Poa annua was nowhere to be seen, and Florida has none of our worst garden weeds, although I do not consider their own any improvement.

In the best vegetable grounds Cane-grass is very abundant, growing in the manner of our Couchgrass, but it is far stronger, the underground stems being as thick as lead-pencils, and the stems 18 inches in height. The creeping roots of this grass soon fill a piece of ground, if left alone for a time, when it is peaty and moist. Another species of grass has stems which ramify on the top of the sand, and grow at a great pace until they reach a length of 30 feet, rooting, and sending out sideshoots as they advanced, and in moist places this soon covers the sand completely, if left undisturbed. A kind of grass, or Sedge, called the Sand-spur, which seeds very freely, is also very troublesome. It derives its name from the fruits, which are covered with sharp spines, and have an uncomfortable trick of getting into one's boots, and other like places, and never let go their hold without much persuasion.

The timber is chiefly composed of Pinus cubensis, a coarse-grained hard wood, containing a good deal of turpentine. Another species of Pinus, but which is very local, is P. inops var. clausa, whose cones remain on the trees a great number of years, and give them a very peculiar appearance. Taxodium distichum is abundant in some parts, and is always found growing in the water, or close to it, sometimes it may be found where the water is 3 or 4 feet deep, but in such positions it is generally in a state of decay. The curious excrescences, or outgrowths, from the root, called "knees" in England, are abundant, and are dangerous to small craft. This tree gives the largest timber of any that I saw, and some specimens measured from 10 to 12 feet in circumference, while the species of Pinus are not found of more than 5 feet in circumference. I measured a dead tree of P. cubensis which was 102 feet high, and 4 feet 8 inches in circumference at 4 feet from the ground. P. inops does not grow so tall or so large as this. Evergreen Oak is occasionally lieen of large size, but the wood is so hard they cannot work it up. It is called Live Oak, to distinguish it from Quercus coccinea, a tree which is also occasionally seen of a good size. Other kinds of timber, Hickory, Ash, and Cherry, are found in some parts of Florida, and the Red Cedar, which is so much used for making pencils; but I found on inquiry that this is scarce in large size, although often used as posts for fencing.

The chief drawback to the trade of the country is the bad state of the roads, which are so loose that it is impossible to walk any long distance, and riding or driving becomes a necessity; and there are no means of improving this state of things, for not a stone of any kind is to be seen, and in the larger towns the footpaths are made of cement, and in some instances of shells, which are spread on the sand, the streets being sprinkled with a water-hose, which causes some little improvement.

Among wild animals, deer, rabbits, tortoises—called by the negroes "gofers"—wild cats, opossums, skunks, &c., are more or less abundant; and away in the swamps bears and panthers are occasionally met with; snakes are abundant, and for the most part harmless. Doves, turtle-doves, quails, butcher-birds, mocking-birds, hawks of several kinds, buzzards, water-turkeys, herons, woodpeckers, storks, &c., and some rarer kinds, are found in the uninhabited portions.

Anyone intending to settle in Florida as an Orange-grower, &c., should be previously well instructed in the first principles of horticulture, as the most of the persons engaged in Orange growing out there have vague ideas as to what is required, and it is difficult to get from them any definite information. On the whole, I found the country very enjoyable and healthy; but intending settlers should be very careful to get on the highest land, towards the centre of the State. A good amount of capital is required, in order to get good returns, as it costs quite 50 per cent. more for

food than it does in England, and many other things are dearer than here. The work is mostly performed by negroes, who are paid at the rate of 5*s.* 2½*d.* per day, and they are not, as a rule, very industrious folk. There is a fair amount of English society in some parts, and a good many Americans from the North, who in many instances live in the Northern States during the summer.—W. H. DIVERS, Ketton Hall, Stanford.—*Gardeners' Chronicle.*

THE USE OF INSECTICIDES.

The following details are taken from current American publications:—Professor Lake's experiments upon spraying Apples and Pears with London Purple for the Codlin moth, give some interesting results. Four sprayings were given, the last one being August 12. The treatment had a decided benefit until "the latter part of August, but from that time to the date of picking (October 1), the affected fruit increased so rapidly, that the final results on some trees of both sprayed and unsprayed were about the same. We had considered it unsafe to spray later than August 12, but the results would indicate that had we omitted the first spraying, and given another in the latter part of August, effective work would have been done." The first spraying immediately after the falling of the blossoms, seemed to accomplish little or no good, as observations made for two weeks after the first spraying failed to give any indications of the moth's work in the fruit of either sprayed or unsprayed trees." The Codlin moth must behave differently in Oregon than in the eastern states. The summary of the season's work is as follows:—"1. Early spraying—just after the blossoms fall—is useless. 2. A mixture of 6 oz. of London Purple to 100 gal. of water is better than a stronger one. 3. The mixture should be kept thoroughly stirred while being used. 4. Young and vigorous foliage is more susceptible to injury by burning from the application of arsenitiee than is older or less vigorous foliage. 5. Spraying as late as September 1, or even later on winter Apples, is desirable as far as fighting the moth is concerned. (There may be some danger in such late spraying, however, and this is one phase of the subject for next year's work.) 6. All fallen Apples that are affected should be destroyed daily. 7. The cost per tree for each spraying will average, in small orchards, about 3 cents. In larger orchards it would be less." *Bulletin No.* 3, *Oregon Experiment Station.*

Woolly Aphis.—Woolly aphis upon Apple trees was destroyed by a spray of lye-water—1 lb. of concentrated lye to 3 gal. of water. Kerosine emulsion was not found to be a satisfactory remedy.—*Bulletin, Oregon Experiment Station.*

Fighting Codlin Moth in Iowa.—Mr. Gillette controlled a small and isolated plantation of Duchess Apples, upon which careful experiments were made with London Purple and water, Paris Green and plaster, and carbolished plaster. In every case treated trees gave better fruit than untreated trees. The poorest results were obtained from the use of carbolised plaster, there having been a saving of 34 per cent. of fruit liable to injury. "This remedy could hardly be recommended, even if very good results were obtained, as it does not kill the insect in any of its stagee, but simply repels the moths, which seek the fruit of neighbouring trees, on which to deposit their eggs." Next best results were obtained from the London Purple, which saved about 80 per cent. of the fruit. One pound of poison was used with 128 gallons of water; some of the trees were sprayed once, and some twice. Best results followed the application of Paris Green and plaster. This saved 94 per cent. of the fruits liable to attack. "I believe that no one has ever reported on a remedy for the Codlin moth, which, by careful counts, has shown as good results as this." One pound of Paris Green was used with 100 lb. of plaster. This was thoroughly dusted over the trees, from one to three times. Mr. Gillette thinks that two applications are ample. "Poisons cannot be applied by this method as rapidly or easily as by means of a force-pump, but it has the advantage of costing nothing for apparatus, and the trees can be dusted quite rapidly from a waggon, by driving on the windward side of the row. This method of applying the poisons would be especially useful where only a few trees were to be treated, and where it is thought that a pump cannot be afforded." These results with the dry poison are certainly remarkable, and they indicate that a distributing-machine like the lately perfected Strawsonizer, of England, may yet find use and favour in our orchards. At all events, these experiments afford a new proof of the efficacy of arsenites in the combatting of the Codlin moth. *Bulletin No. 7, Iowa Experiment Station.—Gardeners' Chronicle.*

STRAWBERRY LEAVES AS TEA.—A new industry has sprung up in Germany with the young leaves of the wild strawberry plant. Having been carefully dried, they are used instead of Chinese tea, and are said to approach that beverage very closely in taste. An addition of young bramble and woodruff leaves is said to add to the excellent flavor of this most inexpensive of teas.—*Manchester (Eng.) Grocers' Review* in *American Grocer.*

PISCICULTURE.—Some time ago Mr. Le Mesurier of the Ceylon Civil Service, was deputed by hie Government to proceed to Madras and secure the fry of the *Laboe*, a species of fresh water carp, and of the *Gourami* native of the Malaccan Islands, and introduced into Madras by Sir William Denieon while Governor of the Presidency. The fry was wanted to stock the fresh waters of the colony with. This mission Mr. Le Mesurier successfully accomplished with the aid of Dr. Thurston, taking back with him a number of fry not only of *Labeo* and *Gourami*, but of other fieh much esteemed as food. The introduction has evidently been successful, for we find that Dr. Thurston has been requested by the Ceylon Government, through the local authorities, to procure and forward the fry of the *Cirrhina Chiirrhosa*, or "white carp."—*Pioneer*, June 9th.

THE writer of an article in the *New York Forum* entitled "When the Farmer will be prosperous," looks forward to an early date when the United States will have to import large quantities of which to feed ite ever growing population. The acreage per head of population necessary to produce cereals and other agricultural produce required for home consumption is calculated at 3·15 acres. In the ten year's preceding 1884 the cultivated area had been extended at an average rate of something over eight million acres a year, the result being that at the close of that period there was a eurplus of 20,248,000 acres under cultivation beyond the aggregate required according to the above calculations. But during the succeeding four years the rate of extension fell to a little under three million acres a year, so that the surplus area was reduced to 12,888,000 acres between 1888 and 1894, the writer ie of opinion, the rate of extension will undergo a still further diminution, but taking it at three million acres per annum, and the ratio of increaee of population at 27 per cent per annum, there will at the end of the period remain only three acres of cultivated land per head of population, instead of the required 3·15 acree. To keep up this cultivated area to the requirement of the growing population would neceseitate an annual addition of six million acres of arable land, and the writer does not believe that it can be found, though of course higher prices would bring inferior soils under the plough. This is, indeed, good news for both the British farmer and the Indian ryot.—*Indian Agriculturist.*

GOLD MINING IN SOUTH AFRICA.

A correspondent writing from Barberton says:—

"These fields ('Dekaap'—or Barberton) though older are of very much less importance than those at the 'Rand' (or Witwaters Rand) which have sprung so wonderfully into prosperity—and now lately are under such a deep wave of adversity. This gold mining is a wonderful sort of business, scarcely business at all: it is a mass of speculation and manœvring on a thin basis of actual mining. I often wish I was in some other line. I was not sharp enough to make a lot when the first rush occurred, and money could have been made; and since then, the reaction has been continuous and severe. Everything is very dull, and no one can predict when the next wave of prosperity will be. Capital seems to fly about the world like a swarm of insects, alighting now on one industry or locality and now on another, alternately helping and blighting. At present South African mines are out of favor with capitalists, but I suppose their turn will come again, when they increase the output of gold. That is the great thing, and it takes years of work and experience like building up any great business."

NOTES ON PRODUCE AND FINANCE.

WHAT IS A BLENDED TEA?—The action of the Ceylon Association in prosecuting tea dealers for selling tea not correctly described has caused a flutter in the retail trade. One correspondent asks:—"May I ask what is a Ceylon blend?—or, as we are now learning what some so-called Ceylon blends are, I will vary the question, and ask—What should a Ceylon blend be? Should it be a blend of various Ceylon teas, or a blend of which Ceylon tea forms a prominent or principal part? Men are going round and trying to frighten grocers by saying that if they sell as a Ceylon blend an article containing any other tea than Ceylon they can be prosecuted. Now, the decisions in the cases of Paget and Piggott and in Kearley and Tonge were given upon issues differing from that now raised. For years grocers have safely sold as an Indian blend teas that were Indian only in part. If the word blend protected the mixture of Indian and China tea why should it not protect the mixture of Ceylon and Indian? Although the scare which is being created is ostensibly in the interests of Ceylon planters, it may be questioned if it will ultimately prove to be so. Another point raised in Kearley and Tonge was that this firm did not import their own teas though their label said they did. But surely it is not an indictable offence to style oneself an importer. Is every aspiring baker, or notable porkbutcher, or enterprising milkman, or worshipful greengrocer, who on the strength of having purchased a dozen pounds of tea from a neighbouring grocer calls himself 'an importer of tea' to be hauled before a magistrate for this heinous offence? This is mighty fine for the lawyers, but I hope you, sir, will protest against this dangerous and revolutionary doctrine. Should not these assertions be taken in a Pickwickian sense? It is something new for tradesmen to be called on to prove their assertions or be mulcted £10, and costs £5 5s." Another correspondent writes to the *Grocer*:—"In consequence of the prosecution of two firms of wholesale tea dealers at the instance of the Ceylon Tea Growers' Association (Limited), under the Merchandise Marks Act, for misleading descriptions of Ceylon packeted teas, there is a deal of misunderstanding among grocers as to what they should and should not sell. I am selling a packeted tea bearing the following description:—'Ceylon Blend.' The firm from whom I buy the tea guarantee it to contain 70 per cent. of pure Ceylon. Taking it for granted that such is the case, can I be convicted of false description under the aforementioned Act?"

ENEMIES OF TEA AND COFFEE.—Dr. Mendel, of Berlin, a well-known physiologist, has made an attack on coffee and tea, especially the former. So far from believing that two pence off the pound of tea or coffee will reduce the "drink bill," he contends that, by permitting the poorer classes to buy more of these stimulants, the cheapness will conduce to the spread of what he has described as "coffee inebriety," a form of intoxication which very frequently leads to the more alarming, but not actually more dangerous, form produced by alcohol. Dr. Mendel does not say much about tea but he infers a great deal. Eminent physiologists must attack somebody or something, otherwise their occupation would be gone. Tea and coffee, like other good things, require to be taken in moderation. The increase in the consumption of tea vexes the souls of believers in the good old days of John Barleycorn in this country. A correspondent of the *St. James's Gazette*, who might—by reason of his sentiments—be a brewer or distiller, writes as follows:—"Any one who watched the recent procession, especially the teetotal varieties, must have been pained to notice the stunted forms and poor physique of the greater part of the crowd composing them. Stalwart men were conspicuous by their absence, and the greater number would fail to fulfil even the present very easy conditions of military service. A hostile foreigner would have rejoiced at witnessing what, if not checked, may prove the ruin of England. Though much has been done for them by increasing wages and lessening hours of labour and paying more attention to sanitation, still the habits and mode of living of our town population fully account for their degeneracy. They marry while in their teens and rear their squalid children on tea. The women especially drench themselves with tea to the ruin of their nerves and digestion. Though no one is more willing than I am to admit the evils of intemperance, I firmly believe that tea has done more harm to the working classes than beer, and nearly as much harm as spirits." The inference that our national decadence has set in and that we are becoming a nation of dwarfs because we drink too much tea, is droll.—*H. and C. Mail.*

THE PRECIOUS METALS.

The idea propounded by a correspondent, that the supply of silver in the world and its annual production are limited rather than excessive, is novel and startling. Most of us have been under the impression that nations on the Continent of Europe were embarrassed to know how, without enormous loss, they could dispose of the accumulated silver which they had demonetized; while recent legislation in the United States was undoubtedly promoted in the interests of the "Silver Kings" of Nevada, who found their product depreciated by the demonetizing policy in Europe and over-production in America and Australia. It would require more and better authenticated facts than have been yet adduced to lead us to abandon this conviction, and the additional one that when the present boom caused by the proceedings at Washington has abated, the value of silver and that amount of "exchange" which depends on it will revert to the standard which recently prevailed. While the production of silver has largely increased in the past forty years, that of gold does not seem to have much exceeded an average of about twenty to twenty-five millions per annum. This limited production of an article which in Britain has been long the sole standard of value, and which has now been adopted as such by many of the leading Continental nations, has naturally led to an appreciation of gold over silver, far beyond the proportions which once prevailed, and which bimetallists fondly hope they can restore, of 1 to 15 or thereabouts. Mulhall, in his "Progress of the World," published in 1880, brought together what we suppose are fairly accurate figures regarding the world's accummulated wealth and the annual supply of the precious metals, at which it may be interesting

to glance. Under the heading "Gold and Silver," it is stated :—

"These two metals, which have materially aided the cause of progress, have suffered such mutations of fortune in the nineteenth century, that it may be worth while to study their antecedents. Michael Chevalier is of opinion that at the period of the discovery of America the total amount of gold in Europe was only £12,000,000, and of silver £28,000,000. At that time on ounce of gold was worth ten of silver, but as soon as the conquest of Mexico and Peru by the Spaniards poured a flood of silver into Europe this metal lost one-third of its value. In the seventeenth and eighteenth centuries gold stood for fifteen times the value of silver. A new epoch occurred with the discovery of gold in California and Australia, but silver never recovered its position as a precious metal."

We can remember the fears entertained of the depreciation of gold when California and Australia began, each of them, to add nine or ten millions annually to the supply of gold in the world. But such was the simultaneous expansion of commerce that no such result followed, and gold has retained a quality of permanency most valuable in an article adopted as a standard or representative of value, which really rests in the goods which nations or communities barter. Mulhall gives a table, the figures of which show that since the era of Columbus, 1492, the world's wealth in gold has risen in value from £20,000,000 to no less than £1,120,000,000 in 1880. The progress of silver in the same period of nearly four centuries has been from £40,000,000 to £1,612,000,000. The aggregate increase has been from £60,000,000 to the enormous value of £1,832,000,000. We quote again :—

"During 300 years of the Spanish dominion in America the mines of Mexico, Peru, and Brazil yielded a little over £1,200,000,000, of which three-fourths were silver. Since Marshall's discovery of gold in California (1848) there has been an increase of £950,000,000 in precious metals, as follows:—

	Gold.	Silver.	Total.
	£	£	£
United States	282,000,000	74,000,000	356,000,000
Australia	252,000,000	...	252,000,000
Spanish America	20,000,000	160,000,000	130,000,000
Russia ...	93,000,000	3,000,000	96,000,000
Other countries	11,000,000	55,000,000	66,000,000
	658,000,000	292,000,000	950,000,000"

Mulhall calculates that the production of the two metals had, in the case of gold, gone down from £27,000,000 per annum in 1852-1861 to £16,000,000 in 1872-78 ; while the production of silver had risen from £8,000,000 per annum in the former period to £12,000,000 in the latter. Since 1848 the calculation was, that notwithstanding gold had doubled in quantity and silver increased only one-fourth, the purchasing power of gold was only 20 per cent reduced against 33 per cent depreciation in silver. Increased production of silver and the demonetization of the metal both contributed to lower the value of the secondary precious metal. To meet the wants of increasing trade, coinage had in the thirty years trebled, the figures in 1878 having been, for

Gold coins £959,500,000
Silver ,, £620,000,000
Total...£1,579,500,000

To meet the demand for coinage, stocks of the precious metals in excess of the yield of mines had been drawn upon. But a process of melting down coins goes on continually ; and it was known that between 1840 and 1880 India had absorbed £105,000,000 of gold and £238,000,000 of silver. Were the precious metals hoarded in India ceased, the value of gold would be somewhat, and that of silver considerably affected. Mulhall calculates that about one-sixth of the bullion of the world is locked up in banks, mainly as representing paper in circulation, of course. All the nations of Europe import bullion except Russia, which possesses gold mines, the produce of which does not seem to be very accurately reported. And in dealing with imports and exports of bullion and the balances in different countries, we must never forget the large sums of money carried by passengers to and from all parts of the world. If the silver is, as our correspondent tried to make out, not over-abundant but the reverse, conditions must have greatly changed since Bismarck stopped the sale of the German demonetized metal because such sales were being made at a loss of 15 per cent. American legislation, demanded by the farmers, who believe that plenty of currency means good prices, as well as by the owners of silver mines, has, for the time, given silver a boom ; but bimetallists and others must not "lay the flattering unction to their souls" that this is likely to last or that silver is likely to recover its former relation to gold.—The extract from the *Encyclopædia Britannica* appended to the letter we are noticing affords further information on this complicated question. While the value of silver fluctuates so greatly and is so uncertain, no wonder if the great and wealthy countries of the world refuse to use it as, alternatively with gold, a second standard of value.

CEYLON UPCOUNTRY PLANTING REPORT.

THE PLANTER AND HIS COLOMBO AGENT—RISE IN EXCHANGE—PRICE OF TEA LEAF—MR. LIPTON AND HIS TEA TRADE—WHAT WE MAY HEAR NEXT—A CASE OF ALCOHOLIC FAMINE—WHAT THE WRITER FEELS RESPECTING IT—COFFEE CROPS—WEATHER.

July 31st.

The planter has long regarded the Colombo agent as his natural enemy. He could drill into his profits with as little consideration as a hard-headed borer makes its way into a cacao pod ; and when the planter showed any tendency to exuberance of flush, the Colombo agent was able to keep it well in hand, and put the best sucking bug to shame by his powers of absorption. For keenness in looking after number one he was held to be unique : his like not easily to be found in creation. When a story of mean smartness was told upcountry, if it were fathered on the Colombo agent it took at once and became a portion of the orthodox canon which was regularly recited when planters were wont to gather together. Of late, however, the Colombo agent's notoriety has been somewhat on the wane, and—it is with grief I have to record it—his place is being taken by the planter who buys leaf. Before the rise in exchange, leaf was fetching from nine to ten cents a pound ; but when the Americans meddled with our silver and we had to face the dearer rupee, the planter who buys leaf fixed his own price. In doing so, he very often not only covered the difference of exchange but so much for his panic as well ; and it became pretty evident to the seller that whoever was to be cornered, it was not likely to be the man who was buying the leaf. "Talk about the rapacity of Colombo agents," said one to me who was told that 8 cents was all that he was to get in place of the decent 9½ cents—"talk of rapacity : why, when you begin to sell leaf to your neighbour, and prices fall or exchange rises, nothing can beat him for extortion." I suppose that there have been more disagreeables among planters over the purchase of tea leaf than over everything else put together. The

only way which I know to get out of the difficulty is the Central Factory, which is the property of the contributing estates, and which runs and divides its profits, as a separate concern.

The following about Mr. Lipton is from a home correspondent :—"I intended sending you a cutting out of an evening paper about Mr. Lipton's great purchases in Ceylon, but you seem to know all about him already. He is a wonderful man, and I don't think you would know the tea he sells to be *pure* Ceylon tea. It may be pure when it leaves the island, but not when it reaches the tea-pot. Mr. Lipton has quite a regiment parading the Glasgow streets just now advertising his goods. About twenty or thirty men rigged out in white suits, red turbans, red and yellow umbrellas, and a commander on horseback with his face coloured to match his turban. There must bs a good profit off the tea after all." The next thing we shall hear of will likely be that an arrangement has been made with Mr. Lipton's men in Csylon, that when at any time they go home on leave, part of that leave will require to be spent in pushing the tea trade in the ranks of the above-mentioned corps. Only the V. A's should be mounted, and this privilege should be granted on the understanding that while on duty all orders should be given, with the view to impress the public, in a stentorian voice, and in the Tamil tongue; uniforms to be supplied at Mr. Lipton's expense, and like the historical toothbrush to "belong to the ship"!

A friend of mine has a pathetic tale to tell me of a popular resthouse run out of drink. It seems that this poor thirsty soul arrived after a journey of something like twelve miles in a pony-bandy with bad springs. He had been smoking all the way to keep himself cheerful. The boy as usual was nowhere, and a thirsty throat was made drier, in shouting around for him. When he did appear, a whiskey-and-soda was ordered: but there was none. The visitor then said he would have beer, but the reply was "Beer all done, sir." "Then what have you?" "Got nothing, sir! plenty of gentlemen here yesterday, everything drink!" My friend, I suppose, must have looksd desperate, when this awful truth was made known, for the boy immediately assured him that they had plenty of *empty* bottles! He has been puzzled ever since to know what there was in his appearance to justify that boy in fancying that a smell alone would do him good. It is rather funny the idea of his expecting sympathy from me when an alcoholic famine is on, as my settled opinion is, that it would do a lot of good if this kind of scarcity were more general.

I was at one time visiting the menagsrie of an Indian Rajah, which was a poor, poor affair. The place was badly kept, the animals few and dirty, and the attendants were numerous. As I was leaving in disgust the guide pressed me to wait and to see the tiger. Reaching his haunt, the fellow stopped and pointing to a big empty cags, said, "This is the tiger's cage, but *the tiger is dead*"! I fsar my friend looked with as much disdain on the empty bottles as I did on the vacant cage, and to this extent only can I enter into his feelings.

Coffee is ripening up a little, the fruits of the first blossom. The sample of bean however is somewhat small, but if there will just be plenty of it, that need be no cause for complaint. Liberian dried in the cherry sells locally very much better than when pulped. The Moor buyers readily give R5 a bushel, and as it takes about three to make a bushel of parchment selling it as cherry coffee is very much more profitable.

The weather is simply perfect for planting purposes.

PEPPERCORN.

GOLD IN AUSTRALIA AND INDIA.

The following extracts from recsnt letters on the Victorian gold fields by a special correspondent of *Engineer* may be of special interest at the present time :—

That some of the Sandhurst people have learned to mine and crush quartz economically is beyond dispute; in fact, in a few cases, the mine records are astonishing, and point a most useful lesson to miners and millmen all over the world. The *St. Mongo* Mine at Eaglehawk being notably one of this class, some particulars concerning its work for the past half-year supply the lesson. The quartz in this mine is not in a defined lode, the western wall is tbe only one marked; tbe eastern wall is entirely broken up; from 600 ft. to 803 ft. the deposit is almost vertical, then it underlies west. The quartz is nearly pure white intersected by bands of slate, and both show pyrites but little or no gold, the width of the deposit varies from 3 ft. to 35 ft.; a general fair average would be about 14 ft., and of this only about 6 ft. is put tbrough the battery, the remainder being barren bands of rock. For 5½ years this mine has worked on quartz, giving a yield of under 5 dwt. of gold to the ton; on this return some £28,000 has been paid in dividends; the machinery has been kept in thorough repair, and the mine properly worked and developed.

Another of the typical mines on Sandhurst is "Landsell's 180;" the depth of the sbaft was on July 31st, 2,590 ft. This is the deepest mine in the Southern Hemisphere, and if I mistake not the deepest gold mine in the world.* When the property came into the hands of Mr. George Landsell, the present owner, the shaft was at a depth of 460 feet, and no machinery on the ground; all the winding was done by a horse "whim." During Mr. Landsell's tenure of the property, he has taken out over 160,000 tons of quartz which have yielded 88,346 oz. of gold the value being about £353,384, and he is still working the mine vigorously. The correspondent of *Engineering* concludes his artiole as follows :—"Where miues have to bear the burden of snpporting boards of ornamental directors each drawing £100 or 200 per annum, together with highly paid secretaries, managers, consulting engineers, staffs of clerks, and costly offices, &c., other and richer fields tban those of Great Britain or even the majority of the present fields of Australia, must be sought before subscribing sbareholders can expect a return in the shape of dividends." These extracts contain both encouragement and warningto our local gold Syndicates. It is evident that if quartz containing only 5 dwt. of gold to the ton can be raised 2,000 ft. and crushed probably in Australia with expsnsive labour, to contend with quartz at least equally rich should yield a handsome return here, with care and economical supervision. The Mysore mines, which are only 200 or 300 feet deep are said to require 20 dwt. to the ton to cover cost and we believe the special correspondent of *Engineering* has pointed out the cause of this, in the concluding paragraph which we have quoted.—*Indian Agriculturist*, July 19th.

COCHINEAL.

The Belgian Consul-General in the Canary Islands devotes a very considerable portion of his report to cochineal, describing in detail its production, the different commercial classes of the product, and its analysis, also enumerating the various substitutes which are now in use in place of cochineal, as well as a tabular statement of the exports, price per pound, and total value for each year from 1831 to 1888. In 1831 only eight pounds were exported, for a value of 80 francs; the maximum export was reached in 1869, when it amounted to 6,076,869 lb. for 19,749,824 francs, fluctuating then for several years between four and five million pounds, declining in 1886 to 2,330,947 lb., in 1887 to 2 169,341 lb., and in 1888 to 1,735 200 lb.—(*Recueil Consulaire*, vol. lxix., part 4, 1890.)—*Chamber*

* The deepest mine of any kind in the world, we suppose, unless the record is beaten by a salt mine in Germany?—ED. *T. A.*

of Commerce Journal, July 5. [The dye is yielded by a coccus allied to our coffee bug, but which feeds on a species of cactus. The aniline dyes have adversely affected the trade in this substance as well as that in Indian and other madder.—ED. *T. A.*]

CATTLE AND CATTLE MURRAIN IN CEYLON.

Our correspondent "Truth" is very much mistaken if he supposes that we do not appreciate, as much as he does the value of cattle for industrial and food purposes. The difference between us resolves itself into a question of the effectiveness of measures of quarantine in stamping out disease. Such measures and the destruction of affected herds have proved efficacious in countries like Britain, where the humane principles of Christian civilization are applied to the treatment of animals and where cattle are warmly lodged and amply fed. In such countries cattle disease is not indigenous, as it is in the Russian steppes, in most parts of India, and most certainly in Ceylon, although our correspondent writes as if, like cholera, cattle murrain was always introduced from India. We can prevent cholera from assuming an epidemic form in Ceylon by segregation and other measures, more or less heroic, because the dreadful disease is not of local origin and we are able generally, at once, and effectually to deal with the first cases introduced from India. But as regards rinderpest and other forms of cattle disease we are comparatively helpless, because disease, in the germinal form at least, is ever present and ever will be until the natives learn to feed and fold their cattle according to the dictates of humanity and the principles of enlightened science. In recent letters from Nuwara Eliya the writers have contended that the measures of quarantine and restriction as to feeding grounds eventuated in a greater destruction of cattle than was due to the epizootic disease against which the precautions were taken. The difference between Britain and Ceylon is accentuated by the fact that in the one country cattle are bred and "byred" and fed with reference to consumption as beef. Here their chief value by far is with reference to their employment in agricultural operations and, notwithstanding the advance of railways, for draught purposes on roads to a very large extent. Some years ago we had to point out to this very correspondent that the stringent measures he advocated for the repression of an epizootic, if carried actually into effect, would put a stop to the principal traffic and commerce of the island. The difficulties still remain, as the Nuwara Eliya case shows, and we confess that our own hopes of improvement rest on the gradual disappearance of disease, as the natives are taught by Government measures and individual efforts and as they profit by such teaching, to add adequate shelter to plenty of nutritious food in the treatment of their cattle. Our readers are aware that we have frequently advocated the utilization of some of the tanks which have been constructed and reconstructed of recent years, in the irrigation of grass meadows for the provision of cattle food as well as for the growth of rice to feed the owners of cattle. Then much could be done by clearing rice grounds left fallow and also village reserves of all low jungle and weeds so as to encourage the growth of the more nutritious of our native grasses some of which are excellent. In addition to these, why should not the cultivation of the valuable water grass, so common in Colombo be extended to the swampy lands of rural districts? Government, through its Agents, could do much to help on reform by offering prizes for such culture; for the best and cleanest kept village feeding grounds; for the best constructed and most carefully attended cattle sheds, as well as for the best bred and best fed, largest and strongest cattle. At present so-called wooden ploughs which merely scrape the surface soil in the shape of mud are used to the exclusion of real ploughs calculated to stir effectually six inches of earth, however light such ploughs may be, because of the chronic weakness of the badly-fed and ill-tended draught cattle. In a private letter our correspondent denounces Sir Arthur Gordon who did so much for irrigation, because he did nothing calculated to improve the breed of cattle. We suppose our late Governor would adduce the supply of pure water in so many places as a great step in advance for the improvement of the health of cattle; and there can be no doubt that the more rice is grown by irrigation, the greater is the supply of food for cattle in the shape of straw, husks and occasionally grain. But we quite feel that in addition to due attention to irrigation as well as other modes of culture, our new ruler would do wisely and well in taking up with energy the cognate and no less important problem of improving the breed and condition and saving from periodical destruction by disease the cattle on which so much of the agriculture and internal traffic of Ceylon is dependent. We feel sure that it will be the inclination as well as the duty of Sir Arthur Havelock to initiate and further all the direct efforts possible to secure such desirable objects. It is for this reason among others, that we have urged the widening of Irrigation into Agricultural Boards, but if a permanent change of that kind is not contemplated at present there ought to be a special effort made in reference to cattle disease.

Meantime let it be specially noted that not only every tank constructed, but every mile of railway, carriage road, bridle and village path by which the country is opened up and intercourse and commerce facilitated, tends not only to improve the condition of the people of Ceylon, but to render possible such measures as will lead to the improvement in breed and condition and the protection from disease of the cattle, which are not merely a source of wealth in themselves, but on the presence of which in sufficient numbers and in good working condition the prosperity of the country's agriculture and commerce so largely depends. One of the ablest of Sir Arthur Havelock's predecessors, Sir Hercules Robinson, who did so much for systematic irrigation, recognized so fully the importance of this cattle question, so closely allied to the other, that he appointed a Commission to report on the subject. That Report, which embodied matter of considerable interest, might well be reprinted as an extra Sessional Paper now, and made the basis for the conduct of investigation, report and recommendations by a fresh Commission, of which Mr. Wm. Smith ought to be a member as he was of the previous one. With him might well be associated Mr. Green of the Department of Public Instruction, Mr. Drieberg of the Agricultural College, and Messrs. Ramanáthan and Seneviratne as representing the two great sections of the native community. If a Commission of seven should not be deemed too unwieldy, another civilian who has taken special interest in the subject might be added, as well as a well qualified member of the general community. On this occasion the Commission need not be peripatetic. It can collect much and valuable information, suggestive of wide improvement, while sitting at Colombo.

After having written the foregoing we read for the first time the English version of Mr. W. A. de

Silva's pamphlet on the treatment of eattle, with the manuscript remarks of our correspondent "Truth." Considering that Mr. de Silva, writing for natives, was bound to deal with the very elements of the subject, we think his performance creditable and calculated to be of considerable use. We find that he antieipated our suggestions respecting the cultivation of water grass and the clearing of village feeding grounds. Amidst much stringent comment our correspondent approves of a good deal of Mr. de Silva's observations and recommendations on the treatment of cattle in health. But, as we anticipated, when epizootic disease comes, "Truth" would not palter with it by treatment: he would stamp out disease with the life of the animals affected. The extent to which this would have to be done and the enormous amount of the remuneration necessary would be the difficulties.

When cattle murrain breaks out in Ceylon (generally in years of abnormal weather), it does not appear in one or a limited number of localities, where a few affected herds could be sacrifieed and the disease stamped out. Disease occurs in so many centres simultaneously, and becomes at once so widespread, that the stamping out process would require the extermination of the cattle of whole districts, a process which would be too costly for Government to resort to (if the principle of compensation were recognized), even if popular opinion amongst the native cattle-owners did not take the form of serious and active resentment against measures which they are not yet advanced enough to understand. Our correspondent "Truth," evidently holds the opinion that rinderpest is no more indigenous than cholera ; that it always comes to us from India with imported cattle; and that, therefore, it is capable of being cordoned, stamped out and prevented from spreading. A Commission might now do valuable service in collecting evidence and instituting research such as would settle differences of opinion on this question. The Commission of 1869 were unable to say when or whence cattle murrain came to Ceylon, only suggesting that with increased imports of cattle from India in the years following 1840, it may have been "re-introdueed." For the minor diseases, treatment and medicines sueh as Mr. de Silva recommends may be more or less efficacious, although some of the recipes do look empirical. But surely Mr. de Silva has reason on his side when contending that the small, wiry Sinhalese cattle have merits of their own, such as agility and swiftness when used in the native carriages called hackeries, and that with good shelter, pure water, nutritious food and careful and humane treatment generally, they are capable of considerable improvement. These small but symmetrical and lively "zebus" (not zebras, as sometimes printed) have been greatly admired by visitors. One of the chief measures recommended by the Commission of 1869, the provision by Government of bulls of superior breed, failed from the apathetic indifferenee of the natives. This immobility it is which has to be conquered, in regard to all and every proposed improvement, and in an oriental country like this we expect servants of Government not only to hold out indueements such as we have already indicated, but to use a certain amount of benevolent coercion: compelling people who occupy very much the status of children to do what is beneficial to their own interests and the public weal, and to abstain from practices which are injurious to both. The difficulty, as all experienced persons know, is to obtain a native agency which would not pervert powers of compulsion into an instrument of oppression. The Nellore and some other breeds of Indian cattle are beautiful milkers and splendid for draught, and there can be no question of the superiority of British and Australian cattle. But Mr. de Silva is correct in indicating that in proportion to superiority of breed as judged by size, so is the cost of feeding and keeping the animals. At Pallekelle in Dumbara; in the once famous sheds on the Mattakelle patanas in Dimbula; and in other places in Ceylon, we have seen as fine collections of pure imported and half-bred cattle as eye could wish to look upon; but the question for a Commission to ascertain would be,—did such cattle, kept, as they were, at large expenditure of money,—pay, either as manure or milk yielders or as converted into butcher meat? The history of experiments in connection with that unfortunate failure, the Prince Alfred Model Farm, is not in popular estimation encouraging, after all qualifications are made. The difficulty in this country is to get even Europeans to give a good price for a superior article. Demand is, after all, so limited amongst the beef, milk and butter using section of the community that supply can easily be made to outrun it. Such are some of the difficulties to be contended with, in cattle keeping and dairying. In the days when heavy manuring of coffee was in vogue, we heard of a case where the bearing of an estate was brought up from a normal yield of 5 or 6 cwt to 13 cwt per acre! When all the cost of cattle keep, with preparation, carriage and application of manure, was calculated, however, the balance-sheet shewed a considerable loss! When the bad times of the coffee enterprise came, magnificent establishments of cattle were broken up, and the animals, thrown in large numbers on the market, were sold for a song. There can be no doubt of the benefit which tea would derive from liberal applications of cattle manure, but it does not accord with our observation that cattle are often kept on tea estates, save where the existence of adjacent patana and other circumstances are exceptionally favourable. Grain, especially leguminous grains and poonac, with cotton seed, are valuable as cattle food, but price puts a limit to the use of rice, maize, pulses, poonac (especially gingolly poonac), except for animals used for heavy and steadily profitable draught purposes, or by well-to-do persons for dairy produce. Our correspondent will think we are acting the part of "devil's advocate", but it is well that all sides of the question of eattle breeding and cattle keeping should be looked at.

We proceed to notice some of the criticisms of Mr. de Silva's pamphlet by our correspondent, who asserts that native meadow grass is unknown to him. It requires courage for a mere lay editor to differ from an expert, but we venture to assert that if our native grasses got fair play by being kept clear of weeds, and especially if they were irrigated by ordinary water, or better still with liquid manure, they would supply excellent cattle feed. That they could be converted into beautiful coverings for lawns, the writer knows from the fact that in the green turf of the grounds of the Melbourne Exhibition of 1880-81, he recognized one of the grasses most common in Ceylon. We would remind our correspondent, too, that, included in the Report of the Commission of 1869 was a paper on the value of Indigenous Grasses supplied by the late Mr. Thwaites of the Peradeniya Gardens. We are not speaking of the wiry grass common on some of the mountain patanas, which in its natural state is about as "fusionless" stuff as could be found in the shape of grass. But even this, like the still more common mana grass, yields fairly good cattle feed in the shape of the young stalks which spring up after a patana burning. But, as to the merits and demerits of the prairie grasses of Ceylon, so

undonbtedly inferior to the prairie grasses of America and Australia, no one can speak with so much authority, founded on experience, including the application of fertilizing substances, as our correspondent himself. He can tell us whether Thwaites was correct in stating that the wiry patana grass, and other coarse grasses, so poor in nutriment in their growing state and so little relished by cattle, were capable of great improvement when converted into hay and then chopped and pounded? Mr. de Silva advances the proposition that "the cause of local cattle being generally of a poor type is not owing to any imperfection in the variety itself, but because they have degenerated by bad treatment." Our correspondent must surely have written rather rashly when he penned the following criticism: "Not so: they are the product of the soil." Surely the cattle are as much the product of treatment as of the soil? The Report of the Commission of 1869, to which we shall refer in another article, explicitly recognized the degeneracy of the local breed of cattle as due to bad treatment which specially predisposed them to disease. Beyond question the Sinhalese breed of cattle, during ages of starvation, in the two senses of inferior food and insufficient protection from the weather, have degenerated, and are capable of very considerable improvement, with reformed treatment, as draught animals, as flesh suppliers, and even as milk yielders. To come to the opposite conclusion would be the pessimism of despair; for we do not suppose that our correspondent contemplates improving the indigenous cattle off the face of the earth and superseding them by introduced stock? The country is scarcely prepared for measures even less revolutionary. We have always felt that the Sinhalese people were inexplicably indifferent to the value of milk as food, and we have not the slightest doubt that to neglect of this most valuable source of nutriment is due a large portion of the excessive mortality amongst children in Ceylon. But we know that native cattle, when properly fed and treated do become fair milkers, and it requires only a little sum in arithmetic to prove that a Sinhalese cow yielding half-a-dozen bottles of milk per diem and consuming food only in proportion to its bulk and yield may be as good an investment and a far safer one than a big European, an Australian or an Indian animal, the first cost of which is heavy and which is costly to keep. Let us have better breeds introduced by all means, but surely on the improvement of the native cattle, and on measures founded on faith in their capability of improvement, our main hope of successful effort must rest? On some points our correspondent is at one with Mr. de Silva; and while he characterizes cotton seed as one of the best feeding stuffs for cattle, he is still more emphatic in his approval of poonac, the local term for oil cake. Referring evidently to coconut cake, he writes: "Poonac is the only indigenous artificial food we have, and too much cannot be said of its valuable nutritious properties. When fresh and sweet, it is, in my opinion, second to no cake, linseed or cotton seed not excepted." Such being the case, can our correspondent tell us why so large a quantity of gingelly poonac is imported into Ceylon from India and used as food for milk and draught cattle in preference to the coconut cake? The qualification "fresh and sweet" is important as regards coconut poonac, which even in its freshest condition is possessed of an odour that so tells on the milk of cattle fed on it, that such milk is not considered suitable for children. What has our correspondent to say on this point? As a flesh former, no doubt coconut poonac is a valuable cattle food, but is it equally valuable as food for cattle yielding "the lacteal fluid"? On cattle disease our correspondent remarks: "Our two contagious diseases are rinderpest, (murrain) and, second, vesicular epizootic (foot and mouth disease)." The word "our" sounds as if our correspondent agreed with the view that the diseases referred to are practically indigenous to Ceylon, which we shall certainly hold until we have evidence to the contrary. Some years ago we dealt with a mass of reports and recommendations, by the head of the Medical Department, amongst others, which showed that (contrary to the deliverance of the Cattle Commission of 1869,) cattle disease in Ceylon was as prevalent and destructive in the early period of British rule at the beginning of the century as it is now. Then as now it was traced to poor food, foul water and specially exposure to the influences of the inclement monsoon weather. The real remedies are more obvious now than they were at the period referred to. Our correspondent will say: "Yes: quarantine and stamping out." We also say: "Yes, if the latter were possible. But as we fear it is not, and as the disease is, now at least, as native to the soil as the cattle themselves, we must resort and trust mainly to less heroic measures of gradual improvement in breed and treatment of cattle, and largely in improved pasturage." We are very much surprised to see the adverse criticism on what we consider a very sensible passage in Mr. de Silva's pamphlet, which runs thus:—

"The principal causes which lead to the spread of cattle murrain and the destruction of such a large number of cattle in this island may be attributed to the want of proper shelter from the extremes of weather, their degenerate condition, protracted droughts and the want of a proper knowledge of preventative measures.

"The great hardships and the evils attended on cattle for want of shelter was dwelt upon at length in a previous section. When cattle suffer on account of exposure to night air, &c., and hence become weak, they are liable to get the contagion easily. A weak animal is always liable to disease."

Now it is quite true that when rinderpest breaks out amongst animals, as in the case of cholera amongst human beings, the strong and healthy are liable to attack with the weakly and diseased; but certainly not in the same proportion, and to deny that a degenerate state, arising from bad treatment, as well as unfavourable meteorological conditions, predisposes to disease, is to go counter to experience and commonsense. As a comment on Mr. de Silva's recommendations that diseased animals should be segregated and treated, our correspondent interjects the exclamations, "Kill them at once! and bury them!" That, of course, would be effectual, (if the carcases were not, as they have been, dug up and used as food!) were there only one, or even half-a-dozen centres of contagious disease; but if, as we contend, the germs of the disease and the tendencies to contracting it are widespread and general, stamping out by destruction is impossible. Of course we are writing of rinderpest, the equivalent in the bovine race of cholera in the human being; for even our correspondent concedes that foot-and-mouth disease, which in veterinary nomenclature becomes "vesicular epizootic," may possibly be best treated by segregation.—Let our position as regards the much more serious and fatal disease be clearly understood. We most thoroughly believe that the true remedy is "stamping out,"—were it possible. But if, as we believe, it is not, then we must address ourselves to so altering existing conditions in the treatment and condition of cattle as to render its appearance and ravages gradually rarer and rarer, and ultimately impossible.

COFFEE IN UVA.

(From an Old Planting Visitor.)

Coffee looks wonderfully fresh on the Spring Valley and Uva Companies' estates as well as in Haputale, and in many places, only close inspection reveals the presence of the lurking enemy green bug. It is, however, very apparent that all estimates must be more or less "shaky" as long as this pest displays such vigour as is seen on almost any field of coffee.

MANGOES AND MONKEYS IN AFRICA.

From the proceedings of the A. & H. Society of India we quote as follows:—

Colonel Pollock, writing from *Mombassa*, says:—"The mango here is excellent, almost as good as any graft, and of a very large size. The trees as soon as one crop is all but ripe, begin to flower, and go on flowering at intervals: so, on the same tree may be seen fruit from the size of a large gooses egg to fruit just forming. There is, therefore, on the same tree, fruit which ripen n succession, and the same tree givesmangoes for upiwards of two to nearly three months, and virtually it bears all the year round.

The trees are never bare, but for six weeks, from August to middle of October, there is very little ripe, but plenty of unripe fruit, fit for tarts, pickles, &c. I have planted a lot of kernels which I brought with me from Bombay and Bangalore, and they are getting on well. I have also some 6 of the best grafts from Bombay; time will show whether the plants are affected by the climate, or whether the African mango is different from the Indian. I am going to graft some best kinds of Africans on to the Indian grown from seed, and will let you know, if I remain long enough, the result. Please let me know if the mango kernels I sent you germinated. I can send you hundreds and hundreds, for the place is a mass of mango trees. Some of a delicious variety, as large as an ordinary musk melon, and others, equally as sweet—not much larger then a duck's egg and all but free from fibres; but the Africans pick them too soon, and they sodden in the ripening, but if they did not thus pick them the monkeys would save them the trouble, for they abound in thousands and are most destructive. If they see the ground has been disturbed, they immediately scratch all round, and if they find grain, devour it. I have had a large area planted with Indian corn utterly ruined. The seed they failed to find came up only to be destroyed by these mischievous brutes, by being plucked up in pure devilry. Could you send me some blue gum and other Australian seeds to put down. It is puzzling here, for the seasons are just opposite to what they are in India, and having lived there so long and been used to plant in October and November, I can scarcely restrain myself from doing so here. But December is our hottest month, and though the heat under shade is nothing to speak of, the sun is very hot, the earth becomes almost red hot. Even the Indians or rather Africans, with hoofs like that of a Rhinoceros, can scarcely walk over it, and plants crumble up. Can you tell me what will destroy the large black ant? They are here in millions and kill everything. The climate here is delicious out of the sun. There is a nice breeze all day, and I prefer it to Bangalore. Twenty miles from this, easy to get at, is a plateau 1800 feet high, with a climate like that of Shillong."

FIBRES.

Read a letter from Mr. W. H. P. Driver of Ranchi, referring to an article in "*The Englishman*" on Yucatan hemp, and asking whether the Society could supply the seed, or where he could obtain some. The following is the article referred to:—

"Where is Yucatan? Probably few people could lay their fingers on it on the map at a moment's notice, but it is worth while to look for it. It is asserted by the correspondent of the leading Commercial organ of South American trade, that Yucatan is now so prosperous that money is a drug, people do not know what to do with it, and they are willing to buy all kinds of goods even the most costly."

The *Morning Post* states that this assertion is backed up by official information, since made public, relating to the material progress of Yucatan. We are thus informed that the abnormal prosperity which the country is enjoying is entirely due to the successful culture of the 'henequen,' or, as it is generally termed, the 'Sissal' plant of commerce, which yields one of the finest varieties of hemp extant. The population of the whole Republic of Yucatan does not exceed 3,000,000 souls, but the value of the 'Sissal' crop annually exported exceeds ten million dollars. There is an unlimited demand for the article in Europe, as well as in the United States, where it fetches from fifty to fifty-five pounds sterling a ton. The plant, we are told, is indigenous to the country and grows wild. It is easily propagated, and will thrive in the worst soil. In fact, it does best in rocky and impoverished ground, where nothing else can be grown, and in such situations it yields the best fibre. It cares nothing for drought; cattle have an objection to it, and avoid the spots where it grows. It suffices to dibble in the young plants in any barren and exposed plot of ground. Three years after planting the leaves are large enough to furnish a supply of fibre, and then the plant yields abundantly for 15 or 20 years. The produce of an acre of land is estimated at 1,000 lb. to 1,200 lb. of clean fibre, and the money value of this produce is estimated by a Jamaica planter, who has spent several years in growing Sissal in Yucatan, at eighty dollars or £16 sterling. But if all this information is correct, why should not an attempt be made to cultivate the Sissal in India? Every body cannot emigrate to Yucatan to try his fortune there; so it would be preferable to begin by trying if Sissal cannot be acclimatized in India. The climate is not dissimilar, and there is a fine area in the Sonthal Parganas where an experiment might be made on the rocky, barren, and exposed soil which the Sissal is said to love in Yucatan."

According to Mr. Baker, the three plants yielding the Sissal hemp of commerce are varieties of *Agave rigida*, Mill. Full information respecting this hemp has been published in recent numbers of the Kew *Bulletin*, a note embodying all known on the subject appeared in one of the earliest numbers, No. 3, for March 1887, and additional notes as recently as March and again October of the current year. From the short allusion made to the machine in use for cleaning the fibre, by Mr. D. J. Stoddart of Jamaica, whose pamphlet is quoted in the *Bulletin*, it appears to be similar in form to one of those in use in Mauritius for cleaning the aloe fibre (*Furcræa Gigantea*, Vent) there. This machine would, no doubt, be equally applicable for cleaning aloe fibre in this country, and as the raw material can in some places be had for the cutting, its capabilities could be readily tested and cost of working, &c., exactly ascertained. A model of the machine was obtained some years ago and is still in the possession of the Society.

It may be as well here to quote the Kew *Bulletin* for March last as to the prices for *Sissal*:—"The market value of this class of fibre, and the permanency of demand for it, has been fully investigated at Kew, and in a note on page 3 of the Kew *Bulletin* for April 1887, there is a summary furnished by Messrs. Ide and Christie which gives the average price per ton for Sissal hemp in London for the years 1879-86 inclusive. These are 1879, 27*l.*; 1880, 27*l.*; 1881, 28*l.*; 1882, 28*l.*; 1883, 27*l.*; 1884, 21*l.*; 1885, 19*l.*; 1886, 21*l.* The highest price paid was 32*l* 10*s.* 0*d*, in December 1879 to February 1880, the lowest price was 17*l.* 15*s.* 0*d.* in January and February 1886. Recently there has been an increased demand for white fibres, with a corresponding rise in prices. There was no quotations for Sisal hemp in Messrs. Ide and Christie's London monthly circular for December 15th, 1888. The only remark being 'in retail supply, and selling at fancy prices.' In the United States, Messrs Crockens' statistics, dated the 1st December, gave the price at 8 to 8¾ cents, per lb. (equal to about

37*l.* to 39*l.* per ton). A rough Agave fibre from Bombay (probably repared by hand) was valued last December at 15*l.* to 17*l.* per ton. Mauritius hemp prepared by machinery, *Furcræa Gigantea* (known as the green aloe or green Agave), was valued: good 34*l.* to 35*l.* per ton; fair, 33*l.* per ton; common 30*l.* per ton.—*Proceedings of the Agricultural and Horticultural Society of India.*

FUEL PLANTATION IN MYSORE.—The Forest Department of the Mysore State supplies the Mysore State Railway with fuel, and the Inspector-General of Forest Plantations, having in view the increasing demand of the railway and the mills in the province, has made arrangements for maintainig fuel plantations on a large scale.—*Indian Engineer.*

TEA MACHINERY.—The Commercial Co. in Slave Island are adding extensively to their engineering establishment, by means of extending their workshops &c. The work of this particular branch of their business has been steadily increasing owing to the great demand for Mr. John Brown's patent tea machinery which has sprung up of late, so much so, that the Engineer in charge of the workshop, Mr. W. Pottie, is now turning out as many as ten and twelve patent dessicators per month, which occupies threo European Engineers travelling about the tea districts from estate to estate supervising the erection of them.—*Cor.*

THE PRICE OF LAND IN CALIFORNIA.—A writer in *Bradstreet's*, in concluding a series of articles on the various fruit industries of California, has given some remarkable figures respecting the price of land in that State. At Riverside, which is one of the centres of the orange trade, the prices are almost fabulous. A choice grove was lately in the market there at £600 an acre, and £400 would be called an under-valuation. At Pomona, where oranges, lemons, peaches, apricots, prunes, and nectarines are grown, the upset price for land suited for growing fruit is £40 an acre. About Tresno, the centre of the raisin production, the prices are the same. But when the profits are considered these prices are, perhaps, none too high. Twenty pound to £50 an acre is the usual average, and the cost in labour is very small. The 3,000 acres under oranges around Riverside last year yielded an average of £50 an acre, including orchards not yet bearing. One grower in San Bernardino county put his case in this way:—"I came to this place in the spring of 1882, purchased 40 acres of land and planted it all in orange trees, and muscat grapes. The third year from planting the orange trees bore about £10 worth of fruit to the acre, the fourth year about £25 per acre and last year the orchard produced £60 per acre. Many people are making from two to three times that amount." Another who grows raisins says:—"My 20 acres of raisin vines yielded me this year 50 tons of raisins, which I sold for £1,000 or £50 an acre. I have five acres of orchard the proceeds of which I also marketed green for £60, but my trees were young. this being the first year of bearing. I do not work my land myself, but hire all my labour. My one Chinaman takes care of the ploughs and cultivates my forty acres, and does all the work with the exception of harvesting and pruning, when I have several Chinamen to help him." But the writer concludes by warning his readers that fruit-growing on an extensive scale for commercial purposes is a pursuit for the wealthy and not for the poor man. No land can be got under £20 an acre; the cost of planting is considorable, and then follows a period of from three to five years of waiting for the first crop. Brains, energy and capital are all needed and the chief of these is capital.—London *Times.*

[There is a large market for the fruit close at hand, while the competition of foreign fruit is now prevented by heavy protective duties.—ED. *T. A.*]

THE USE OF INDIA-RUBBER for erasing pencil marks was first suggested in or just prior to 1752 by an academician named Magellan, a descendant of the great navigator.—*A. F. Press.*

TEAMEN are, we understand, losing heavily at present, and we have been assured that no more picking will take place in the country, owing to the discouraging state of the market.—*Foochow Echo*, in *China Mail*, July 17th.

HOW THEY RAISE BANANAS IN HONDURAS.—It seems that they plant them there 18 by 18 feet, which is a very wide distance apart, and a great waste of land. Here the Chinese rarely plant them more than from six to eight feet apart each way, and produce from each hill two large bunches annually for three or four years. A good specimen of a small Chinese banana patch may now be seen opposite Mr. Paul Neumann's residence on King street. They are planted six feet apart, with not a missing hill in the entire patch. They allow but two stalks to the hill, and when the fruit is nearly ripe suckers are permitted to grow, so that they are enabled to get two large bunches from each hill every ten or twelve months. At the end of the fourth year, having taken off three good crops of from 500 to 600 bunches to the acre, they plow up the land and replant with new roots, generally manuring the ground well before plowing.—*Honolulu Planters' Monthly.*

AGRICULTURAL COMPANY OF MAURITIUS.—The annual meeting of the shareholders in this company was held at the offices in Change Alley on June 30th. Mr. J. Longride presided, and in moving the adoption of the report said the company had been very prosperous during the past year, despite the state of the sugar market and the exchanges. There was scarcely anything in the accounts which required notice. Their debenture capital had increased during the twelve months by about 9,000*l.* The stock of sugar in hand this year only amounted to 16,000*l.*, against about 50,000*l.* in the last account. Of course that was an asset which they could not absolutely estimate, but that which they did form on last year's stock was more than realised. There was a net profit of 7,599*l.* for the 12 months, the largest ever made. They proposed now to pay a final dividend of 1s per share, making 10 per cent for the year. They would put 2,000*l.* to the general reserve, bringing it up to 40,000*l.*; 2,000*l.* to the exchange reserve, making the total of that fund 50,000*l.*; and carrying forward 1,993*l.* Lieut.-Col. F. Thurburn seconded the adoption of the report, which was agreed to unanimously.—*O. Mail.*

COOLIES IN COORG.—In Coorg the Coffee planters have as much difficulty in obtaining coolie labour as the tea planters have in Assam, and last year's criminal administration threw some curious light on the caution that has to be exercised in dealing with perverse coolies. Second class Magistrates in the Coorg district were some time ago impowered to try cases of breach of contract, and the immediate result of the increased facilities thus afforded was a marked increase in the number of prosecutions of coolies who had obtained advances on contract deeds and then failed to comply with the terms of their agreement. It might be supposed, says the *Englishman*, that the justice of these proceedings would commend themselves to the coolies, who do not, as a rule, deliberately contemplate breaking their agreements at the time of signature, but rather yield to temptation afterwards, when things do not look so promising as they had hoped. The Coorg coolies, however, do not take this view of the case. They regard the prosecutions as a serious risk attending emigration to the coffee estates, and the effects of efforts of the Government to assist the planters has been a serious increase in the difficulties of obtaining coolie labour. It seems hard to the planters that they should be unable to recover advances for which no work has been done, yet the fact remains that the prosecutions necessary for bringing to justice those who offend are likely to defeat the very objects which the prosecutors have in view.—*Madras Times*, July 15th.

Correspondence.

To the Editor.

PEPPER CULTIVATION AND JAK TREES IN THE KANDY DISTRICTS.

July 9th.

DEAR SIR,—Your correspondent "Peppercorn," in his letter of 4th inst, remarks that "a good healthy pepper vine is found to be more than a match for a sturdy jak tree, and seems to be capable of sucking the life out of it." Where has he lately found the sturdy jak? I am afraid that most planters in the Kandy districts will concur in my opinion that since 1885 a healthy jak tree has been hard to find: every one of them has been in a more or less debilitated condition, with jaundiced foliage and dead and dying branches, and some trees, even without pepper being grown up them, have died outright.

A V. A. with some knowledge of botany might have been expected by this time to have noticed their condition, and to have suggested offhand a remedy; but the common planter is at present in doubt whether the decadence of jak trees is due to the ravages of cockchafer grubs, to borers, to abnormal weather, to root canker, or to the new mysterious complaint called 'mal-nutrition.' We appeal to the press.*—Yours faithfully,

SIC PASSIM.

"£20,000 ANNUAL LOSS TO CEYLON PLANTERS THROUGH CARELESSNESS IN TEA FACTORIES."

London, July 18th.

DEAR SIR,—Take a crop of 40,000,000 lb. tea equal to 400,000 chests. Two-thirds of this equals say 260,000 chests. The dock charge for taring is 1s 6d, and bulking and taring 1s 8d per chest, and it is computed that quite two-thirds of the Ceylon crop has to undergo one or both operations in the London warehouses, and putting this proportion at 260,000 chests the above enormous sum (twenty thousand pounds) approximates the charge incurred.

Why is it Superintendents and Factory Assistants are so careless in these matters of good bulking and even taring of their chests? It can be no great hardship to see that the chests of a break do not vary more than 2 or 3 lb. in their tares, and nailing on pieces of wood or shaving the chests here and there as may be required to obtain even weights. Factory bulking is useless if tares are uneven, for frequently when a break has passed the bulking ordeal the Customs order is, to be turned out and separately tared, the charge for which, as shown, is only 3d per chest less than the charge for bulking.

As to factory bulking, it is often most carelessly done, and a break of say 50 chests pekoe often exhibits three distinct teas; yet all are marked "Factory Bulked" and shipped home as one tea.

These irregularities, which add so much to London dock charges, are easily preventible, and carelessness is practically their only origin.

MERCHANT AND PROPRIETOR.

GREEN TEAS FROM CEYLON.

Kintyre, Maskeliya, July 19th.

DEAR SIR,—The extract to which you give prominence in your paper of 17th from Messrs. Geo. White & Co.'s circular might lead your readers to suppose that it was all u. p. with Green Teas as a class. As a matter of fact the three lowest grades *were sold*, viz., pekoe souchong, fannings and *dust* at an average of 10½d; the average of *all* black teas being 10s ⅞d. For the 65 per cent of fine teas unsold the bids ranged from 1s 7½d to 1s 1¾d against valuations from 1s 9d to 1s 2d. I think the bids should have been accepted, but even with a still farther fall of 2d or even 3d per pound, the break would still be above the average of black teas of that week. It will be interesting to know the prices fecthed for the two finest grades of green tea sold by me locally on 16th June for which 81c and 70c were paid, exchange at about 1s 6d at that date.—Yours faithfully, dear sir, H. D. DEANE.

GAMBIER.

July 19th.

DEAR SIR,—I was glad to read the interesting particulars you gave about gambier, but still the native name has not transpired. I am anxious to get this to make my own experiments. Now that Dr. Trimen has got plants of the Singapore gambier, he is in a position to define the *botanical* difference between the indigenous and exotic.

Christy in his book No. 5 on Tanning Materials says that in Malacca the better kind (cube gambier) is prepared more carefully, and to insure consistency (?) starch or some kind of farina is mixed with it to consolidate it and dry it more easily.

If starch were mixed with a dark extract it would tend to lighten the color, and if such admixture is permitted by the trade I can quite understand that producers would only too readily resort to it, gambier being about three times the value of starch.

Christy also says that as imported into England in its rough state it is very much adulterated, sticks, stones, and large quantities of elephant's dung being mixed with it in the manufacture. PLANTER.

CACAO CULTIVATION: PRACTICAL EXPERIENCE.

DEAR SIR,—I have often heard and seen such erroneous ideas expressed about the profits of cocoa or rather cacao cultivation in this island that I wish to give my experience, with some statistics taken from your valuable Directory, for the benefit of those who may think of embarking in this pursuit, believing it to be very profitable and, as I have somewhere read, a "grandchildren's patrimony."

I came here in 1878 with a certain amount of capital, and after careful investigation concluded that I could not do better than invest in the cultivation of cacao. The conditions of the land on which I commenced operations were exactly those said to be required by the manuals on the subject: Messrs. Jardine and Barber's wealth of information was not then available. The soil was generally a good chocolate loam, three to five feet deep, and the land well-watered, one of the streams having rich alluvial banks: elevation from 400 to 900 feet; the average annual rainfall 90 inches fairly distributed; and the land well-sheltered from wind by ranges of hills and by no means steep. Part of the land had many years previously been for a short time under coffee, part was jungle or heavy forest. The land was opened in 1879 in the ordinary way, many of the jungle trees being left for shade wherever required.

My expectations were for a long time fulfilled: *everything* grew with truly tropical luxuriance, even the Arabian and Liberian coffee of which I had planted a small quantity. As for cardamoms, their growth was marvellous: planted in the open without any shade whatever, and without any holes being cut, the plants, nine feet apart, at the age of two

* Or rather to Dr. Trimen, if there are any such suffering "jak trees" in his neighbourhood.—ED. *T. A.*

years were touching one another and gave a maiden crop of 160 lb. per acre. My flower garden and vegetable garden were highly successful; nothing was blighted, nothing failed to grow. And the cacao grew equally well on level ground and in hollows, on slopes and on ridges, better without shade than with it, if only sufficiently protected from wind. I have seen it growing well in those days up to 2,000 feet elevation in poor quartzy soil.

As I had a large reserve, I selected land every year to extend the cultivated area. My clearings were equally successful in the north-east and the south-west monsoons; many parts never had to be supplied at all, the failures being *nil*.*

On May 1st, 1884, on visiting an estate near Polgahawela, I saw for the first time the signs of what I thought to be a serious blight or disease; large-sized trees looking as if they were scorched by fire, the ends of the branches dead or dying. The superintendent told me that, to make sure whether it was due to helopeltis, or not, he had covered one of the few remaining healthy trees after careful fumigation with fine gauze, but that the tree, after some days, had shown the same signs of disease while nowhere on it could any signs of helopeltis be discovered. There were two nurseries in close proximity, one of the ordinary Ceylon kind, the other of the hardy variety called Forastero; the first was in a miserable state of disease, the other perfectly healthy. Not many months had elapsed before this disease had spread in several districts, and a meeting was held in Kandy, with the ordinary result that everyone who had an opinion went away with it, without converting or being converted by his neighbour. But the catching of helopeltis and the planting of shade were generally thought to be the panacea. Forastero and hybrid varieties were not then attacked, and many planters used only those kinds for supplying or for planting new fields.

But to come back to my personal experience. It was only in 1885 that I noticed the first signs of disease in my fields, and by the end of that year I had made up my mind that I should soon see the end of my enterprise, such was the virulence of the attack, and I was not very far wrong.

I have made experiments with manures: digging, forking, holing, trenching; with quicklime and gaslime, with sulphates of copper and iron, arsenic, corrosive sublimate, with kerosine &c., without success. The only palliative is shade, and the best is the dadap, which was introduced some years ago from Assam by a Dimbula planter and by him first planted as shade for cacao.† I say that shade is only a palliative with good reason, because it only mitigates the disease. Near Polgahawela the cacao under shade was severely attacked as well as that in the open, but when the shade trees were cut down three or four years ago and tea planted the cacao recovered and has since given good crops.

Since the year 1885, all my attempts at planting *any products*, in the best of soils, with good weather and with greater care than formerly have been comparative failures. The weeds themselves as well as the jungle trees and the undergrowth of the forest show unmistakable signs of sterility. The Forastero cacao, which for a time had resisted the disease, followed suit, and trees of the ordinary Ceylon kind, which were known to have given good crops regularly for twelve years, were attacked and very soon became barren skeletons.

In your "Ceylon Directory" of 1883-84, p. 40, you state:—"As regards the area planted in 1877-78, it was 500 acres: in March 1881 this had increased to 5,460 acres, and this area in three years has increased by 4,500 acres, and from the 10,000 acres now growing (at end of 1883) of this valuable product we may look for an export of 50,000 cwt, before Sir Arthur Gordon's term of office expires. Of cacao planted alone the area is 4,711 acres; of coffee and cacao planted together we have 10,709 acres" (or a total of 15,420 acres).

If we admit that cacao gave generally its first crop of 1 cwt. at four years of age, of 3 cwt. at five years, of 4 cwt. at six years, and after that age 5 cwt. per acre, we find the following table:—

CACAO PLANTED.

	Acres			Cwt.
1876 ...	122	gave in	1879-80	122
1877 ...	113	„	1880-81 plus the above	479
1878 ...	191	„	1881-82 „	1,018
1879 ...	1,953	„	1882-83 „	3,588
1880 ...	2,065	„	1883-84 „	9,863

Thus the 5,460 acres said to have been in cultivation in March 1881 ought under the same circumstances to have given in 1884-85 a crop of 17,153 cwt., but the exports fell to 6,758 cwt.! With a large yearly increase of land coming into bearing, the highest export (1886-87) was only 16,638 cwt., and the acreage has fallen, by your latest computation, from 15,420 at the end of 1883 to 11,772 acres, although new land has been opened yearly (1,500 acres would be a moderate estimate). This would have brought up the acreage planted with cacao to 16,920 acres, so that 5,548 acres must have been abandoned almost before they had come into bearing.

If now we assume that of the 11,772 acres only 10,000 are in bearing this season, now nearly ended, we shall find from the exports that the average crop this year is only a little over 1½ cwt, per acre, which shows conclusively that cacao cultivation is not an ELDORADO.

[This tale of disappointed hope is only one of many in regard not only to cacao but to Liberian coffee and cinchona. In certain select or fortunate localities, however, cacao seems still to flourish. —ED. *T. A.*]

DAVIDSON' SIROCCOS: PRACTICAL HINTS.

Colombo, July 21st.

DEAR SIR,—With reference to "Darjeelingite"'s query taken from the *Indian Planters' Gazette* of the 1st July, *re* difficulty in working a large-sized Down-draft Sirocco, I have much pleasure in giving him the required information. In the first place he says, "I find that the temperature drops from 385 deg. to 210 deg. before it hits the tea on the lowest tray. I also find that it takes 5 maunds of dry wood to each maund of tea, that it does not turn out anything like 2 maunds per hour.

"*P.S.*—I do not find that it puts price on tea, it only enables you to dry with other material than charcoal."

The temperature at which "Darjeelingite" is working is very much too high. Pure hot air cannot be passed through tea roll at the same high temperature as the charcoal furnishes from a chula.

A pure hot air tea drier worked at 385 deg. F. will in the first place consume a large amount of fuel, and in the second will not produce a high quality of tea. But with the Down-draft Sirocco it is *utterly impossible* to raise the temperature over the

* A neighbouring plantation gave in 1883-84 a crop of 4 cwt. per acre over 200 acres planted in 1878-79. The trees, planted 9′ × 9′, were interlacing so much that it was thought necessary to sacrifice the alternate ones, and shade trees were in some places thinned, with good reason as the cacao in the open was growing much better.

† Mr. Robert Fraser's introduction of the best erythrinas from Trinidad must surely have been anterior to the import of the Assam "dadap"—the Java name for erythrina being "dadap."—ED. *T. A.*

top tray in the drying-box, to anything like this degree of heat, *if the fan is working*. "Darjeelingite" must be working his drier with his fan stopped or more likely with the valve behind it shut, which of course would have the same effect.

With a temperature on the thermometer of 385 deg. and say 8 or 9 lb. roll charges on each tray the exhaust air would indicate about the 210 deg., which is the same temperature as that which strikes the bottom tray.

This reduction in temperature of the air after passing through a number of trays of wet roll is essential in any drying machine whatever, as unless the hot air gives some of its heat up in passing it could not absorb any moisture from the roll whatever.

If "Darjeelingite" holds a thermometer over the exhaust of *any* tea drier, he will find that the temperature has been considerably reduced from that indicated on the drier thermometer; or even if he places a thermometer over and under the trays of his charcoal chulas he will obtain similar results. In order to work Davidson's Large Down-draft properly, the following points should be attended to:—

First.—See that the fan is running at 800 to 900 revolutions per minute at least 1,000 rev. gives very good results and the difference required in power to drive at the increased speed is imperceptible.

Second.—The fuel used should be split up small and cut into 1'—6" to 2' lengths. Large round logs make *very* expensive fuel, as they do not burn well, therefore generate heat slowly. The drier the fuel is, the better.

Third.—The stoking should be properly attended to. A cooly has a natural inclination to cram the furnace full of fuel so that he may have no further trouble with it for half an hour or so. The stoker should stoke lightly and constantly, putting small pieces of wood in at a time and keeping *a good light, even blazing fire*, instead of a black, on the top, and a glowing red fire in the heart of his furnace.

Fourth.—Immediately after the fire is lighted, the fan should be started and the lever handle working the tray-lift and the fan valve should be lighted, thus partially *closing* the valve and therefore *deducting* from the suction power of the fan and enabling the temperature to rise quickly. This handle should be lifted to within an inch or so from the top of the slot in which it works.

Fifth.—The charge per tray must not be too heavy —6, 7, or 8 lb. according to the amount of moisture contained in the roll would be about right. The wetter it is, the lighter it should be spread on the trays.

If the trays are drying too quickly for the coolies to keep up with the work, on no account decrease the fan speed.

To reduce the rate of drying a tray, increase the charge of roll per tray.

The trays should be spread as evenly as possible. Coolies have a tendency to spread thickly in the centre; in that case the sides would dry first as is the case in any drier. If this is attended to, I find the trays are dried perfectly evenly all over. After work is finished, the fan should be allowed to work on for 15 or 20 minutes in order to carry away the heat which the stove would still be producing. When the fan is shut off, the door over the stove should be opened. If these points are attended to, "Darjeelingite" will have no further trouble in the working of his machine, but will be bound to confess, as numbers have done and are doing every day, that the Down-draft Sirocco is a complete success, especially the new large size, not only in quantity of outturn, but also in the quality of same.

The outturn of these machines vary from 140 lb. to 200 lb. per hour tea made, with a fuel consumption of about ½ lb. per lb. tea.

The quantity of out-turn depending on the fan speed, the moisture of the roll and the moisture in the fuel.

Hoping that these remarks may be of use to "Darjeelingite" and to any others who may have takenan interest in his letter.—I remain, yours truly,

F. G. MACGUIRE,

c/o Messrs. Mackwood & Co., Colombo.

PLANTING IN TRAVANCORE: PROSPECTS FOR SUPERINTENDENTS.

July 21st.

SIR,—Having had a few inquiries and heard of others having been made by Ceylon men as to the advisability of seeking or accepting employment in the planting districts of Travancore, I would be glad if you would kindly give publicity to the following. To such enquiries I would most emphatically say "Don't," and for these reasons:—

Individual salaries are small.

Superintendents' prospects, with few exceptions, are *not* encouraging.

Vacancies are, as a rule, filled by persons having interest.

There can be no doubt that Travancore, as a tea-producing country, has fair prospects indeed before her; but for a man of fair abilities and prospects to leave Ceylon and come to Travancore without having his position, salary and future more or less *guaranteed* would be madness indeed; while again some districts are so unhealthy that a superintendent may never hope to develop the resources of his charge and so gain credit to himself, that with a fair amount of guarantee he would be badly off; and in the event of his wishing to reinstate himself in his old position in Ceylon might find some difficulty after a sojourn of a year or two on this side, to say nothing of time lost.—Yours faithfully, TRAVANCORIENSIS.

PEPPER AND JAK CULTIVATION.

July 23rd.

DEAR SIR,—I am glad to find from "Peppercorn's" letter of 18th instant, that the sickness amongst jak trees is more local than general. But I think most planters will admit that there has been, if not serious illness, at least a want of tone in their systems for some years, and this has been shown as much by their poor foliage as by the irregular yield of fruit. I do not refer to tree growing in gardens or specially favoured places, but to those planted on estates. But the debility is not confined to the jak trees. Leaving out of consideration the coconut disease, which Dr. Trimen has disposed of, there has been a marked decline in the vigour of areca trees, pepper, vanilla, annatto, cardamoms, cotton and even of the worthless Ceará rubber. None of these planted during the last four years have grown as freely as they used to; and as regards the last, whereas its seedlings used to germinate in hundreds under the trees, for some years past the self-sown seedlings have not been seen.

Is it not possible that a severe attack of cockchafer grubs has been followed by a root fungus which has impaired the vitality of all vegetation? The effects, of course, would vary according to soil and other surroundings, and would be modified as "Peppercorn" suggests by high cultivation.—Yours faithfully, SIC PASSIM.

WHAT "BI-METALLISM" AND EXCHANGE AT PAR MEANS IN RESPECT OF CEYLON PRODUCE—(1) COFFEE.

Colombo, July 23rd.

SIR,—Herewith is mem: showing the result of our coffee crop of last year at the then rate of exchange and what the result would be at the bi-metallic rate of exchange 2s.

We in Ceylon can in no wise affect the question of bi-metallism, but the statement shows the effect it would have for planters.

The change of currency has powerful influences in its favour at home,—Manchester and the farmers,—and so may probably come to pass.

In "Hazell for 1887" there is a very good article on bi-metallism explaining the matter in short space and showing how the present bi-metallic countries—the United States and the Latin Union—get over the difficulty.—Yours truly, NEMO.

STATEMENT showing the result in sterling of a coffee crop (year 1889) at the then average rate of exchange and the result as it would be at the bi-metallic rate of exchange 2s.

The coffee sold averaged	R66·85	p. cwt. f.o.b.
R66·85 at exchange (the average rate) 1s 4⅝d	92s 7½d	
92s 7½d at 2s bi-metallic rate	R46 31	
The cost of the crop f.o.b. was	R31·97	p. cwt.
The value of crop as above	R66·85	p. cwt.
Less cost	31·97	„ „
Leaving available for remittance	R34·88	„ „
R34·88 at exchange 1s 4⅝d	£2 8s 3d	„ „
Value of crop as above 92s 7½d at bi-metallic rate of exchange 2s	R46·31½	p. cwt.
Less cost	31·97	„ „
Leaving available for remittance	R14·31½	p. cwt.
R14·31½ at 2s exchange	£1 8s 8d	„ „

Summary.

If the crop sold at the same rupee price, R66·85 per cwt., when the exchange was 1s 4⅝d, there would be £2 8s 3d per cwt. to remit to England; when the exchange goes to 2s there will only be £1 8s 8d per cwt. to remit to England.—N.

[This is very interesting; but we should expect to see sterling prices "harden" and advance if exchange went still further against us.—ED. *T. A.*]

BUSHEL MEASURES AND ORDINANCE NO. 2 OF 1836.

DEAR SIR,—I am sorry you have made no comment on case No. 3,326 P. C., Panwila, as reported in *Observer* of 26th July last.

In discharging the accused the Magistrate said; "The evidence of the complainant only goes to show that the accused was in the possession of the bushel measures described in the plaint; and I hold that mere possession without proof that these measures were used by accused is insufficient to maintain a charge against him."

What, however, says Ordinance No. 2 of 1836 clause 5? "Any person or persons selling by retail who shall use or attempt to use, *or in whose shop, house, stall standing place, or premises shall be found any weight or measure of length or capacity not being in conformity with the standards hereby established*, shall, upon conviction, forfeit and pay for every such offence," &c.

Coolies are so frequently cheated by dealers in the issue of rice, that as desirable punishment should be sure as inspection should be effective.

A. G. K. B.

["Jove" sometimes nods! The acting Magistrate referred to is, of course, hopelessly wrong. Section 257 and 258 of the Ceylon Penal Code amended by section 1 of Ordinance 11 of 1887 makes it a criminal offence for anyone to fraudulently use or fraudulently to possess a false measure, &c. The mere possession of a false weight or measure however by a boutique-keeper, or shopkeeper is of itself a criminal offence, and no proof of any use or intention to use is necessary.—ED. *T. A.*]

THE INTERMINABLE SILVER QUESTION.

July 26th.

SIR,—Who will be able to agree when doctors differ? Will you try your hand?—or if you have not the data (although I have no doubt it is, being so important a question, already in your new Handbook) perhaps some of your readers may be able to throw light on this inquiry as to the *silver production of the world.*

In the *Observer* of the 19th instant appeared a long statement from the *Economist*, London, 28th June last, in which figures are given as follows:—

	United States.	All other Countries.	Total.
	Fine ounces	Fine ounces	Fine ounces
"1889	50,000,000	76,000,000	126,000,000."

Now at 48d per ounce this would give in sterling

£10,000,000 £15 200,000 £26,200,000.

The *Economist's* figures for 1878 were as follows, *in ounces*:—

34,960,000 38,516,000 73,476,000,

showing that in twelve years the increase under the above headings was say roughly

50 per cent 100 per cent 70 per cent,

—a vast increase without doubt, when it is considered that it has been accomplished at a low rate per ounce during the period mentioned. But our eyes are opened further by the Chairman of the New Oriental Bank Corporation, for in the *Ceylon Observer* of the 21st inst. appears *his* statement as follows:—"The amount of silver coined last year throughout the world is given as 26½ *millions* sterling" (*i. e. all* the silver produced in that year, according to so reliable a source as the London *Economist*, was positively *coined*!) Then he proceeds to tell us, on his own authority apparently this time, that "the whole produce of silver throughout the world was only 32½ *millions* sterling." I suppose he used the word "only" advisedly.

It thus left, says the N. O. B. C. Chairman, only over six millions for making spoons, &c., and therefore it does not seem that there is any enormous overplus of silver!

Well, then, I turn for consolation to the *Tropical Agriculturist* for July last, and this is what I find, on page 45, written by one John Richards, whoever he may be, to the *Adelaide Observer* of May 10th:—"It is quite on the cards, judging from past progress that in less than twenty years, the output of silver (from Australia) will exceed in value any one of our long established staple products"—something very vast no doubt, but extremely visionary, yet it is consoling as far as it goes, for it indicates a cheap rupee—but I am afraid Mr. Richards' figures are more or less the result of a dream, for he says further on that the silver produced in the United States is equal to "about half the production of the world"! My confidence in his statements is further weakened by his saying (upon what authority I know not) that "426 millions of dollars" (*i. e* 426,000,000 ounces of silver) issued by the United States *in paper* have got "no back," *i. e.* they are not represented either "by gold, silver or bullion." A rotten state of things to be sure, and if true the United States Government's demand for silver is not likely to go on unchecked for a long time to come: as Mr. Richards admits, "the cause of the introduction of the Silver Bill is the growing scarcity of gold which means dear money."

Mr. Richards then comes to figures (which I do not like) with regard to the production of silver in Australia. He says: "This year I estimate that about three and a half million sterling worth of silver and lead will be exported":—what a "blend" to be sure! *

Proceeding, Mr. Richards goes on to say: "Australia being the only silver-producing country of any importance in the British Empire and, barring the United States and Mexico, producing more silver than any other country in the world" &c.

I will not make any more extracts from Mr. Richards' figures, who states that (through him) "Australia has a perfect right to make her voice heard in the great bi-metallic controversy that is now agitating England," but I will accept his figures for "silver and lead" as referring to *silver only*—viz. 3½ millions sterling for 1889: all I want to know is where the balance of the silver now being produced in the world, estimated by the Chairman of the New O. B. C. at 32½ millions sterling, is to come from?

At £900,000 sterling per month the United States is now bound to coin *annually* actually more silver than she is said to produce, viz. £10,800,000 sterling! It is clear that other countries have got to produce (out of 32½ millions)22 millions, and yet Mr. Richard declares that "barring the United States and Mexico," Australia comes the next in the list as a silver-producing country. I give him full credit for lead as well as silver, and yet the value amounts to only 3½ millions sterling. Having 18 millions still to trace I would fain know what Mexico, Spain and other countries can offer to fill up this tremendous gap. With, it is said (in a recent telegram), China about to enter the silver market to the tune of 30 million taels (=45 million dollars) the rupee is evidently destined, ere very long, to give Ceylon tea planter a twinge—any way they should be prepared for it.—Yours, N. D.

[Gold is used by 264,000,000 people as their monetary standard; silver by 749,000,000. In some ancient States—ancient Arabia and ancient Germany for instance,—the value of silver was superior to that of gold: and so late as the 17th century silver and gold were valued equally in Japan. From the *Encyclopædia Britannica* we quote as follows:—

Production.—In the principal producing countries—the United States, Mexico, Chili, and Peru—mining is free, and there are no official returns of the production, which is therefore mere matter of conjecture. In the United States it is the custom to value silver bullion a one-sixteenth that of gold. This unduly swells the value of the conjectural product of that country more than one-fourth (see *Report* of the United States Monetary Commission of 1876, Appendix, pp. 1-66). From a careful consideration of the bullion movement the total annual product of silver throughout the world at the present time is estimated at between 50 and 60 million ounces, at which figure it has remained steady upwards of ten years.

Consumption in the Arts.—Direct inquiries as to the quantity of silver used in the arts have met with little success, and the statistics so obtained are defective. But the total production of silver in the Western World from the discovery of America to the present time, has been, in value, about 1,400 million pounds sterling of which about 300 million pounds remain in coins. Consequently 1,100 millions, or nearly four-fifths, have been consumed in the arts, lost, &c., or exported to Asia. There are estimated to be about 50 or 60 million pounds sterling worth of silver coins in India, and some trifling amounts each in China, Japan, Persia, &c. On the whole it appears quite safe to estimate the average annual consumption of silver in the arts and through wear, tear, and loss as fully equal to three-fourths of the production. Lowe in 1822 estimated it at two-thirds. Silver is principally used for plate and jewellery; it is also consumed in photography, and in numerous chemical preparations, such as lunar caustic, indelible ink, hair dyes, fulminating powder &c.

This was written in 1886-7, we may say.—ED. *T.A.*]

* The explanation is that the ore as it is mined is, in large proportion, sent to Europe to have the silver separated from the lead, that course being found more economical than refining locally.—ED. *T. A.*

CACAO CULTIVATION.

July 31st.

DEAR SIR,—Your correspondent "Eldorado" opens up a very wide question. For several years past there have been very serious discrepancies between the crops seen on the trees and the crops said to have been gathered. At various times I have heard certain Dumbara estates credited with such splendid returns that the Customs export returns looked quite silly in comparison. I hope some of the planters whose estates have lately yielded 3, 4 or 5 cwt. per acre will come forward and explain why their crops have not been despatched to the London or to Continental markets: the local demand, we all know, is trifling.

"Eldorado" dates the disease in his cacao from 1885, but he omits to mention in what year he commenced to plant shade. There is no doubt that the most experienced men, when they began to take an interest in cacao, made very serious mistakes: some adopting plantains as the only possible (and profitable) shade, while some thought the cacao trees, if planted close enough, would shade one another!—and others fancied jak trees were the great desideratum. The apostle of the Trinidad system, to whom you refer as having introduced the "best erythrinas," in his pamphlet, published in 1879, says:—"In Trinidad, of course, the Bois Immortelle is their favorite shade tree, on account of its rapid growth; but I cannot say that the ideas of the school in which I have been brought up quite reconcile me to its use, as it seems to me that it is a surface feeder, for if its large surface roots be cut, a great quantity of water will ooze out of the ground." The writer was quite right in condemning this tree as shade for cacao; and the *Pithecolobium Saman*, even if planted very wide apart, is no better. But the dadap referred to by your correspondent is undoubtedly good: it grows faster than either. Hundreds of acres of cacao that a few years ago were nearly dead have been saved by it; its lower branches, as they drop off, can be used as fuel, and the stems furnish good charcoal. As shade for cardamoms, too, this tree has no equal: I believe it will be found of great use in cinchona clearings also.*

"Eldorado" gives facts and figures which seem very strongly to support another recent correspondent as to the general sterility of all vegetation of late years. If the falling-off, not only in crops but in growth even, has been common everywhere and to all lowcountry products alike, then it must be conceded that there is something *radically* wrong.—Yours faithfully, UT PROSIM.

PATENT TEA LEAD-AND-PAPER FOR PACKING: MR. T. C. ANDERSON'S EXPERIENCES

Colombo, August 1st.

DEAR SIR,—In view of your remarks in your footnote to your correspondent "C. S."'s letter

* But the DADAP is simply an *erythrina*, used in Java as a shade tree. Those we saw in Java we described correctly as shabby-looking, and perhaps their non-luxuriant habit is in their favour. The Trinidad *erythrinas*, on the other hand, which, a few years ago, we saw growing amidst the cacao at Warriapolla, were masses of rich vegetation. It would be interesting to learn what Mr. Robert Fraser's opinion of the *madre de cacao* now is, after full trial. —ED. *T. A*

appearing in last night's issue of your paper, for your information and that of planters generally, I beg to send you a description of the paper lead lining referred to, together with a number of certificates in its favor, which you can publish or not, as you think proper. I have used the lead now for nearly a year in the packing of Gartmore and other estates teas, and the reports on the condition of the tea on arrival in London have all been most favourable. Hitherto the lead has been prepared on the estates by the factory coolies, so that necessarily it has cost more than the ordinary lead, 4 oz. lead being used, but I anticipate that the manufacturers in England, when they learn that there is a demand for it, will produce it cheaper, *i.e.* by utilizing *thinner* lead they will produce a thicker and stronger lining with the aid of the paper. The paper can be purchased in Colombo by those who wish to try it in the meantime, and the cost will be found to be about 12 to 15 cents per chest in addition to the cost of the lead.—Yours faithfully,

T. C. A.

[We give the description, and select one or two from a number of certificates:—

"CLARK'S PATENT TEA LEAD."

This is a new lining suitable for tea chests, boxes and packets, patented about a year ago in Ceylon and the United Kingdom and applied for in other countries. It consists of the ordinary tea lead used in packing tea, lined with *paper* which may be of any degree of thickness, *paper and cloth*, *calico* &c., combined, or any of these materials with that paper. The objects are to better preserve the tea; to prevent the contact of the tea with lead which is injurious; and to provide a stronger and more easily workable lining, which cannot be damaged so easily when opening and repacking tea chests. The paper being *inside* the lead lining allows of the lining being soldered and hermetically sealed in the usual way.

Gow, Wilson & Stanton, April 3rd.—"All the Teas we have seen so far packed in the new patent lead have arrived here in *capital condition*, fresh, crisp, being free from any flatness or damage whatever. In other respects we like the lead: it is neat and light, and from the accompanying letters it would seem likely to become popular with the trade."

(One of letters referred to.)

From Messrs. Somerville & Co., April 25th.—"The teas we have tested with the patent lead kept just as well, if not better than the ordinary lead in use."

From Messrs. Layton & Co., to the Chartered Mercantile Bank of India, London and China.—"'Patent Lead Lining.'—We have examined very carefully the lead used in packing of tea from above estate (Gartmore), and so far as the condition of the tea is concerned we are unable to find any particular objection to it the smell and taste being sound and good, &c."

Messrs. G., W. & S., London, June 27th.—We have the following report on your lead from our friends, Messrs. H. & E. Musgrave, one of the largest dealers in the North of Ireland:—"We have a very satisfactory report from our customers in favor of the new lead lining of 'Gartmore' chests. Lead is kept in better position and tea not so liable to get between lead and wood."

—ED. *T. A.*]

CATTLE AND CATTLE DISEASE IN CEYLON.

Kandy, August 1st.

DEAR SIR,—I have just heard of a new introduction, into Colombo of cattle murrain, no doubt caused by the cattle coming over from India at this inclement season, and being left to stand under drenching rains.

As cholera is developed and propagated among human beings, so are animal diseases. Will we, in this poor country ever learn that our cattle are our wealth? Where is the Mayor of Colombo? and where W. A. de Silva? who has been *teaching* ere he has learned himself. Has a whole 12-month's murrain not taught anything? are we to be subjected again and again, until the cattle of the country are exterminated?

A few days ago I met a herd being driven along the road (our beef supply), coming from the lowcountry tanks, where they had been fattening—driven under our drenching rains, penned into a cold upcountry cattle shed at night; murrain developed no matter as long as the tamby gets rid of them, he cares not.

See what the *diseased drove*, which arrived in Nuwara Eliya last May or June, did for the country: the contagion they brought is still at work; after thousands and thousands of our village and cart cattle have been swept away, now another centre of contagion has(as report goes)been formedin Colombo

It seems to be no one's interest and less anyone's duty to put a stop to this ruin which will sooner or later be the means of killing out the goviya of Ceylon.—Yours faithfully, TRUTH.

MR. LIPTON AND THE TEA FUND.

Kandy, August 16th, 1890.

MAKING KNOWN CEYLON TEA.

SIR,—With reference to the minutes of proceedings of the Standing Committee of the "Tea Fund" recently published under the above heading, I think it right to give the same publicity to the enclosed copy letter from Mr. Lipton's representative received today.—I am, sir, yours faithfully,

A. PHILIP, Secretary.

(*Copy*). Colombo, Aug. 15th, 1890.

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

TAYLOR TESTIMONIAL.

Dear Sir,—Before leaving for England Mr. Lipton instructed me to forward you a small donation to this fund, and I have now the pleasure to send you a cheque for R35 (R25 on Mr. Lipton's behalf, and R10 on my own).

Allow me to take this opportunity of cordially accepting the resolution passed at the recent meeting of the Tea Fund Committee with regard to Mr. Lipton's estates subscribing to its income. Mr. Morison's letter of withdrawal being written under a misapprehension, I am happy therefore to tell you that these subscriptions will be continued as before.—I am, &c.,

(Signed) FRANK DUPLOCK.

SUCCESSFUL CACAO CULTURE.

Uva, August 12th.

SIR,—Your correspondent "U P" wishes to learn the whereabouts of cacao estates giving their 3, 4, and 5 cwt per acre all over.

Of the last named class I know of none, and though there may be half-a-dozen exceptions in Ceylon—*o fortunati nimium agricolae*—they are situated chiefly, I fancy, in some imginary Eldorado (the pagoda tree being grown for shade) existing chiefly in the minds of sanguine proprietors.

But it may interest him to learn that all the older cacao under shade in Monaragala district gave last year crops of 2½ to 3½ cwt. per acre, even the former leaving a handsome profit at present prices.—Yours, &c., 102s 6D.

COTTON IN UDAPUSSELLAWA.

Public Works Bungalow, Delmar Estate,
Udapussellawa, Aug. 1890.

DEAR MR. EDITOR,—I send by this post cotton from 10 pods of Pernambuco or kidney cotton grown here, as also 4 pods and some seeds I have

not weighed the cotton, but if you think the information is worth giving to the public, please give weight. The tree grows for years. I have seen trees near Kegalla and Nawalapitiya loaded with pods and said to be from 10 to 15 years old. The oil from seed is used as medicine by the natives, the refuse I should think would be as good as castor cake. During the cotton famine I sent a sample through Messrs. C. Shand & Co. to Liverpool and was offered 2½d *sterling more* per lb. for it than was being paid for Tinnevelly at the time. The sample I sent was grown on Cadurnally, Dumbara. I had 25 trees each, Sea Island, Barbados, Nankin, Pernambuco, I got the latter name from Dr. Thwaites of Peradeniya.

I gave a lot of the seed which was given to the Cotton Spinning Company, perhaps the Managing Director of the cotton trinity might inform us of its worth as compared to other cotton now grown in Ceylon.—Yours very truly.

JAMES ROBERTSON.

[We referred the cotton to the Hon. Mr. Mitchell, who writes:—"I return Mr. Robertson's letter you sent me with the Pernambuco cotton, sometimes called Peruvian and Kidney. The seed weighed 748¼ grains and the clean cotton weighed 282 grains. The percentage of clean cotton was thus about 28. This kind of cotton is about the best the natives can grow as it is hardy, bears well, and is a perennial. The difficulty is to get seed in quantity. The cotton is of similar value to the Egyptian sort, and we value it locally at 30 cents per lb. clean."—ED. *T. A.*]

"TEA FOR PRICE."

SIR,—Will you inform me through your columns what is the correct definition of the term so often used by London brokers in their circulars "Tea for price."—Yours truly,

INTERESTED IN TEA.

[We referred to a leading tea buyer, who replies:—"I cannot give you an exact definition for teas coming under this heading of 'Teas for price'—so much would depend on market and range of values. All classes and qualities selling at and under about 10d I should consider 'Teas for price' now.—ED. *T. A.*]

MR. JOHN HUGHES ON TANNIN IN TEAS.—Until the appearance of Mr. Hooper's paper and figures, the popular idea certainly was that the delicate flavour, so conspicuous in high-grown teas (Darjiling and Kangra Valley teas, for instance), was due to the smaller proportion of tannin contained in such teas, compared with low grown Assams and others of similar character. Mr. Hooper's experiments led him to an opposite conclusion, and he was induced to believe that the tea which contains most tannin is the most valuable. Mr. Hughes, in his letter to the Planters' Association, which we publish further on, is not willing to receive Mr. Hooper's conclusions, because the facts do not seem sufficient to justify them. Mr. Hughes is specially not prepared to receive Mr. Hooper's dictum that the proportion of tannin in tea can be affected by neither altitude nor process of manufacture. The questions at issue are so interesting and so important that we cannot doubt the ready acceptance by the Association of Mr. Hughes's offer to conduct, at a specially moderate scale of remuneration, analyses of Ceylon teas with a view to determine the proportion of tannin in such teas. The results compared with average selling prices will justify conclusions as to the points at issue, and may lead to improvement in modes of manufacture.

TEA BLENDS.—"What is a tea blend is the question agitating the minds of tea dealers in the old country and the *Home and Colonial Mail*—see the *Tropical Agriculturist*—discusses it at some length. Of course grocers can sell any blend they like if they truly describe it. But it is melancholy to see the immorality of the pleas put forward. Deliberate falsehood is condoned as merely Pickwickian story-telling!

TEA IN JAPAN.—The *Japan Weekly Mail* of 28th June says:—The Tea trade has slacked off somewhat, which may be attributed to two causes, the quantity already fired—nearly 20,000 piculs more than at the same date last year, and to the inferiority of the second crop leaf, which is said to be decidedly poor in cup. Notwithstanding that sales have dragged to some extent, prices remain unaltered.

THE IMPERIAL BRITISH East African Company have appointed Mr. J. R. Dudley McAllister their engineer to carry out the construction of the railway to which Mr. Stanley alluded in his speech at Newastle, extending from Mombasa on the coast to Lake Victoria Nyanza, a distance of about 400 miles. Mr. McAllister has left London for this object.—*Public Opinion*, July 18th.

CEYLON HALF-CHESTS OF TEA.—The question of the absurdly small contents of Ceylon "half-chests" continues to exercise the minds of both dealers and grocers. As has been frequently pointed out, when ordering a half-chest, the buyer expects to obtain not about 30 lb., but from 50 to 60 lb. of tea, and makes his purchase accordingly. From the importer's point of view, the dock rate of charges makes the half-chest of 60 to 70 lb. by far the cheapest package to handle; and from the grower's, there is to be remembered that the larger the package the less wood is of course required to hold the same amount of tea. It is, therefore, everyone's interest to maintain packages of reasonable size, and although this has often been pointed out, no steps have apparently been taken to meet the wishes of the trade. —*Produce Markets' Review.*

THE NETHERLANDS INDIA SUMATRA TOBACCO COMPANY have issued a circular to their shareholders stating that the total of the 1889 crop is somewhat smaller than originally calculated upon, as in the process of fermentation the tobacco lost a higher percentage in weight than was expected. The prices realised for the parcels already sold are highly favourable; and, although the quality of the tobacco not yet arrived is not quite so good as that of the portion already sold, the directors feel confident that the result of the company's first year's operations will prove satisfactory, and an interim dividend will be declared as soon as possible after the sale of further parcels. Reports about the 1890 crop continue to be of a favourable nature. By last mail advices, dated May 15th, 2,497,300 trees had already been planted, and the head administrator states that unless anything very unforeseen should happen a much larger crop can be expected for the current season.—*O. Mail.*

SOME PALM TREES furnish a sweetening juice. The most famous of these is probably the *Areng*, or sugar palm of Amboyna (*Arenga saccharifera*) which grows in the Indian Archipelago. * It is a superb tree, with pinnate leaves twenty-five feet long and is as handsome as it is useful. A number of species belonging to the different genera furnish a kind of hair of finer or coarser texture. It is found in the fibrous sheaths of the leafstalk and in the jagged edges of the leaves. Cables made of the black tough fibres of the *Areng* are preferred by the coasting sailors of the Spanish colonies on account of their elasticity and durability: and they are, moreover, very fine. The hemp palm of Japan and (*Chamærops excelsa*) is available in the hands of the industrious people of those countries for making the finer brooms, light strings and a thousand articles of daily use. Palms of coarser fibre, like the *Piaçaba* of Brazil (*Leopoldinia piassaba*), furnish material for blinds, brushes, brooms, and the rollers of mechanical sweepers, which are much more durable than rollers fitted with steel teeth.—*Indian Agriculturist.*

* Specimens of this the great sugar palm of Java are growing near the banyan tree close to Muirburn, Colombo. It is closely allied to our kitul palm, but there is the difference that the fruits of the arenga are edible, while those of the kitul are not. Old trees in the Peradeniya Gardens have borne fruit. For ornament as well as utility the *arenga* ought to be extensively cultivated in Ceylon.—ED. *T. A.*

THE TEMPERATURE OF THE GROUND.—At Calcutta the soil is, on the average, 2·7° hotter than the air, at Allahabad 2·4° hotter, at Jeypore (where the soil on which the instrument is placed is almost pure sand) 5·8° hotter, at Lahore 6·6° hotter.—*Indian Meteorological Report.*

MASKELIYA, July 20th.—Paper lining will *never* do, however cheap, for tea boxes; tea must be hermetically sealed to keep. A voyage from the estate to London now-a-days is no test. Look at the sample tins sent by post. All open, and yet for the short time the tea keeps fairly well. Navy and Army contractors have to guarantee the tea to keep for 2 years!—Heavy rain here for last 3 days.

QUININE.—According to the annual report of the directors of the Amsterdam Quinine Works, the results of the year 1889 were satisfactory. The deliveries of quinine sulphate (irrespective of other quinine salts) from the works during the past year have been about 400,000 ounces, and the accounts show a profit sufficiently large to admit of the payment of a dividend of 6 1-5th per cent.—*Paramatical Era*, June 15th.

TEA IN JAPAN.—The *Japan Weekly Mail* of 24th May says:—"The Tea Trade has been large—nearly 23,000 piculs of leaf having been taken during the week. It is estimated that first crop pickings will be all in hand by the end of the first week in June, and then show a shortage of production as compared with last year of 20 per cent. Another week, however, must elapse before anything like a trustworthy statement can be made as to the probable first crops outturn."

COCOA ADULTERATION.—Mr. T. A. Pooley, the county analyst for Essex, reported to the Essex County Council, on Tuesday, that the only sample of cocoa examined was also adulterated. Butter came next to milk in number of adulterations, but most of the cases are offences against the Margarine Act. Flour was added to the mustard, and starch and sugar to the cocoa. In the cocoa case no proceedings were taken, as it is doubtful whether to use the constituents found really constitutes adulteration, since commercial "cocoa" is a compound article, and is never made in a state of absolute purity. The value of this article as a food, however, is greatly reduced when more than half of it is made up of starch and sugar, as was the case in this instance. —London *Grocer.*

MANUFACTURES IN MALABAR.—There are a variety of manufactures carried on in the Malabar District. The Basel Mission has four cotton weaving establishments, which turned out during the year 1889-90 about 150,000 yards, valued at R80,000. It has also a tile factory at Calicut, the value of the outturn being estimated at R40,000. It employs 200 workmen. There is also a tile factory at Ferok, owned by an enterprising Parsee Firm, Messrs. Maneckji & Co., employing 100 individuals. Messrs. Volkart Brothers and Messrs. Pierce, Leslie & Co., have extensive coir manufactories at Cochin and Calicut respectively. Messrs. Volkart Brothers' out-turn is about R20,000 annually. There is a cotton mill in Calicut taluk established in 1888-89 under the name of the "Malabar Spinning and Weaving Company." It has not yet commenced weaving but it employs 400 individuals and turns out annually 1,185,900 lb. of yarn estimated at R487,790. Messrs. Henke & Co., have a cigar factory which turn out cigars valued at R5,000 per annum. Palghat is noted for its fine mats, the best kind fetching very high prices, and brass vessels are manufactured at Kunhimangalam in Chirakal and Cherpolcheri, in the Walawanad Taluk.—*M. Mail*, 22nd. July.

SPRING VALLEY COFFEE COMPANY, LIMITED.

REPORT.—To be presented to the Twenty-fifth Ordinary General Meeting, of the Company on Thursday, the 24th day of July, 1890, at 12 o'clock noon.

CROP 1888-89.

The out-turn of the Coffee crop for this season proved satisfactory, the total weight sold in London being 2,607 cwts. 1 qr. 11 lb.; this brought an average of 96s 9d per cwt., the value of the crop amounting to £13,065 7s 10d.

The yield of Tea on Spring Valley amounted to 86,458 lb., and this, altogether with the Tea bought from neighbouring estates sold at an average of 10¼d per lb., the value of the proceeds being £4,425 5s 4d.

The weight of Tea sold in London from Oolanakande estate was 13,128 lb., at an average of 8¾d per lb., the total value of Tea from this property being £511 19s 3d.

Cinchona Bark to the extent of 36,969 lb. was harvested on Spring Valley, which sold for £585 11s 1d, or an average of 3¾d per lb.

The total value of all produce sold during the season was £18,588 3s 6d, while the year's expenditure in Ceylon and London, after allowing for profit on exchange, amounted to £13,498 11s 11d, thus showing a profit on the season's working of £5,089 11 7d; to that has to be added the balance of £586 5s 8d brought forward from last year, giving a total of £5,675 17 3d at the credit of Profit and Loss.

On the 10th January last an interim dividend of 2½ per cent. was paid on the capital of the Company, absorbing £2,000 of the above amount, and the Director now recommend the payment of a further dividend of 1½ per cent., making 4 per cent. for the year, free of income tax. To meet this dividend a sum of £1,200 will be required, leaving a balance of £2,475 17s 3d to be carried forward to next year.

CROP 1889-90.

When the interim dividend was paid in January, and indeed up till quite lately, the Directors had every reason to believe that they would be able to recommend the payment of a divend at the same rate at the present time, but from Reports lately to hand from Spring Valley it is seen that the Coffee Crop for the above season will fall far short of estimate. The original estimate was 1,200 cwts., but it is feared that a total of only 800 cwts. will be secured; so large a shortage on such a small crop is very disappointing, and with the present good prices ruling for Coffee means a very considerable reduction on the year's returns. The Board, therefore, think it judicious to carry forward a much larger sum at the credit of Profit and Loss than would under other circumstances be necessary.

It has been the policy of the Board to retain the Coffee on Spring Valley as long as possible, and everything that skilful cultivation could suggest and the means of the Company permit, has been done with this object. Up to the present time this policy had been attended with success, sufficient revenue having been obtained from the area under Coffee to enable the Company to pay fair Dividends, and also to provide considerable sums of money for the necessary outlay on planting up large areas of Tea, and on the erection of factories and machinery for the manufacture of the leaf.

The season for Crop 1890-91 opened well, the Coffee being healthy, and there being every indication that good blossoms would result which the trees would be well able to mature, they being comparatively free from disease. The Directors, therefore, are much disappointed with the recent reports from Spring Valley announcing severe attacks of green bug and leaf disease which may materially affect the Coffee crop.

It was hoped that these pests were disappearing as the Coffee looked so healthy, but the regularity of their return, thus rendering the tress too weak to mature their crop, coupled with the small yield to be secured for season 1889-90, viz., 800 cwts. off an area of 970 acres, has compelled the Directors to give instructions to plant up 108 acres of the weakest and least remunerative Coffee in Tea, thus leaving 862 acres still under Coffee, while it is very possible that, year by year, this area may have to be gradually converted into Tea, unless, as is hardly to be expected, the pests which are attacking Coffee should disappear.

The Tea on Spring Valley is now maturing well; the crop for 1889-90 is estimated at 113,000 lbs., and from the way in which the bushes are improving as they gain age, the crop for 1890-91 should show a material increase on this figure.

Extensive manuring operations are being carried out on Spring Valley, both on Coffee and Tea, and as tea responds in a remarkable way to applications of manure, the best possible results are anticipated from this work.

The market for Ceylon tea is well supported, and the average price for crop 1889-90 will show an improvement on that obtained last year.

The following table shows the total area now under tea on the Company's properties:—

TEA.

		acres.
Planted Nov./Dec.,	1884, on Spring Valley ...	271
„ May,	1885, on Oolanakande ...	143
„ Nov./Dec.,	1885, on Spring Valley ...	230
„ May,	1886, on Oolanakande ...	7
„ Nov./Dec.,	1888, on Spring Valley ...	20
	Total area under tea	671
	To be planted during 1890 on Spring Valley	108

UVA COFFEE COMPANY, LIMITED.

CAPITAL £100,000, IN 10,000 SHARES OF £10 EACH.

Report to be presented to the Twenty-seventh Ordinary General Meeting of the Company, to be held at No. 5, Dowgate Hill, London, on Thursday, the 24th day of July, 1890, at 1 o'clock p. m.

CROP 1888-89.

The Coffee Crop for this season was estimated in the last Report at 1,500 cwt., and it will be seen by reference to the Accounts that the actual outturn, as nearly as possible, amounted to this quantity. The average price of the Coffee sold in London was 96s per cwt.; the total proceeds derived from the sale of this product being £7,183 2s 3d.

The estimated Tea Crop was 177,000 lb.; the actual yield from the Company's estates being 170,150 lb. The Tea brought an average price of 11d per lb., and inclusive of that bought from neighbouring estates, the total proceeds amounted to £12,320 18s 3d.

Cinchona Bark, to extent of 147,715 lb., was sold at an average of 4¼d per lb., producing £2,678 5s 10d.; 22 cwt. of Cocoa were also sold for £92 7s 10d, making the total value of all produce for the season £22,274 14s 2d.

The total expenditure for the year in Ceylon and London, after allowing for Profit on Exchange, amounted to £20,426 1s 9d (inclusive of not less than £2,700 spent on Tea factories, machinery, &c., and over £400 in adding 67 acres to the Tea area). There is thus a profit of £1,848 12s 5d on the season's working. To this has to be added the balance of £220 0s 3d brought forward from last year, giving a total sum of £2,068 12s 8d at the credit of Profit and Loss Account.

An interim dividend of 1 per cent on the capital of the Company was paid on the 10th of January last, which absorbed £1,000 of the last named sum, and the Directors now recommend the payment of a further dividend at the same rate, making 2 per cent for the year free of Income Tax. To meet the dividend now proposed the sum of £1,000 will be required, leaving a balance of £68 12s 6d to be carried forward to next account.

CROP 1889-90.

The outlook for this season is fairly good. The Coffee Crop is estimated at about 1,400 cwt., and the yield of Tea from the Company's estates is expected to reach a total of 250,000 lb., exclusive of bought leaf. The good prices which have ruled for Coffee for some-

time past still continue, and it is thought that the whole of the Crop will be disposed of at very satisfactory rates. The Tea market is also well supported, and it is hoped that the average price of the whole Crop will certainly not be less than last season's. Should the Directors' expectations as regards Crop and prices be realised, a fair profit on the year's working should result.

Bearing in mind the present value of Coffee, everything possible has been done to retain this product on the Company's estates, and in spite of the yearly disappointment brought about by steadily diminishing crops, hopes have been entertained that the two pests, Green Bug and Leaf Disease, might in time disappear, but it is difficult to entertain such hopes any longer. The Coffee trees looked vigorous and healthy, and everything was in favour of a good Crop for season 1890-91, but last accounts to hand from the Estates report very severe attacks of both Green Bug and Leaf Disease, which cannot but affect the out-turn of that Crop.

Under these circumstances, the Directors have resolved to plant up in Tea 270 acres of the weakest Coffee, still leaving 942 acres under Coffee, which may gradually have to be planted up in Tea in future years.

It is satisfactory to report that all the Tea on the Company's properties is thriving well, and from past results the Directors have every reason to anticipate a continued improvement, both in point of yield and quality as the Tea gains age. As Ceylon Tea daily increases in favour, there is no reason why the present range of prices should not be maintained.

The Company have on their estates Wire Tramways and other appliances which enable manuring operations to be carried out most expeditiously and cheaply, and from this work, which is now being undertaken on a large scale on the Company's properties, the best possible results are looked for, as the Tea bush responds to manure in a most marked manner, and within a few months of its application.

The area under Tea is as follows:—

TEA.

Planted Nov. Dec.	...	...	1883	9 acres
,,	...	...	1884	347 ,,
,,	...	...	1885	448 ,,
,,	...	...	1886	27 ,,
,,	...	...	1887	17 ,,
,,	...	...	1888	67 ,,
,,	...	...	1889	12 ,,
Total area under Tea				927
To be planted during 1890				270 acres

TEA AND DARJEELING.

Sixty-five inches of rain had been gauged since the 1st January to date. Taking the average rainfall to be 120 inches in the year, it will be seen that a little more than half our usual allowance has reached us, while if the season is at all a normal one we may count our rain until the first week of October. A very considerable amount of damage, as was to be expected, was done by the deluge, and for a few days through booking of passengers on the D.-H. Railway had to be suspended. The line was completely blocked near the 38th mile by a huge rock. With the help of dynamite the obstruction was removed in a little over 48 hours. It was rather amusing, though excessively aggravating, to notice how very quick the local petty shopkeepers were in taking advantage of the line being blocked. Up went the price of their wares fully 50 per cent. and at once: so that the public loss was their gain. The line has been damaged near Kurseong, and again near Gyabaree Station, where the Puggla Jhora—very appropriately so called—broke loose and carried away a large portion of the retaining wall, which had stood so well almost since the line was completed. Your readers will see from this rough sketch that the traffic branch of the Railway have had by no means an easy time of it in keeping communication open with Silligorie. From what I have seen the quality of tea is very satisfactory. Davidson's Sirocco tea drier does require four men to look after it, and does not dry off the leaf in the time stated by the prospectus. I say this after watching one of them at work several times. Still, the new drier is an improvement on his earlier driers, and no doubt when these points have attracted Mr. Davidson's attention—it has been drawn to them already I know—he will set to work to remedy these undoubted defects.—*Indian Planters' Gazette*, July 22nd.

TANNIN IN INDIAN AND CEYLON TEAS.

Analytical Laboratory, 79, Mark Lane,

London, E. C., July 18th.

John Hughes, Agricultural Analyst, to A. Philip Esq., Planters' Association, Kandy.

"TANNIN IN INDIAN AND CEYLON TEAS."

Dear Sir,—In the *T. A.* for last February there is on page 562 an abstract of a paper on the above subject. The original paper was communicated to the "Chemical News" of December 27th, 1889, by Mr. David Hooper of Ootacamund, and as the analytical results are interesting and worthy of being confirmed or refuted I send you a copy of same.

You will observe that out of 65 samples of tea examined for tannin, only six represent estates in Assam at the comparatively low elevation of 600 feet. All the others represent tea grown at an elevation ranging from 2,500 feet in Travancore to 7,800 feet on the Nilgiris, the tannin per cent being 19·95 in the former and 13·55 in the latter. Practically, therefore, these teas represent the hill gardens, and not the plains of lowlying gardens of Assam, and as such it is not at all remarkable that the proportions of tannin should agree closely with that produced on the Ceylon hills.

In the 13 Ceylon teas examined by Mr. Hooper in his report the tannin ranged from 15 per cent in a sample of pekoe souchong from Yellangowry estate 2,500 feet, to 20·87 in broken pekoe from Kanangama 200 feet. Here we have a difference of nearly 6 per cent in favour of the low grown tea; though curiously enough in a sample of broken pekoe from Glenorchy 5,700 feet Mr. Hooper found as much as 19 per cent: Before, therefore, disputing Mr. Hooper's conclusions, namely that the amount of tannin present in tea is not influenced either by *elevation* or *manufacture*, I would respectfully ask, Are his facts correct? At present his conclusions are certainly in advance of his facts, and the very opposite of popular opinion based on practical experience.

Mr. Hooper tells us that the figures for tannin given in the list of the 65 samples represent the total amount of this constituent obtained by perfectly exhausting the leaves, and do not represent the amount taken in domestic use. Further that the usual teapot infusion of ten minutes removes only one-third of the total amount.

Therefore all the 65 examinations for the total amount of tannin present in these several specimens are of little practical use in showing the actual available tannin for domestic requirements.

What would be really useful information to the planter, and also interesting to the tea-drinking public, might be obtained if the proportions of tannin were carefully determined with a 1 per cent infusion after standing for ten minutes.

With our present information it is only reasonable to conclude, that not only the *elevation*, but the mode of cultivation, manufacture, season of the year, variety of plants and general skill brought to bear upon the industry, must exercise a very great influence on the quality of tea produced, and on the strength of same as indicated by the proportions of what I may term the available tannin.

According to Watt all tannins are remarkable for the avidity with which they absorb oxygen, especially in the presence of alkalies. This remark, I think, should be considered in connection with the operations of withering and rolling.

The temperature as well as the humidity of the atmosphere must have an important influence in increasing or retarding the chemical action set up after rolling. Again in regard to firing it is quite possible that over-firing many render a considerable portion of the tannin insoluble, and so reduce the proportion of available tannin in the made tea, causing it to have less strength than it otherwise would have had. I understand from Mr. Leake that reliable samples of Ceylon tea from well known estates could easily be obtained in London together with the actual market value of same, so that there would be no necessity to send samples from Ceylon more especially as such samples would not represent the bulk delivered this side, so perfectly as samples expressly drawn for market purposes on arrival.

If the Association should desire to have such a series of determinations of tannin made I may mention that the expenses would not be great, and I should make the analyses at a specially low rate of charge for the members of your Association.—Awaiting your reply, believe me, dear sir, your's faithfully, (Signed) JOHN HUGHES.

THE TOMATO-CURE FOR DYSPEPSIA.

Don't talk to me of colocynth or famed cerulean pill,
Don't mention hyoscyamus or aloes when I'm ill ;
The very word podophyllin is odious in mine ears,
The thought of all the drugs I've ta'en calls up the blinding tears :
The Demon of Dyspepsia, a sufferer writes to say,
At sight of the Tomato-plant will vanish quite away.

The Faculty will diet you till indigestion stops,
On what have always seemed to me interminable slops ;
A dainty dish is sure to be the worst thing you can eat ;
The bismuth and the charcoal come like nightmares after meat.
Away with all restrictions now, bring mutton, beef, and veal,
As long as ripe Tomatoes come to supplement a meal.

Hepatic action, doctors say, is very hard to start,
And if you have too much of it, that also makes you smart ;
And so the fate of many folks, especially in town,
Is first to stir the liver up, and then to calm him down.
Now he can trouble us no more, although we go the pace ;
A diet of Tomatoes keeps the tyrant in his place.

Away with deleterious drugs, for here's a plant been found,
Worth all the weird concoctions that dispensers can compound:
Get fresh Tomatoes, red and ripe, and slice and eat, and then—
You'll find that you are liver-less, and not like other men.
Come ye who dire dyspepsias's pangs impatiently endure,
It cannot hurt, and may do good, this new Tomato-Cure.

—*Punch.*

INSECT PESTS: THE HELOPELTIS PESTS OF CEYLON CACAO AND INDIAN TEA.

Vol. 1, No. 4, Indian Museum Notes, edited by Mr. Cotes, possesses a painful interest, in its very full and copiously and carefully illustrated descriptions of the species of *Helopeltis* so destructive to cacao in Ceylon and to tea in India. In Ceylon, as yet, we have happily escaped the prevalence of "mosquito blight" on our tea, and we trust the exemption may continue, for it is deplorable to read of the ravages of this species of *Helopeltis* in India, where the crops of tea are on some estates reduced by one half or more by the tapping and sucking operations on leaves and stems of swarms of the insects. No fewer than 25 pages of the number we are noticing are taken up with Mr. E. T. Atkinson's paper on the genus *Helopeltis*. Readers specially interested ought to obtain copies of the Calcutta publication. For the information of our readers we reproduce the engraving of *Helopeltis theivora*, in its various stages, with the characteristic horn shewn separately. We also quote some of the most interesting portions of the text:—

RHYNCHOTA. By E. T. ATKINSON, B.A., C.S., C.I.E.
MOSQUITO BLIGHT.

In this paper, reference is made principally to the species of the genus *Helopeltis* of the family *Capsidæ*, belonging to the sub-order Hemiptera-Heteroptera of the Rhynchota. The genus comprises the insects so well known as the 'mosquito blight' in Assam and Sikkim, as the 'roest' or 'rust' in Java, and under similar names wherever the tea plant is cultivated. Species of this genus have been reported from the Philippine Islands, Java, the Eastern Archipelago, Ceylon and India, and are of considerable economical interest from the ravages that they commit. It was my intention to prepare a monograph of the entire genus, but this could only be done with fresh materials, and it appears to be desirable to summarise here what is known regarding the genus, and ask those interested to forward fresh specimens in weak alcohol for a fuller description of the species.

Genus HELOPELTIS, *Signoret.*

Ann. Soc. Ent. France (3s.), vi, p. 502 (1858).

First joint of the antennæ as long as the head and the pronotum taken together, second joint longest, 3—4 joints short: scutellum with a spine on the disc: side of the abdomen reaching beyond the hemelytra. Signoret placed this genus in the subdivision 'unicellules,' formed to contain those genera in which the membrane has but a single cellule the head transverse and truncate beyond the eyes, the antennæ long and slender, ocelli wanting, and the pronotum narrowed anteriorly. The division to which *Helopeltis* apparently belongs is represented in Central America by Distant's '*Valdasaria*' (Biol. Cen. Am. Hem., p. 242).

Then comes a notice of *Helopeltis antonii*, Signoret:—

Black varied with red: head black, rostrum yellowish: antennæ black, yellow at the base: pronotum and pectus sanguineous: scutellum red, spine yellow cup-shaped at the apex: hemelytra brown-yellowish deeper at the base than at the apex, median portion transparent: abdomen yellow, with a basal spot and apex, black: feet black: femora nodulose, the first pair, with a yellow ring at the base, intermediate pair of a lighter colour, varied with yellow: last pair with a yellow ring at the apex (*Sign.*) Long, 11 broad, 2 mill.

A description by Waterhouse of specimens received by him from Ceylon is given, and we quote thus :—

Reported from Ceylon. Dr. Trimen, in *Nature* for October 23rd and December 25th, 1884 (Vol. xxxi, p. 172), remarks that this species is found on the cacao and is its only formidable enemy. In the same Journal for October 30th, 1884, Mr. W. L. Distant states that he had received from Ceylon mutilated specimens of a Reduviid which doubtless occurred with the Capsid *H. antonii*, easily known by its nodulose femora and the spine on the scutellum. The Reduviid, however, probably feeds on the Capsid, and from its similar form and size may be confounded with the really injurious insect, so that in taking measures against these pests the Reduviid should be spared.

Next comes a description of *Helopeltis bradyi*, Waterhouse.

Mr. Waterhouse obtained this species from Java, where it was reported to have done much mischief on the Cinchona plantations.

Next we get *Helopeltis niger*, Walker. Then follows *Helopeltis braconiformis*, Walker, reported from New Guinea.

Helopeltis febriculosa, Bergroth.

This species was found amongst a number of *Disphinctus humeralis*, Walker, sent by me to Dr. Bergroth for identification. All were collected on the Cinchona plantations at Mungphu in Sikkim by Mr. Gammie, where this species was found on *Cinchona calisaya*, and occasionally on *Cinchona succirubra*. It has not occurred yet in sufficient numbers to do much damage; but as it belongs to the same genus as the destructive 'Mosquito pest' of the tea, its operations should be carefully watched. *H. febriculosa* is allied to *H. theivora*, Waterh., but is distinguished by the erect, very little curved scutellar horn; in *H. theivora*, ♀, the horn is much curved: this difference, however, appears to be merely of varietal importance.

Helopeltis pellucida, Stål.

Reported from the Philippines. *Helopeltis collaris*, Stål.

Reported from the Philippines. *Helopeltis podagrica*, Costa.

The habitat is not recorded. *Helopeltis romundei*, Waterhouse.

Hab Java: on tea.

We can testify from personal observation the truly fearful effects of *Helopeltis* on tea in Java; and the following full account of the Indian species shews how heavily it handicaps the Indian tea planters :—

Helopeltis theivora, Waterhouse. *Plate XII, fig.* 2.

Helopeltis theivora,? Moore, Wood-Mason, Tea-bug of Assam, p. 12 (1884): Proc. Agri. Hort. Soc. Calc., 20 Nov. 1873, and v, p. xviii, xxviii (1873); Westwood, Gardener's Chronicle, Feb. 21, 1874. *Helopeltis theivora*. Waterhouse, Trans. Ent. Soc., p. 45, t. xi, f. 3 1886.)

♀ Black: pronotum orange-yellow, with a black line near the anterior margin, the base margined with black: scutellum brown, black at the base, spine or horn long, much curved, black, at the apex brown: antennæ dark brown, basal joint paler, yellow at the base: femora dark brown, mottled with light brown, with a light-yellow ring at the base: tibiæ light brown, speckled with dark brown (*Waterh.*) Reported from Assam, Sikkim. Easily recognised by the long and curved spine on the scutellum. Mr. Moore does not appear to have described this species, so that Mr. Waterhouse must be considered as having named it. There does not appear to be any fixed time for the appearance of the insect or seasonal broods. The eggs are found apparently both in the axils of the young buds and on the lower leaves, but this is a point requiring further examination. The larva is about 1-16th inch long, obtuse, soft with a very small, clavate caudal appendage; colour amber-hyaline, but after sucking the juices of the green leaf for some time it becomes of a greenish colour. The head is horizontal; the rostrum is about one third to three eighths of the length of the body, and in repose lies quiescent on the pectus: two eyes, no ocelli: antennæ purplish, hemelytra rudimentary: gradually the insect increase in size and becomes of a deeper amber or orange colour, the antennæ become longer and turn to black, and the insect is less active, though furnished with complete hemelytra, which with the head and pronotum is black, whilst there is a broad white band on the abdomen. An observer informs us that the insects seem to commence tapping in February and go on till the end of August. A young larva procured by nipping off the shoot, a leaf or two below the place where it was seen, was placed in a bottle with a shoot containing a pekoe bud and leaf and a pekoe-souchong leaf. After 21½ hours it was found that this single insect had made 58 taps on the pekoe-bud, each marked by a discoloration of the epidermis; there were 48 marks on the pekoe-leaf and 18 on the pekoe-souchong leaf. The spots at first were of a brown colour but soon changed to black. Dr. Aleyboom states that these insects, in Java, repose during the day near streams and in moist ground, and feed by night, though a few may be found during the day in shady positions on the shrubs, but not on the ground. The garden referred to was surrounded by paddy-fields and near a river, and seemed to be more liable to attacks in cold and wet weather. The insects in Assam are to be found to repose in shady positions beneath the shrubs, and do not leave the area of attack. The observations of Dr. Aleyboom would therefore appear to be not of general application, but to have reference to the particular position of the garden referred to.

H. theivora is the form with which we are chiefly concerned in India, and Mr. S. E Peal of Sibságar was the first to bring to notice (Journ. Agri.-Hort Soc., Calcutta, IV (i), p. 196, 1873) that the "black blight," "smut," &c., on tea was the work of this insect and not a spontaneous fungoid growth. Further investigations have shown that the attacks of these insects occur under all conditions of soil and climate, in high land and low, dry or wet, rich and poor, in a dry, season as bad as in a wet one, and as frequently with good culture and clean tea as with the reverse. That it is not due to "shade" or "want of cultivation" is shown by the fact that in the two worst cases, one had the garden particularly open, and in the other it was quite clean. It is difficult from one year's attack to say where the insect will appear the next year; all places appear to be equally liable to its ravages, but it seldom is seen over an entire garden at once.

Mr. Peal states that the young leaf alone is first attacked, and the more tender and succulent the shoots are, the more they suffer. The shrubs show the shoots brown and withered in a garden that has for some time felt the attacks of the insect; but if only recently attacked, the general appearance is normal, and only on the youngest shoots and twigs are a few small brown spots seen, the size of the spots varying with the age of the insect causing them. If the insect be very young, the punctures are minute and close, and the consequent discolorations coalesce and become continuous. When the larva attains its full growth, these spots become one eighth of an inch in diameter. When the punctures are recent, the colour is pale brown and darkest at the edges; but if one or two days old, the spots are dark brown, verging on black, the entire leaf curling up and withering completely if they be at all close. Where the shrub has suffered for some time and severely, the symptoms are often less visible at first sight. The dead leaves have for the most part fallen off and the minute shoots at the leaf-axils above show the damage, all being dried and dead; there is less dead leaf showing, but dead "tips" appear everywhere. Further examination will show that the affected shrub, ere it ceased entirely to shoot out, had made many efforts to grow, all of which had proved abortive, and a branch that has not yielded a single leaf presents all the appearance of having been very severely plucked. On the tips of the young vigorous shoot being punctured and its juices withdrawn by this insect, it has died as certainly as if nipped off. When the eyes below the leaf-axil shoot out, and before the insect can do serious damage, one or two shoots may attain some size and bear several leaves, but as the insect increases in size, these tips are attacked: other shoots start from other eyes, attaining, however, less vigorous growth; these too, in a short time, succumb, and the shrub becomes leafless. When this occurs growth ceases, as every shoot requires from 40 to 50 days to mature so as to be fit for plucking, and the recovery of the tea is slow unless pruned.

Dr. C. Aleyboom of Java in the same Journal (v i), p. 55, 1878) describes the attacks of this insect on tea-shrubs there much in the same manner, except that he states that it attacks the under side of the leaf He adds that the insect inserts its rostrum and remains for a long time on the same spot, and some hourss afterwards the leaf shows a brown puncture that slowly turns black on the very spot where the puncture has been made. If the leaf be punctured closely it becomes black and so dry that it can be pulverised by rubbing between the fingers, and examination shows that the insect has removed all the juices from the soft part of the leaf. As in Assam, so in Java, the insect attacks first the buds and then the young leaves, and last of all the old thick leaves, until the shrub becomes leafless, and to prune it in this state is hurtful. The denuded shrubs seldom make new shoots, for the insects after having destroyed the leaves return to the parts of the twigs where the juices are gathering to send forth new shoots, and by sucking the juices there effectually prevent the development of buds. By remaining leafless the bark whitens and the wood becomes dry, and if the attacks continue for two consecutive years, the branches become covered with moss and die.

As already stated, these insects are reported in Assam to occur in all sorts of soils and under all atmospheric conditions. In Java, too, Dr. Aleyboom's researches have led to a similar result. There the soils may be divided into two classes—(*a*) those containing humus, and (*b*) those composed of red clay.

The first series comprise a mechanical admixture of humus, clay, and sand; it has a black hue, sometimes a depth of eight feet, and, when heated, it becomes red from the presence of oxide of iron, and gives off an ammoniacal odour. There are several varieties, due to the varying proportions of the constituent parts, but they usually contain mineral substances and from eight to twenty per cent of humus. The humus soils absorb and preserve moisture, and old shrubs usually thrive on them and produce a rich foliage. Young plants, however, easily fade and perish, and seeds do not develop, but rot.

The clay soils are of a brown hue, and are usually composed of fine clay and from ten to fifteen per cent of the oxide of iron, with some proportion of sand. These soils are arid, and during the rains absorb much water, drying up to the depth of two or three feet immediately afterwards, and also becoming heated. Here the tea-shrubs do not thrive except in moist seasons.

From 1869 to 1873, the shrubs in the humus soils were always affected by blight, which first attacked the leaves and the best-developed shrubs in the best parts of the garden, also the shrubs in the alluvial portion lying at the base of or between the hills. The shrubs in the red soils were at first free from blight, but they were also attacked when the fine leaves on the shrubs in the humus soils had been destroyed. Several experiments were then undertaken in order to ascertain the cause. Where the humus was thin or absent, the roots of the shrubs were top-dressed with good earth, which led to a new flush that was again attacked and destroyed by the blight. A very fertile part of the plantation was dug to a depth of 18 inches and thoroughly cleaned; in another place, furrows to the same depth were made and filled with branches of other trees; again another patch was drained; in another sticks smeared with tar and *oleum cornu cervi fœtidum* were placed amongst the shrubs; tar was also put in the ground; but none of these experiments proved successful. Large quantities of *calcium sulfuratum* were also placed on the ground, and in another part freshly-made phosphates, but the rust did not diminish. Fumigation with sulphur burned to windward only resulted in the destruction of the leaves reached by it; whilst fumigation by burning bad-smelling wood and leaves to windward had no influence at all. Pruning only gave temporary relief, and when potatoes were planted in the neighbourhood of affected shrubs, they also blackened and died.

Picking off the insects as they appear has been recommended and tried. When it is considered that if only moderately bad there are ten to twenty insects on each bush and if very bad thirty to forty, and the shrubs are planted 6′ × 3′ the number of insects to an acre—and therefore the numbers in a considerable garden—will preclude recourse being had to this procedure on an extensive scale. The insects are most injurious in the larval state, even when they are of microscopic dimensions, and when disturbed, however slightly, drop through the bush to the ground, where it would be useless to follow them. Picking would therefore be too expensive and unsatisfactory, as only partially clearing the bushes. In this connection Dr. Aleyboom recommends the early plucking of tips and tender leaves, so as to diminish the food-supply of the insects, which as already noted, attack those parts first. Another suggestion that cannot be recommended is to place bird-limed strings or light cotton bags smeared with some similar sticky substance in the affected areas.

Syringing as a prophylactic would be of little use in the rains, as in a day of heavy rain the substance used would be washed away. Spraying infected tips when the attacks first appear with kerosine emulsion as an insecticide appears to promise good result. It has been of practical value in the case of coccid pests on coffee, and is very simply made. The proper course suggested by the life-history of the insects is to search for the eggs, and to spray those places where they occur, for, as a rule, in the earliest stages, the larvæ are found only where the eggs have been deposited. * * *

Amongst the many remedies proposed, cutting down the forest and grass jungle adjoining plantations has found some favour. A writer in the Calcutta Journal already quoted suggests that *toon* trees may harbour the insect (November 1885), another that spear grass and other similar growths furnish the shelter. There is no doubt that in this country grass harbours vast numbers of *Capsidæ*, and it is quite possible that the original food-plant of the insect may be discovered and eradicated. It is, however, for the planters themselves to discover this, and there can be no harm in removing and burning during the cold weather grass jungle in the neighbourhood of plantations. Some support is given to this remedy by the statement of a planter that "even if destroyed on the tea plants, the insects come in from the neighbouring jungle, which should be burned down." Others say (Journ., *l. c.*, vii, p. xlii) that clearing the jungle is of no value. There is no precise record, however, in the whole of the correspondence regarding this pest of the persence of the insect on any plant other than tea or cinchona.

[This *Helopeltis* seems to be as specially and exclusively a tea pest, as *Hemileia vastatrix* is exclusively a coffee parasite.—ED. *T. A.*]

Anointing the bushes with "tar" has been recommended and tried, but abandoned, as it flavours the tea. Fumigation by burning bad-smelling weeds is reported in some cases to have kept down the pest, "but to do this successfully, the *tila* surroundings where they harbour and breed must be cleared away and burned during the cold weather."

Mr. R. B. Walker, Manager, Sookerating Tea Estate, Doom Dooma, Dibrugurh, writes:—

"Now to reply to your inquiries about what we did to get rid of the 'Mosquitoes' To begin with, before we stopped plucking last year, and while the blight was at its worst (about September and October), I started cutting down a 'belt' of jungle 80 yards wide all round the edge of the garden; this 'belt' was completed about the same time as the pruning of the garden was finished (the end of February this was): well then I commenced lighting fires all over the place: in the tea the prunings were being reduced to ashes as rapidly as the cut-down jungle in the 'belt' was being burnt up; by the middle of March I finished all the burning I wanted to do, and then every soul was put on to hoe round the bushes, *take away all stale earth from near the stumps of the plants, and fill in fresh earth.* The pruning I went in for last cold weather was most severe: the whole of the garden nearly was cut down to within eight inches of the ground; *all* knotty and gnarled wood was removed and nothing but straight wood left. During the pruning, immediately following up the pruners were gangs of women and children armed with small knives whose only work was to rid the *bushes of every leaf and small twig.* To protect the plants from the flames (while the prunings were being burnt) a drain fifteen inches deep by a foot wide was made in every alternate row of tea, and into this the pruning *leaves, &c.*, from round about were carefully brushed before being set alight to.

"Up to date not a trace of the blight is to be seen; this time last year about 100 acres (or more) were completely ruined; the tea is looking as healthy and nice, and growth is as vigorous as though the plants had never been blighted. So successful have we been so far in combating this destructive pest, that I am convinced now we will not be troubled with it *at all* this season, and that we will make our 8 to 8½ maunds an acre against a miserable 4 maunds an acre last season!

"The theory of letting tea run has been tried without the slightest signs of doing any good, for the simple reason the bushes *can't* and *won't* run! Bushes that I left alone during the three months (middle of April to middle of July) were, if anything, smaller at end of this period than at commencement of it, because not a vestige of growth had been made during the whole of this time, and the long healthy shoots chiefly) in the very centre, therefore the tallest part of the

bush) died gradually down to the parent stem. I have measured some of these dead shoots occasionally and have found them in some cases to be over 18" long.

"The shoots that I have found to so die down have always been of this year's growth *viz*, those shooting out from just below last cold-weather pruning.

"Now, as blighted patches here have been found to have a large number of the young of the Bug (which by the bye are in appearance like red ants, with two feelers apiece, and are wingless) in all stages of development (from the size of a pin's point to almost a full-grown bug) on nearly every bush, and as these young live right away inside the bushes and feed on only the 'minute shoots at the leaf-axils,' the theory of pruning is to give the bush pruned a severe check and so stop for a time the rising of sap (and. of course, the production of the 'minute shoots at the leaf-axils') in the hopes this brief period of the bushes' dormancy will be sufficient to kill the young bugs of starvation. Whether we have succeeded or not in destroying *any* young ones by starvation it would be difficult to say, but that pruning is doing good is quite certain. Three days ago I got 25 maunds of leaf off the piece of tea that was pruned (5 acres in June last) in July; previous to pruning, this bit of tea was *completely* shut up' for about 2½ months.

'Of course we know it is only right to cultivate and keep extra clean any tea that may be hanging fire' or doing at all badly. I reversed the order of things with a bit of about 5 acres of very badly blighted tea: I allowed it to go into 'howling jungle,' the bushes were out of sight for over a month; strange to say when I hoed and cleaned it up after a fortnight, I found the bushes quite recovered and with a very decent flush on them. The block of tea of which these 5 acres are a part presents a peculiar spectacle with its small piece of bright green healthy tea surrounded by dismal-looking acres and acres.

"Some weeks ago I tried sprinkling kerosine and water (¼ of k. to ¾ of w.) over a piece (about 2 acres) of tea: on two occasions the day the mixture was squirted I found a young dead mosquito, evidently killed by the oil having reached them. I will with pleasure report results of all experiments to you.

"I forgot whether I have mentioned to you the fact of my having found mosquito eggs on the lower and seed-bearing branches more frequently than I have come across them on any other parts of the bush: *always the old* leaves have I found covered with eggs and never have I seen an egg on a *young shoot*. I have more than once found eggs on the tea seed itself. To give you some idea of the number of eggs there are knocking about I'll just mention:—I ripped off from a bush near the bungalow all the leaves with eggs on them: on counting the leaves I found I had 1,741. Some of these were smeared on both sides. This particular bush was about an average one, and was not picked out by me, because I thought it had a larger proportion of egg-leaves than its neighbours.

"Young mosquitoes are very plentiful too; I have picked off more than 70 from one bush.

"On one occasion I pulled a seed-bearing branch off a bush and counted 33 leaves on it; *every* leaf was smeared on *both* sides with eggs, and besides this the main branch itself and the smaller ones too had any quantity of eggs sticking to them. This will show you mosquitoes are not very particular where they lay their eggs. This is quite in opposition to what others say about mosquitoes depositing their eggs in the young shoots between pekoe and souchong leaf."

Then follow descriptions of three homopterous insects found on the mango.

We quote what is said of a Cotton Pest:—

In February last Mr. E. E. Green, of Punduloya, Ceylon, sent me a small Lygaeid which, he states, infests the ripe pod of the cotton, discoloring and caking the cotton. I find it is the *Oxycarenus luyubris*, described some thirty years ago by Motschulsky. Hab. Ceylon.

A coccid is noticed, the *Coccus ceriferus* of Anderson, found on the Mango, Arjun, Pipal and other trees, and now on tea.

Signoret,* in his paper on the Coccidæ, merely quotes the imperfect description of Anderson, and gives no details. Under these circumstances I have sent examples to Mr. W. Maskell for description, as I have not leisure to take the work up myself. I do not think that there is any danger of this insect doing much damage to tea. If it does become troublesome, the application of kerosine emulsion by spraying to the leaves containing the larva will quickly destroy them and prevent their spreading. The waxy portion of the adult female may possibly be used as an article of trade like the insect-wax of the *pela* in China, but of the uses of the Indian wax we know nothing yet.

A butterfly destructive to fruit is described as *Virachola isocrates*, Fabricius, a butterfly of the family *Lycœnidæ*, of the suborder *Rhopalocera*, of the order *Lepidoptera*. It is found almost throughout the plains of India (except the desert tracts), and in Ceylon, but not in Assam or Burma.

Every fruit that is attacked by the larva dies before it is full-grown and has ripened, as the heart of the fruit is entirely destroyed by the insect. Were this pest to increase largely in numbers, it would certainly do a vast amount of damage to fruit, as is now the case with the Mango beetle.

The most effective remedy against this pest, if practicable, would be to catch the female butterflies and to destroy them before they have laid their eggs. When once an egg is laid on a fruit, that fruit is almost certainly doomed. As a further prevention against attack for the coming year, if all the fruit with holes in them were gathered and destroyed (burnt or buried), there would be but few butterflies left to lay eggs and to carry on the species during the following season.

In Miscellaneous Notes by E. C. Cotes, there is much that is interesting, but we can find room only for a few extracts:—

From Messrs. Octavius Steel & Co. were received, 11th October 1889, some specimens of a caterpillar covered with urticating hairs. The specimens, though too much decayed for precise determination, were obviously the larvæ of a moth belonging to the group Bombyces.

The following is an extract from the letter of the Manager of the tea estate in South Sylhet where the insects were found:—

"By today's post I send you in a bottle a number of caterpillar-looking insects that have been giving me a lot of trouble this year, not destroying the bushes but laming the coolies. I have sixty coolies incapacitated from work owing to this. The caterpillars, or whatever they are, lie under the edge of the bush and the coolie treads on them when plucking, his foot begins to pain, and if not on the hard sole a blister rises, and until this forms into a wound and suppurates he suffers agony and can't walk at all."

Information has been received through Mr. Lionel de Nicéville of injury done during the past year to tea in Sikkim by *Helopeltis theivora* (Mosquito blight) and *Tetranychus bioculatus* (Red spider).

The Red spider attacks the tea in spring and early summer, while the Mosquito blight is found during August and September and confines its ravages chiefly to elevations below 2,000, feet. On one tea estate alone the loss caused by the Mosquito blight in the past year was estimated at 300 maunds of tea, valued at R20,000, that done by the Red spider being even greater. It is said that the Mosquito blight has only appeared of late years in Sikkim, with the cessation of the practice of annually burning the jungle.

Preparations are being made in one garden, on a considerable scale, for sprinkling bushes attacked by the Red spider with Flour of sulphur, with a view to the destruction of the pest. Sprinkling with flour of sulphur has been found useful in Florida for destroying the Rust mite *Typhloromus oleivorus*, which attacks orange trees. This treatment would therefore be promising for use against Red spider.

* Signoret, *l. c.* (5s.), ii, 1872, p. 40, t. 7, f. 3; Atkinson, in Jl. As Soc. Calc., iv[1] (2), 1886, p.279.

Washing the orange trees with a solution of whale-oil soap (1 lb of soap to 5 gallons of water) has also been found useful against the rust mite, it is therefore suggested for Red spider, in case the sulphur treatment is not found to be successful.

Through the Officiating Director of Agriculture in Assam were received, in the latter part of August last, (1) specimens of a caterpillar which had proved destructive to castor-oil plants, (2) specimens of Eri silk-worms (*Attacus ricini*) which had died of disease which had been very fatal to them in Cachar.

The caterpillar proved to be the larvæ of the Noctues moth, *Achæa melicerte* of Drury, a species which has previously been reported as destructive to castor-oil plants in Lower Bengal and in Madras (*vide* vol. I, pp. 52 and 104 of these *Notes*). The insect is a common one and occurs in India, Ceylon, Celebes, and Australia.

Millions of these caterpillars are described as emerging from the jungle in one night and eating up acres of castor-oil plants, grown for the feeding of silk worms.

The following extract from the Annual Report, 1888-89, of the Bhadgaon Experimental Farm has been furnished by the Revenue and Agricultural Department of the Government of India :—

"In pursuance of Government Resolution No. 6093, dated 9th September 1887, Revenue Department, experiments were made to test the efficacy of $C.S._2$ as a preservative of grain from the attack of weevils, and upon which a separate report was submitted in August last. The observations were continued this year.

"A summary of the results of the experiments is given below :—

(*a*) That soft varieties of grains such as soft wheats and jowari are sooner attacked with weevils than hard varieties, as *bansi* wheat, *bajri*, &c.

(*b*) That $C.S._2$ is a perfect preservative against the attack of weevils upon grain.

(*c*) The action of $C.S._2$ lasts in cases not hermetically closed six weeks, after which period a fresh charge of the reagent is required.

(*d*) That even in samples which have been attacked with weevils the effect of $C.S._2$ is immediately felt, the weevils disappearing *en masse*.

(*e*) That $C.S._2$ does no harm to grain as regards its colour, smell, and cooking properties, &c.

(*f*) That the poisonous property of $C.S._2$ need in no way interfere with it introduction into Indian villages, as, unlike arsenic, its strong and repugnant smell will act as a sufficient safeguard.

(*g*) With the dismantling of the old granary, which had been used as a store-house for grain for the last nineteen years, weevils have almost disappeared from the farm. After a long and diligent search, I succeeded in observing only a few under the heaps of jowari ears in the threshing yard, so late as the 20th of the last month. This proves beyond doubt that wheat is damaged most by weevils in city godowns, where a large quantity of it is stored every year before being shipped to Europe.

(*h*) It is therefore fair to conclude that painting the interior of the godowns with poisonous paints and charging the grain with $C.S._2$ (in the proportion of $1\frac{1}{2}$ lb of the reagent to a ton of grain) will reduce the damage caused by weevils to wheat and other grains to a considerable extent.

In a letter, dated 13th July, Mr. E. Green of Ceylon wrote :—

"The larva mines below the cuticle of the upper surface of tea leaves. I do not know that the pest is of any real importance, as it only attacks leaves too old for plucking. The habits of the larva are interesting, however. From its being laterally compressed, it accordingly rests upon its side beneath the cuticle of the leaf. It feeds very rapidly, clearing a space more than twice its own size in half an hour's time,—the head and anterior segments moving in regular sweeping curves like a mower with a scythe. Before pupating, the larva assume the usual horizontal position, so that the preparium rests upon its abdominal surface."

The specimen was submitted to M. Bigot, who determined it as a Dipterous insect (Fam. Muscidæ) belonging to a hitherto undescribed species of the genus *Oscinis*.

Specimens of the Hesperid butterfly, *Gangara thyrsis*, Fabr., have been received through the Director of the Forest School, Dehra, from the District Forest Officer, North Malabar, who reports that the caterpillar is very destructive to young cocoanut palms. The following is extracted from his report :—

"The egg, which is spherical in shape, is laid on the upper surface of the frond. The larvæ appear in from 8 to 10 days, and immediately draw a section of the leaf together, first cutting it laterally to enable it to be drawn into a cylinder by means of fine silken thread. In this cylinder the larvæ live, travelling out at night to feed.

"In appearance the larvæ somewhat resemble that of *Attacus atlas*, but are, of course, very much smaller. They are covered with white filaments which appear as if powdered with flour. There are two patches of scarlet on the segments near the head placed laterally."

Mr. E. E. Green furnishes the following notes regarding the identification of the species described in the paper by the late Mr. Nietner on coffee pests in Ceylon :—

Orgyia ceylonica, Nietner, is probably synonymous with *Orgyia postica* of Moore, the larvæ of the latter often occurring in large numbers upon coffee trees :

Trichia exigua of Nietner corresponds to *Somena irrorata*, Moore, or *Somena scintillans*, Walker :

Agrotis segetum of Nietner is probably either *Agrotis conspurcata*, Walker, or *Agrotis suffusa*, Fabr.; the true *Agrotis segetum* not having been observed in Ceylon ;

Boarmia ceylanicaria is probably *Boarmia*, Walker; biffusaria, while the identity of *Glleriomorpha lichenoides* has, it is feared, been completely lost.

It is much to be regretted that representatives of the various coffee pests that were described by the late Mr. Nietner were not deposited at the time in some local museum where they could be examined and their identification settled. It is hoped, however, that as specimens and information accumulate in the Indian Museum, it will be possible to determine and to publish accurate figures of at least the more important of the insects described by Mr. Nietner.

From Messrs. Mitchell, Reid & Co., of Calcutta, were received, on 29th June 1889, specimens of a scale insect determined by Mr. E. T. Atkinson as *Leeanium theæ*. Messrs. Mitchell, Reid & Co. wrote :—

"We have received from our Holta Tea Gardens in the Kangra Valley, some prunings from a tea-bush showing a species of blight, which, our manager advises us, has made its appearance and threatens to spread. The manager says it was first noticed in a garden which largely used castor cake for manure, and he expresses his opinion that the blight resembles that which affected and ultimately ruined the coffee industry in Ceylon . . . . The prunings, which we send herewith, show the blight referred to."

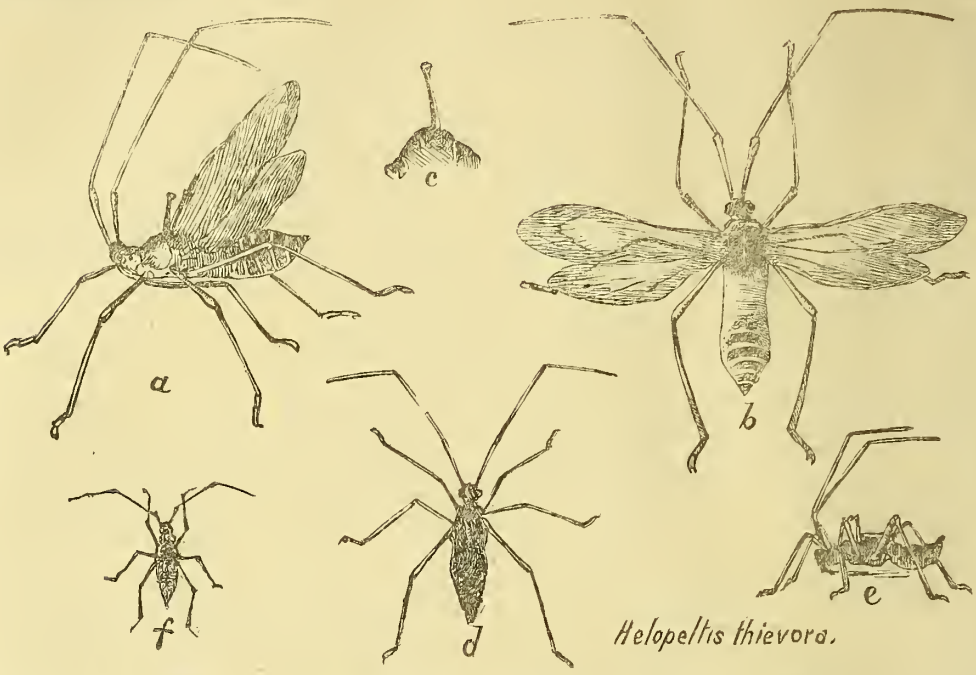
On 3rd July Messrs. Mitchell, Reid & Co. again wrote ;—

"In a letter received from the manager this morning he informs us that the pest is distinctly spreading, though in a most irregular manner. Healthy and weak bushes are alike attacked; a few bushes may be attacked in the middle of a plot in the valley and the pest not appear again for miles, while some gardens have it in a much more aggravated form."

This insect belongs to the same genus as the well-known Coffee scale of South India and Ceylon, and there is little doubt but that it can be destroyed by the kerosine and soap solution recommended for destroying that insect.

We have thus extracted matter locally interestings ; but all tea planters, we repeat, ought to secure copies of the number we are noticing for the sake of the plates, which includes no fewer than 13 pictures of the insects and their parts, prominence being

given to the horn-like spine which rises from the head of that most deadly of all tea pests, the *Helopeltis*. Our engraving—executed by Messrs. H. W. Cave & Co.—fairly reproduces the characteristics of this deadly insect.



a—b.—Imago × 4; *c.*—Scutellar horn × 6; *d—e.*—Pupa × 4; *f.*—Larva × 4.

NUTMEGS IN GRENADA.—A West Indian planter in ordering the *Tropical Agriculturist* and offering to send us an occasional letter—an offer we gladly accept—adds:—"The staple on this estate is nutmegs, and we have lots of trees from 70 to 80 years of age, fine sturdy old fellows which bear enormously and look 'good' for another century."

PLASTER.—A new process of hardening plaster, so as to make it available for the construction of floors in place of wood, has been brought before the French Academy of Science by M. Juite. A mixture of six parts of plaster of good quality and one part of finely sifted recently slaked white lime is employed like ordinary plaster. After it has become thoroughly dry, the object manufactured from it is saturated with a solution of any sulphate, &c., whatever, whose base is precipitated in an insoluble form by lime. The sulphates specially recommended for the purpose are those of iron and zinc. In order to obtain the maximum of hardness and tenacity, it is necessary to temper the lime plaster well in as brief a space of time as possible, and with no more water than is strictly necessary.—*Indian Agriculturist.*

UVA PLANTING COMPANIES.—We have received copies of the Reports of the Spring Valley and Uva Coffee Companies Limited, details of which will be found on p. 201. Meantime we may mention that besides spending money on tea planting and Factory machinery, the Uva Company declares a dividend equal to 2 per cent per annum. The Company has 927 acres under tea and 270 more are to be planted this year, while 942 acres will then be left under coffee. The prospects for both coffee and tea are satisfactory.—The Spring Valley Company is able to declare a dividend of 4 per cent notwithstanding the falling-off in coffee and extensions in tea. Of the latter, 671 acres are planted and 108 acres to be done this year leaving 826 acres still under coffee.

HOW TO INFUSE AND DRINK TEA.—One who knows writes:—"The Norwegian tea cans (sold for a trifle in Vienna) should be sold by millions to the British working men: they keep tea piping hot for quite 3 hours." Specimens should be got from Vienna for inspection by the Ceylon Tea Fund Committee and then if approved of, the advantage of such tea cans could be "officially" proclaimed in England and especially in America where the new Company would only be too glad of a novelty of the kind to accompany their crusade in favour of Ceylon tea.

TEA BOXES.—During a conversation latlely held by me with a member of the Stanley-Wrightson Syndicate it was mentioned that it is not only tea planters that are patronizing the boxes made by it. The soap manufacturers and other traders requiring packing boxes have shown a great interest in the progress of the new undertaking and are likely to aid it extensively. Until the raw material is produced in this country, however, the extension of the manufacture must certainly be delayed. The prices hitherto charged for the tea boxes sent out to India and Ceylon have been below the absolute cost of making them. It is the heavy duty charged on the strawboard exported from Holland that handicaps the Syndicate at the present time. But once let the supply of board become reliable and cheap, and the capacity for manufacture may be extended almost indefinitely. There is one detail as to the making of the chests which at present creates some difficulty. The strawboard is so tough that the ordinary punches break in many cases where they have to be driven through two or three thicknesses of it. A tool which shall partly screw and partly punch seems to be a necessity for working in this particular material.—*London Cor.*

THE COLONIAL COLLEGE AND TRAINING FARMS.

[The institutions referred to in the following report are so important and calculated to be so useful, that we feel bound to lay the details before our readers. Young men passing successfully through the College and Training Farm, will be well equipped for the battle of life in the Colonies, which they cannot help benefiting while benefiting themselves.—ED. *T. A.*]

Lord Knutsford, Secretary of State for the Colonies, distributed the prizes at the college, Hollesley Bay, Suffolk, on Wednesday. A large company was present, among the most prominent being Sir Graham Berry, Sir F. Napier Broome, Sir Rawson Rawson, Sir Arthur Hodgson, Sir Augustus Adderley, Sir Frederick Young, Mr. Braddon (Agent-General for Tasmania), the Hon. A. J. Clarke, Lord John Hervey, Hon. Lionel Holland, Mr. Landale, Mr. W. N. Wallor, Mr. Abraham Scott, Major Craigie, Mr. C. S. Read, General Montagu, General Lowry, Major Barnardiston, Major Howey, Major Windham, Captain Stirling, Captain Hope, Captain Bougbey Burgess, Mr. Hunter Rodwell, Q.C., Mr. Tylston Hodgson, Mr. T. Holmes, Mr. Frank Garrett, Mr. F. Dutton, Mr. F. M. Dutton, Mr. Percy Borrett, Mr. Dunoan Thomson, Mr. E. K. Blyth, Mr. Charles Burrell, Mr. Stancomb Dunn, Mr. Seth-Smith, Mr. Anley, Mr. Rutherford, Mr. Francis B. Baker, Mr. R. Butler, Mr. H. J. W. Jervis, Rev. R. Lawrance, Rev. J. A. Clowes, Rev. A. S. Morse, Rev. J. F. Hervey, Dr. Eager, Mr. J. R. Wood, Mr. O'Halloran (Secretary to Royal Colonial Institute), Mr. C. R. Steward, Mr. G. H. Garrett, Mr. David Johnson, Captain Moor, Mr. John Sherwood, and Mr. Robert Bond. Letters were read from the following gentlemen who had accepted invitations, expressing regret at being prevented from attending:—The Marquis of Bristol, Sir Charles Nicholson, Sir Saul Samuel, Sir Charles Mills, Sir Frederick Weld, Sir F. Dillon Bell, and Sir G. Baden-Powell.

The college is situated on Hollesley Bay, about two and a half hours distant from London. The estate contains about 1,330 acres of pasture, arable, heath, and woods, the college in addition hiring and farming 500 acres of fine arable and pasture land adjoining. On the estate there are 1,600 sheep, mostly of the pure Suffolk breed, 100 bullocks, 50 cows, and 66 horses. The institution, which was established in January, 1887, is intended to provide the intending colonist with suitable training, with advice as to his future career, and so far as possible with an introduction to it. A course of instruction is provided in field cultivation, the making and repair of agricultural implements, gardening, bee culture, forestry, tree planting, the care of horses, bullocks, sheep, swine, and poultry, verterinary practice, riding, land surveying and lovelling, engineers' and smiths' work, carpentry, and ambulance work. At present there are about 70 pupils under instruction.

After luncheon in the dining hall the company proceeded to make an inspection of the college, gardens, and workshops. At the distribution of prizes which afterwards took place, Lord Knutsford took the chair.

Mr. JOHNSON (the resident director of the college) said that the class work of the college was of a practical character. It was important for young men intended for colonial life to know the reasons why a thing was done and how to do it, and it was a great gain to approach one's work with an enlightened mind instead of approaching it in the dark. The object of the system followed at the college was to turn out good all-round men who should not only be a credit to the college, but whom the college would be glad to recommend afterwards. Their object was to familiarize the pupils with all the circumstances of rural life, whether at home or in the colonies.

The following prizes were then presented by the chairman:—General farm work, L. H. Parker; ploughing, H. A. Wells; dairy work, H. A. Wells; veterinary work, R. B. Baron and M. Deans; surveying, G. Honywood; levelling, T. Rutherfurd; carpentry, A. E. Fichardt; smith's work, G. Honywood; smith's work and carpentry (combined), G. Honywood; best collection of grasses, T. Rutherfurd; gardening, E. N. Howard.

Lord KNUTSFORD, in addressing the students, said that it had given him great pleasure to be able to come to the college that day and to exchange the rather heavy, and perhaps official, air of the Colonial Office for the breezy and much fresher air of the Colonial College. He was very glad to be present, not only to show his own personal interest as Colonial Secretary, but to assure them of the interest which her Majesty's Government felt in the institution and in the increasingly good work of this kind. (Cheers.) It had been very pleasant to him to present the prizes to those who had earned them by hard work. At the same time that pleasure was somewhat diminished by the fact of being called upon to say a few words of advice. It had been said that the giving of advice was a privilege which was very often exercised by one to say foolish things under the pretence of preventing other people from doing foolish things. But he appeared before them without that pretence, because he believed that, in going to cast in their lot with the colonies, the students were doing a remarkably wise thing. They were aware that there was no royal road to success; but there was a royal road against defeat, and that was by perseverance and good work. (Cheers.) He had seen a warning given by some one to emigrants who were going out to other countries without any practical knowledge, without previous training, without studying the climate, the local habits, and the customs of the colonies, and the warning was couched in these words:—"If you are going out unprepared to fight a wilderness—a mighty, tongueless, obdurate, mysterious adversary—he will give you opulence if you conquer him, but a grave if he conquers you." It was a pleasure to him to know that such a warning would be absolutely lost in the case of the students of this college, because they were receiving that practical knowlege with which they would be able to meet the adversary, to secure a victory and not a grave, a competence and happiness if not opulence. (Cheers.) That was the great advantage of the work performed at this institution. In the time of James I, a learned maiden was brought before the King and pointed out to him as a rarity because she could speak Hebrew and Greek. The King immediately turned round and asked, "Can she spin?" (Laughter)—in other words, he did not depreciate the Hebrew and the Greek but he wanted to know whether she was fitted for the work she had to do in life. (Cheers.) The students of this college gained practical knowledge by a variety of instruction, this instruction including a knowledge of ambulance work. That might possibly be, next to the shoeing of horses, the most useful work they would have to do, because many of them would be stationed in the colonies far away from medical assistance, and therefore they would be enabled by this instruction not only to help themselves, but others as well. (Cheers.) It had been hinted to him that he should give the students some advice about the colonies. Frankly, he could not assist them in that respect. The only two colonies he had seen were Malta and Heligoland (laughter), and therefore his knowledge was likely to be still further reduced, because they were just parting with the last-named possession.* He was afraid that he could only speak of the colonies as an old writer, Fuller, spoke of the shires of England—"Some of them," he said, "Joseph-like, have a better coloured coat than others; others, like Benjamin, have a more beautiful mess of meat." (Laughter.) In other words, some of the colonies are very good for agriculture and crops; others are better for cattle and ranches. On a previous occasion Lord Lorne, in addressing the students of that institution, advised them to take work in the colonies, but as a general rule to look around them before they began working on their own account. He

* The time may come when practical knowledge of the colonies will be deemed as much a qualification for the office Lord Knutsford holds, as the practical knowledge imparted at this college is deemed essential to the success of a colonial career.—ED. *T. A.*

felt that to be sound advice. One of the characters in one of Trollope's novels, on being asked how he got on, replied, "Dogged does it," and he gave the students the advice "Be dogged." They would have misfortunes to contend with. Their crops or their cattle might be destroyed; but they ought not on that account to fold their arms and sit down under the misfortune. Let them, on the contrary, stand up like gallant men and fight so as to recover their losses. (Cheers.) In this respect they had an example before them in this country. If they looked around them they would see how the farmers of this country during a succession of bad years had had to fight gallantly against misfortune, and the students in similar circumstances could not do better than imitate that example. He heartily wished them all success. (Cheers.)

SIR A. HODGSON also addressed the students. He said that he went out to Australia when he was 21 years of age, knowing nothing about agriculture. All that he had learned before this was most unwillingly learned as an Eton boy studying Virgil. (Laughter.) Afterwards he entered the Navy, and then went to Cambridge, going ultimately to Australia. He had enjoyed no advantages similar to those now enjoyed by the students of this college, and he impressed upon them to take advantage of this great and golden opportunity to learn. He urged them when they went to a colony not to shift their ground without good and sufficient reason, to stick to the man with whom they might be for the time engaged, to study his character. In the long run their good sense, good feeling, good character, and sound education would stand them well in the hour of difficulty. (Cheers.)

SIR GRAHAM BERRY also thought that young men entering colonial life from the preparation of such an institution as this possessed a great advantage over their predecessors of the olden times. He urged the students who might go to the colonies to be brave, firm, persevering, resting assured that success would be their reward.

SIR F. NAPIER BROOME said that his latter days as Governor of Western Australia had been everything he desired, because he saw that his colony was on the point of obtaining everything it wanted. The Constitution Bill, as soon as it had received the assent of the House of Lords and her Majesty, would allow the colony to enter on a career of free institutions enabling it to take a place side by side with the other great colonies. Western Australia was a new colony, and there was plenty of room in it, and as an old practical colonist he thought that some of the pupils of this college might do worse than turn their attention at this juncture to it, especially when the colony might be said to be starting on a new career. He thought that in Western Australia they could start on a smaller amount of capital than in the larger colonies. A young man with £2,000 could begin his career as a squatter or pastoral farmer. On behalf of the colonies he expressed their great obligations to the Colonial Secretary. (Cheers.) If the Western Australia Constitution Bill had not been handled with great tact and judgment and with great consideration for colonial interests and the guardianship of Imperial interests, it would have been a much more delicate matter to overcome the opposition which a short time ago existed throughout the country.* Almost the whole of the Press was more or less opposed to the Bill giving control of the lands, but now, owing to the way in which the measure had been handled, there was no voice raised against it at the present moment. The chief credit for this was due to Lord Knutsford, and he knew that this feeling was felt in the Australian colonies. (Cheers.) The colony was also very sensible of the support which it had received from the Agent-General of Victoria and the representatives of the other colonies, and who had backed it up so well. Hundreds of young men had come to him with letters of introduction, but on inquiry he found that they knew nothing of practical affairs concerning agriculture, their thoughts being in the direction of obtaining some small post in the Government. (Laughter.) Any one, however, who arrived in the colony having passed through such an institution as this possessed a market value the moment he landed, and his future was assured. (Cheers.)

SIR F. YOUNG also spoke a few words of encouragement.

MR. BRANNON (Agent-General for Tasmania) bore testimony as a colonist to the immense advantage which students derived from such a college. He advised students to go to some British possession rather than throw in their lot with those who were not of their own race and blood.

A vote of thanks to the chairman brought this part of the proceedings to a close. The company afterwards inspected the farms, dairy, cattle, and sheep. —London *Times*, July 18th.

* The objection to handing over one million square miles of territory, even though much of it is sterile, to 46,000 persons was certainly natural, and the concession required to be carefully safeguarded.—ED *T. A.*

TEA FOR PERSIA.

From an official report on the trade of Khorassan for the year 1889-90, we note that the total value of British goods imported there during the year *via* Trebizond and Tabriz was about 82,000 tumans (23,429*l.*), and of British goods, *via* Bander Abbas, 213,050 tumans (60,871*l.*). This last total does not include the value of China tea, the larger proportion of which should, however, be fairly included, as there is no doubt that most of it was purchased and brought from China by English merchants. No less than 118,571*l.* worth of China green tea and 5,143*l.* worth of China black tea came from Bombay, while the value of the India green tea was only 7,143*l.*, and of the Indian black tea, which is universally drunk in Khorassan, 112,000*l.* Thus the total value of China tea was 123,714*l.*, against 19,143*l.* of Indan. A Peshawar tea merchant, just arrived at Meshed to arrange to forward his goods by that route in future, states that the Amir of Afghanistan levies 80 Indian rupees (5*l.* 13s. 4d.) on every camel-load of goods passing through his territory (*via* Kabul) to Bokhara. The Amir of Bokhara also levies 2½ per cent. He further states that a pound of tea, costing 12 annas in India, will cost about 16 annas when it reaches Meshed, 18 annas when it reaches Bokhara by this route, and 21 annas by the Kabul route. He says two-thirds of the green tea imported into Bokhara is Chinese, and one-third Indian. If this is so, a great quantity of Indian tea must travel there by Kabul, the most expensive route, and the Indian merchants must be unaware that the Persian route is the cheapest.—*Grocer.*

TEA IN JAPAN.

Researches on the Manufacture of Various Kinds of Tea. Bulletin of the Imperial College of Agriculture and Dendrology. By Y. Kozai, Assistant in the Agricultural Chemical Laboratory. (Tokio, 1890.)

Y. Kozai is a Japanese chemist who performed his researches under the control of Dr. Kellner, the Director of the Chemical Laboratory at Tokio. His paper includes the chemical constitution of tea, the effect of tea on mankind, the principal methods of manufacture employed in Japan, and the methods of preparing tea for consumption. These subjects are all treated mainly from the point of view of the analytic chemist. The author appears fairly well acquainted with what the German chemists have done in the matter of tea.

We need not abstract much of his account of the constitution and properties of tea, as it is largely taken from European sources. "The chief action of tea, after it has got into the blood, is to excite the nervous system; it thus harmonizes the mind, drives out drowsiness, and awakens thought, stops hunger, and cures repletion, refreshes the body, and prevents head-ache" —and (it might be added) if taken too strong keeps you awake half the night. As to its constitution, tea

contains (besides the common plant-constituents) theine, a volatile oil, and tannin. Theine is a rank poison, in toxic doses causing convulsions and paralysis, in lethl dosesa death; but in small quantities is (like strychnine) a delicate tonic. Of the volatile oil, Y. Kozai can affirm little beyond its well-known exciting action upon the organs of taste and smell; nor is it easy to follow it analytically through the processes of manufacture; the hot steaming employed (at near boiling temperature) in the green-tea manufacture does not appear to diminish the volatile oil sensibly, though Y. Kozai intimates that preparing green tea by boiling does dissipate the aroma. As to the properties of tannin, it is an astringent remarkable for its strong affinity for the albuminoids; hence, if taken in excess, it may, by precipitating the ferments of the digestive fluids, cause indigestion.

The account of the chief Japanese methods of manufacture is of more interest and instruction to the European planter.

We may premise that there are two (main) kinds of tea, viz. black and green. In the manufacture of black tea there are four essential processes, viz. (1) withering; (2) rolling, (3) fermenting, (4) drying. In the manufacture of green tea, the fermenting is omitted, and in Japan (for some kinds of green) the rolling also.

For the manufacture of black tea there is no real difference between the Japanese method and that practised by English planters in Bengal. The fresh picked leaf (*i.e.* tips of the young sboots) must be first withered, or the petioles and leaves break under the rolling; the exposure of an hour or two in strong sun withers the leaf sufficiently; if there is no sun, the leaf must he withered by the aid of fire-heat. The rolling is done, even in Japan, by the aid usually of a box, and in Bengal often by steampower (and very roughly). The juices are thus expressed, and the leaf given a "nice" twist, *i.e.* a twist pleasing to the fancy of the tea purchaser. What perhaps renders rolling so essential in the manufacture of black tea (for it is not essential in the manufacture of green), is that it masses the leaf in a state conducing *without delay* to fermentation. Neither Y. Kozai nor the best Bengal authorities like to lose the juices more than can be helped. He also hazards the view that, by rolling, the juice is expressed from the cellular tissues of the leaves and impregnated upon their surface; thus is produced fine aroma, and the leaves are more easily infused. Fermentation is the most important point in the manufacture of black tea, and by it (*fide* Y. Kozai) the leaves lose their raw smell, and the tea acquires its fine flavour. The fermontation is really only carried a very little way: Y. Kozai says it should be allowed, in a temperature of 104° F., to proceed only for about an hour. He thinks the process is a true fermentation, because if permitted to run too far the tea acquires an acid taste. He thinks it probable that the ferment is caused by a living organism, but he adduces very slight ground for this opinion; and it has, in fact, been questioned whether there is any true fermentation in the process at all. But the English tea-makers are agreed with the Japanese in the importance of stopping the fermentation exactly at the proper point by drying the tea, which is usually done by placing it first in the sun and turning it over till it is fairly dry, and then thoroughly drying it by fire-heat.

The result of all the Bengal experience is that the black tea is at least as good when these four processes are done simply and rapidly, as when much labour and time are expended in complicating them. In the early days of tea manufacture by Anglo-Indians, great pains were taken to imitate with tedious minuteness the careful hand-processes (and repetitions of portions of the processes) as practised in China; but all planters now follow rapid short cuts to the finished tea.

The manufacture of green tea is nothing more than drying the leaf; it is so little practised in British India as to be of no commercial interest there, but Y. Kozai describes in detail three kinds of green tea manufactured in Japan.

(1) *Japanese* (not China) *green tea.* In this, the leaf is steamed in order to remove the raw flavour; it is then rolled and fire-dried, the two last processes being usually done together.

(2) *Chinese green tea.* In this, the leaf is roasted (while stirred with a stick) in an iron pan over a fire, then rolled a little, then roasted again; these processess being repeated even six or eight times, and the tea is then finally dried off.

(3) *Flat tea*, the highest class tea of all. For this tea, the shrubs are usually kept shaded for three weeks before picking, so that the leaf is partly etiolated. The choicest leaves are selected before the manufacture is commenced. They are steamed, but never rolled; nor, indeed, touched by hand at all. but carefully turned by the aid of a bamboo stick, After sufficient steaming they are simply dried.

The author finds by analysis that there is 30 per cent. more theine in etiolated leaves than in the leaves of the same plants grown in the light. He tried many experiments to test the chemical effect of the manufacturing processes. Among other tables given by him is the following; a quantity of leaf was divided into three portions, whereof one portion is A, another portion is manufactured into green tea B, the third portion is manufactured into black tea C. Y. Kozai analyzses A, B, C, and finds—

	A.	B.	C.
Crude protein ...	37·33	37·43	38·90
Crude fibre	10·44	10·06	10·07
Ethereal extract	6·49	5·52	5·82
Other nitrogen-free extract	27·86	31·43	35·39
Ash	4·07	4·92	4·93
Theine	3·30	3·20	3·30
Tannin	12·91	10·64	4·89

He remarks that the general result of the green-tea manufacture is merely to dry the leaf; the black-tea manufacture alters materially its chemical constitution. The principal change is the remarkable diminution of the tannin. He does not explain how this is brought about, nor is it easy to see how the incipient fermentation should affect the tannin.

The only teas exported to Europe from Japan are of low class; they are frequently "faced," and sometimes mixed with the leaves of various Japanese plants. Any plentiful leaf, not too unlike the leaf of tea, will do for this adulteration; the leaves actually employed are (Y. Kozai assures us) all harmless, and several contain tannin, but none of them any theine. As to the "facing," he says it can hardly be called adulteration; the quantity of Prussian blue employed to improve the appearance of green tea is (according to Y. Kozai) about 0·001 per cent. the weight of the tea, perfectly innocent, and pleasing to a purchaser.

The author concludes with an account of the different ways of taking tea in Japan, with some analyses of the prepared liquor.

(1) In the case of flat tea, or of the very finest quality of Japanese green tea, the tea is ground to fine powder, and the whole infusion drunk.

(2) In the case of superior (*i.e.* from the Japan point of view) tea, the leaves are infused for two minutes in water at 120°–150° F.

(3) In the case of a medium tea, the leaves are infused for one minute in boiling water.

(4) In the case of inferior tea, the leaves are boiled in water.

The object to be aimed at in the preparation is to get the largest possible quantity of theine without dissipating the aroma, and accompanied by only a moderate amount of tannin. Y. Kozai gives analyses to show that this is effected (in the case of superior teas) by the infusion in water at 120°–150° F. for two to five minutes. By superior teas, he understands teas worth five to seven shillings a pound in Japan. It is probable, therefore, that the highest class teas we ever have to deal with in England come under the medium teas of Y. Kozai, which require infusion in boiling water—for one minute at least. The majority of English people like a good deal of chicory with their coffee, and probably a majority also like a good deal of tannin with their tea; and to them

the analyses and recommendations of the Japanese writer are of small importance.

The paper will be of more use as food for reflection to the Anglo-Indian planter than as direct instruction. The palate of the Englishman is as yet only very roughly educated in tea. There can be very few Englishmen who would greatly prefer the superior tea of Japan and China to the ordinary Kumaon or Ceylon tea; most persons used to drinking the latter would probably prefer it to the most expensive tea made—say China tea worth forty shillings per pound in China. The English planter in Bengal has a tea-garden of 200 acres (possibly still larger). His object is, by the aid of a steam-engine or other coarse help, to put his tea through—to keep his factory clear when he has a strong flush on. He has to carry the daily make through by the aid of uncivilized labourers and overseers. He must reduce every step of his manufacture to a routine; he must have no special tea separately and differently manufactured, and no current experiments. Few planters have made much profit by Pekoe; and the green tea hardly exists commercially in India. There are no doubt many Englishmen who, having not a plantation but (literally) a garden with some tea in it in India, have manufactured, not unsuccessfully so far as the flavour of the tea is concerned, green tea, Pekoe; &c., but this has been a fancy article for their own drinking or for presents, and has never been put in any quantity on the market. To plant successfully in India, the Englishman has to proceed on a broad scale; his large cost and high expected profit cannot be got out of the close superintendence of elaborate hand manufacture. Or, at least, it will be a long time before the public tea taste at home is sufficiently elevated to be willing to pay so large a price for such teas as would remunerate the English planter. For the present, the object of the planter must be to produce the maximum quantity of tea that the English grocer can sell at 1*s.* 6*d.* to 2*s.* 6*d.* a pound. Hence to planters the utility of the paper of Y. Kozai must be mainly future.—*Nature.*

CONCERNING COCOA.

Cacao seeds, or cacao beans, or "cocoa nibs" as they are commonly known in the trade, are the fruit of the cacao tree. They grow in large fleshy rotund pods. The cacao tree belongs to the natural order of the *Stercularia*, and its botanical name is *Theobroma cacao*. This name was assigned to it by Linnæus, the great botanist, as an indication of the high appreciation in which he held the beverage prepared from the seeds. The word theobroma really means "food fit for the gods." There are nearly a dozen varieties of the cacao tree, and these flourish in the West Indies chiefly, but are also cultivated and grow wild in the northern part of South America, and in Central America north as far as Mexico. The best kind is indigenous to Venezuela, and the cocoa which it produces is known as Caracas; that which comes from Trinidad perhaps ranks next in quality. The cacao tree is being cultivated in various other parts of the world, wherever the climate is found suitable, for there is an ever-increasing demand for the "nibs" on the European markets. History relates that the seed of *Theobroma cacao* were first described by no less a personage than Captain Gonzalo Fernandez de Oviedo y Valdés. About the middle of the sixteenth century he writes that Columbus found the natives of Yucatan using these seeds as money, just as some of the aborigines of Africa use cowrie shells. In those times the Spaniards were rapidly extending their conquests and colonies in the New World, having received *carte blanche* from Pope Alexander VI., who issued a bull granting all east of a line one hundred leagues west of the Azores to Portugal, and all west of this imaginary line to Spain! In Spanish literature of the latter part of the sixteenth century there are frequent references to the uses of the cacao seeds.

Cacao seeds are very rich in oil: in the shelled state they yield nearly 50 per cent. of a thick buttery oil, which is known in trade as cacao butter. At ordinary temperatures this oil is nearly solid, in fact is much like soap in consistency and general appearance. The average composition of cacao seeds, according to Wanklyn's analysis, is shown by the following percentages:—Fat or cacao butter, 50·00; albumen, fibrin, and gluten, 18·00; starch, 10·00; gummy and mucilaginous matters, 8·00; colouring matters, 2·60; water, 6·00; theobromine, 1·50; ash, 3·60; loss, &c., 0·30: total, 100·00. The husk of the seed is usually stripped off before exportation; it is composed of three distinct layers or membranes. By means of the microscope the outer layer is seen to consist largely of elongated cells, the middle layer consist of angular cells containing mucilaginous matter, whilst the inner layer is a mere membrane or pellicle, and is composed of angular cells which contain oil. The starch is located in the seed proper, or "nib," which is built up of small cells distended with grains of starch: delicate reagents will detect traces of inulin in these tissues. Wanklyn's averages put the percentage of theobromine rather high, and he must have examined a number of exceptionally fine samples; other observers state that the seeds only contain about 0·5 per cent. of theobromine, and doubtless their results are not wrong, but have been compiled from the examinations of different varieties of cacao. It is wonderful what a difference slight variations in the constituents of the soil or in the species of a tree will make in the chemical composition of the crop.

The question naturally arises, What is theobromine? Now, although it exists in such very small proportions (from about one-half to about one and a half per cent.) in the cocoa nib, it must not be supposed therefore that it is insignificant; indeed, it is to the presence of this substance that cocoa owes its peculiar properties as a beverage. Theobromine bears to cocoa an analogous relation to that which exists between caffeine (or theine, as it is also called) and tea or coffee. It is a rather remarkable fact that caffeine is very closely connected with theobromine, considered from a chemical point of view, for both these substances belong to what is called the uric acid group of chemical compounds. They only occur in the vegetable kingdom, and were formerly classed amongst the alkaloids, that is, amongst such poisonous substances as strychnine, morphine, &c.; but the recent researches of several well-known scientists have demonstrated that they are both analogous to uric acid and to other similar bodies which exist in the animal organism. These facts seem at first to provide matter for unpleasant reflection, but we must remember that we are only dealing with chemical analogies.

We can represent the composition of theobromine by a formula, that is to say, by "chemical shorthand"—it is $C_7H_8N_4O_2$, which implies that seven atoms of carbon, eight of hydrogen, four of nitrogen, and two of oyxgen have all united together to form this substance. The honour of having discovered theobromine is due to Woskresensky. By extracting the pounded "nibs" with boiling water, precipitating with lead acetate, then treating the clear liquid which remains after filtering with sulphuretted hydrogen, and finally boiling with alcohol, theobromine will separate out from the cooled liquid in the form of beautiful microscopic crystals. These crystals are slightly soluble in cold water, and the solution possesses a curious bitter taste, which becomes preceptible after a time. The bitter principle, of coffee and tea, namely caffeine, is strictly speaking, methyl-theobromine, $C_8H_{10}N_4O_2$. Theobromine has actually been found along with caffeine in the young leaves of the Himalaya tea. Its effects upon the human system are mildly stimulating.

Cocoa, as we understand it nowadays, is the roasted and ground cocoa-nib, the husk having been previously removed. Everyone probably knows that although the "nibs" can be obtained whole or broken, most of the cocoa sold is either rock cocoa, flake cocoa, or prepared powdered cocoa. Cocoa is too rich in fat to suit the digestions of the general public, hence many manufacturers eliminate more or less of it. Others incorporate a certain amount of starch

with the ground nibs, thus producing a cheaper article which is not so gross. Chocolate is merely cocoa to which a large quantity of sugar and more or less starch has been added, together often with various flavouring essences. Cocoa really partakes more of the nature of an article of food than of a beverage; it is very rich in warmth-producing and flesh-forming constituents, and in these respects it compares favourably with tea and coffee. The term "soluble cocoa" is a misnomer: it should rather be "miscible cocoa." Anyone can demonstrate this by allowing a cup of cocoa to stand and settle for a few hours. The experiment is best performed in a glass tumbler.

The mixture of cocoa are now made chiefly with sugar and starch, and these are not regarded as adulterations by the manufacturers who make some of the "prepared cocoas." Venetian red, chicory, cocoa husks, and various flours and ground cereals are sometimes met with in low-grade cocoas; but starch is "the thing," and to provide this the potato, sago, arrowroot, maize, &c., are laid under contribution. Chocolate is made to contain a great deal of sugar, hence sophistication is more easily concealed from the taste. Chevalier states that chocolate is largely adulterated, but that as the public generally understand that it is merely a preparation of cocoa, it does not much matter so long as the added ingredients are wholesome. Still there is no excuse for such substances as the following being present, viz.:—Lime, ground lentils, maize and bean flour, foreign fats and oils, various gums, and such colouring matters as cinnabar, red earth, and even red lead. Most of these sophistications can be detected by the microscope if they be of vegetable origin, and if of mineral origin they can be identified by means of the usual chemical reagents. Wanklyn states that the mineral matters ought never to exceed 5 per cent. He recommends the determination of the phosphoric acid in the ash as a means of detecting the adulteration. Fat is best estimated by extraction with ether.—*Grocer.*

NOTES ON POPULAR SCIENCE.

By Dr. J.E. Taylor, F. L. S., F. G. S., &c.,
Editor of "Science Gossip," &c.

Whilst on the subject of chemical experiments and investigations of a practical character, I should do well to notice those on the physiological value of what may be termed "commercial foods," such as the different kinds of oil-cake, &c., in relation to their milk-producing power. The experimental cow received 15 lb. of clover hay and 3lb. of cake per day. It was found that rape-cake produced an increased amount of milk the first day, and the same fact was recorded when this was exchanged for coconut cake. Indeed, in both cases, the increase was very considerable, but that produced by coconut cake lasted much the longer. In other experiments, in which 20lb. of green fodder was given per day, an addition of 3lb. of linseed cake gave an increase of 12 per cent. of milk. The same weight of coconut cake raised the yield to 11 per cent, but lasted longer. Hemp-cake had no effect at all. The increase of milk was also produced by giving the cow (in addition to its green food) sun-flower cake, poppy-seed cake, coconut cake, &c.; the yield of milk being most increased by the last, and least by the sun-flower seed cake.*

For several years past I have been suspicious about the use of nitrate of soda. Many farmers don't know what to do with it when they have purchased it—and it is rather an expensive article. Artificial manures want mixing with the same sort of thing that Sir Joshua Reynolds said he mixed his paints with—brains. Then success is sure. I have long been of opinion that an excessive use of nitrogen, whether organic or artificial, tended to promote and encourge the rapid growth and development of such parasitic funguses as moulds, mildews, and rusts. Thus, in the published results of some Rothamstod experiments on the growth of potatoes, I observe that those manured by ammonium salts and soda nitrates, although they yielded splendid crops, had the largest proportions of diseased potatoes. What is the good of producing a diseased crop? A manure of superphosphate of lime, although it only produced an average of three and a half tons of potatoes to the acre had only two and three-quarter hundredweight of these diseased, whereas ammonium salts and mixed mineral manures, and a mixture of sodium nitrate and other minerals, although they actually produced a heavier crop of Potatoes (nearly six tons in the former instance, and almost approximating to that in the latter), nevertheless yielded eight and a quarter and nine and a quarter hundredweights of diseased tubers respectively. The fact is nitrates of soda, as well as ammonium salts, in nearly every instance ought to be used sparingly (hand sown), and when the crop is just appearing above the ground. Then they are stimulants as well as food for the baby plants.

Notwithstanding my criticism regarding the use and abuse of nitrogenous manures, the above-mentioned Rothamsted experiments distinctly brought out the fact that the use of nitrogenous manure gives rise to a great increase of starch in the potato, just as in the case of root crops there is an increase of sugar under these conditions; and in that of cereals an increase of starch and cellulose. The real cause of the potato disease is the fact that the fungus converts its starch into sugar, and stores up in itself a large proportion of the nitrogenous juices of the potato.

The influence of the electric light upon vegetation has manifested itself in a very remarkable manner in the case of the large lime trees on the Leipziger Platz, Berlin. On the branches of those trees which are opposite the electric light, a few days ago the development of the new leaves had advanced considerably, whereas on the other side, where the light does not strike upon the branches the buds had only just begun to form.

I have frequently referred to the idea of the late Professor Ville, of Vincennes, to the effect that the natural order of plants Leguminosæ have the power directly to fix the nitrogen of the atmosphere. This appears also to be the belief of Sir John Lawes and Dr. Gilbert, based upon their experiments at Rothamstead. It is further thought this nitrogen-absorbing power is largely brought about by the micro-organisms growing on the roots of the Leguminosæ.

Here is a chance for wealthy young Australians to form a syndicate. M. Daubree, the well-known French geologist, has expressed his opinion that the deeper formation of the earth's crust contain abundance of diamonds. Diamond powder, as I have already shown, has been found in meteorites. Professor Daubree has made observations in all the diamond-bearing regions, and finds the stones occur in the oldest and most deeply-seated rocks. Why not start a company and bore down a mile or so?

Two of our young and rising chemists—Messrs. H. T. Brown and G. H. Morris—have just given to the scientific world the results of a long-continued and most delicately manipulated series of experiments on the germination of some of the grasses. Their investigation was undertaken with the view of throwing some light upon the complex metabolic processes which take place during the germination of seeds. This their first paper on the subject (read before the Chemical Society), is almost confined to barley. Some years ago the great German botanist, Professor Sachs rather startled the botanical world by the statement that in a seed the relation of the embryo to the endosperm is that of parasite and host. Messrs. Brown and Morris's experiments confirm Professor Sachs" generalisation. More, in their experiments, they availed themselves of this suggested relation by cultivating the embryo upon suitable media after separating it from

*This supplies a full and satisfactory answer to our question in discussing cattle disease and cattle feed, as to the suitability of coconut poonac for milch cows.—Ed. *T. A.*

its endosperm. In this manner they obtained special information with regard to the secretory powers of the embryo, and the chemical modifications of its absorbed nutriment, which it woud have been impossible to have obtained hy any other mcans.

As the result of cultivating ths excised embryos upon various nutrient solutions, more specially of the carbohydrates, Messrs Brown and Morris showed that while cane sugar, invert sugar, dextrose, lœvulose maltose, raffiose, galactose, and glycerol have all more or less nutrient valuc, mi'k sugar and mannitol do not in any way contribute to the growth of the tissue of the young plant. Of all the substances they tried they found cane-sugar had by far the gratest nutritive power. Maltose, although the natural food of the embryo when attached to its endosperm, is decidedly inferior in this respect to cane sugar. This may be due to the fact that the maltose, directly it is absorbed by the growing embryo, becomes transformed into cane-sugar in the living cells, and in this form is passed from cell to cell. When cane-sugar is supplied ready formed to the young plant there is a saving of chemical energy to the living cells, which receive it in a form in which it is directly available for its requirements. The two young experimenters expressed their opinion that the transformed starch of the endosperm is absorbed by the embryo in the form of maltose, and that the seat of production of the cane-sugar which germinated grain contains is the tissues of the embryo itself.

A new green vegetable colouring matter has just been announced hy Mr. C. Michie Smith. It has been extracted from the green pulp of the fruits of Trichosanthes palmato, and has thefore been christened trichosanthin. It yields a solution nearly resembling chlorophyll, but possesses a very different spectrum. It is thought that in trichosanthin we have in the colouring matter a substance in which the "blue chlorophyll," of Sorby and the "green chlorophyll" of Professor Stokes are replaced by some other substance easily decomposed by reducing agents and acids.

A new and dangerous parasitic fungus on the vine has just been described by M. Lagerheim to the Paris Academy of Sciences, It is a uredo, and accumulates in dense clusters on the leaves. So far it has only been met with in the neighbourhood of Kingston, Jamaica.

The following fact is worth everyhody making a note of. We imagine we have done our duty by the water we drink when we filter it. Now, it has been just demonstrated that when filters (or rather the filter-beds) have been too long in use, they are nothing better than germ-disease breeding-heds. One of the best and simplest filtering-beds I know of is composed of common cinders. It ought to be taken out and made red hot (or calcined) about once a month. That will destroy anything. Then a fresh and calcined layer of fine saud should be strewn over (if red sand all the better, as the iron will fix decomposing organic matter). I have never had the slightest difficulty with my filters, beyond the trouble involved by treating them as above mentioned; and a man who will not take the trouble to keep his drinking water clean would not take the trouble to keep his face clean.

At length it seems that the frequently talked-of idea of utilising the motive power of Niagara Falls will come into operation and turn the spindles of commerce instead of serving no other end than that of allowing fools to go over in barrels. It is intended to bore a tunnel from the water level below the falls under the high bank of the river, extending through the rock to the upper river at a point about a mile above the falls. There a head of 120 ft. of water can be obtained. The tunnel is thence to extend parallel with the river for a milo and a half at an average depth of 160 ft. below the ground, and about 400 ft. distant from the navigable part of the river. The fall of water thus obtained is estimated to produce 120,000-horse power. Mills will he supplied with the power at some distance from the falls, so that the scenic features of the latter will not be interfered with. —*Australasian.*

INDIAN TEA COMPANIES.

Mr. Ernest Tye, Secretary, Indian Tea Districts Association, has compiled for the *Home and Colonial Mail* a list of the Indian Tea Companies in London, numbering 63. No fewer than 10 of these Companies own such large areas of land as from 3,500 acres in the case of the Tarrapore, Cachar, to no less than 9,185 opposite the Assam Company. There are two Companiss below the colossal Assam, with over 8,000 acres, one with 7,000, one with 5,096 and one with 4,715. Of course, with such areas, there can be no scarcity of timber or fuel. Indeed we believe that in many cases the coolies employed have lands on which they cultivate rice,—portions of the areas owned by the Companies being swamps or irrigable.

Out of the 9,326 acres owned by the Assam Company the proportion under the heading of "acreage and mature plants" is 7,520, and the yield psr mature acre is given at 356 lb. The cost of producing the tea was 9¾d per lb., and the value in bond, including seed, &c., was 11¼d. The dividend of this Company, which some years ago ranged about 20 per cent, was, for 1889, 10 per cent. The capital per acre is put down at the low sum of £20, due to the fact that the present Company purchassd the property at a very small sum in comparison with what it cost the originators of the enterprise, who suffered the fate so common to pionsers. The Land Mortgage Bank of India is in a very different position, owing, no doubt, to loans on estates wbich had to be taken over. The capital per acre, in this case, is so high as £43, and although a profit of nearly £14,000 resultsd from 7,467 acres mature plants, yielding 306 lb. an acre, value 10½d per lb. no dividend was declared. We have next four Companies in succession which dividcd 10 per cent in the case of three and 12½ per cent for the fourth. The values of tea in these cases ranged from 10d to 11⅜d, while the cost ranged from so low as 7¼d to 10d. The Company which produced its tea at 7¼d got 452 lb. per acre, while the Company which shows the very highsst yield per acre in the list, viz. 721 lb., has 8d down as the cost and 11⅜d as the value. This was the Company whicb divided 12½ per cent. The highest dividend of all, however, 18 per cent, is opposite the Cherra Tea Company, Limited. The capital of this Company is down at £114,500, for an area of 2,836 acres, or £40 per acre. The acreage in bearing is 2,645, from which a crop of 1,389 was gathered, or at the rate of 489 lb. psr acre. The cost per lb. was only 6½d and the value 10¼d. It thus appears that the best dividend was not declared by a Company having the highest yield or the teas of which sold at the best price. A cost of production equal to only 6½d per lb. seems low enough, but the next figure for cost of production is only 5½d. But, alas! the tea was of a value only one penny higher, so that the surprise is that even a dividend of 2½ per csnt was declared. A Company which produced its teas at 6⅜d and sold them for 9⅜d, divided 10 per cent. So did another Company although the tea cost 10d and sold for 1·0,⁹₁₆d. Another Company which divided 10 per cent, produced its teas at 7,⁵₁₆d and sold at 10⅛d. The Shumshernugger Company gave a dividend of 13 per cent. The capital of this Company is down at £21,000; acreage 812; capital per acre £26; acreage mature plants 677; yield 313,000,

at the rate of 462 lb. per acre. The tea was produced at a cost of only 6d, and sold for only 8¾d. The result, as we have said, was a dividend of 13 per cent, notwithstanding the low price at which the teas sold. The Moabund Company showed a dividend of 15 per cent. Its capital is down at £35,007; acreage 713; capital per acre £49; acreage mature 596; yield 322,000 lb. at the rate of 542 lb. per acre. The tea was produced at 9d and sold for 1/2¾, the very highest value in the list. The Doom Dooma Company divided 14 per cent. The capital of this Company is down at £116,100; acreage 1,671; capital per acre £69; acreage mature 1,403; yield 877,000, a rate per acre of 625 lb. The tea was produced at so low a cost as 7 1/16d per lb. and sold for 1/0 7/16d. For the 34 Companies of which the working results for 1889 are given, we get the following details;—

The paid up capital ranged from £354,644 to £20,000.
The total acreage ranged from 9,326 to 600 acres.
The capital per acre ranged from £154 to £21.
The mature acreage ranged from 7,520 to 510 acres.
The crop of 1889 ranged from 2,674,000 lb. to 143,000 lb.
The yield per mature acre ranged from 721 maximum lb. to 246 lb. minimum.
The cost of tea per lb. ranged from 11⅛d to 5½d.
Value of tea per lb. in bond (including seed etc.) ranged from 1s 2¾d to 6½d.

We must not omit noticing the generally high bearing rate of the mature acreage. We have already noticed the maximum of 721lb. per acre. Then we have 645, 632, and 625; next come 575, 563, 542, and 515; below 500 but above 400, we get 489, 486, 467, 466, 462, 452, 441, and 427. So that there are 16 companies out of the 34, or nearly one half, the average yield of whose estates is over 400 up to over 700. The number of estates which range below 400 but above 300 lb. are 10, so that 26 out of the 34 companies got average yields above 300 up to over 700. In looking at this yield and comparing it with that of Ceylon estates, it must be remembered that the vast proportion of the Indian tea estates were opened on virgin soil of special richness, there being no old coffee estates, more or less washed and worn, to lower the average. Considering how *our* average yield is affected by the low yield of old coffee estates, we compare fairly well with India; in specially favourable cases, such as that of Mariawatte "beating creation."

The results under the head of dividends for the year show that, of the 34 companies, 1 gave 18 per cent; 1 gave 15; 1 gave 14; 1 gave 13; 1 gave 12½; 7 gave 10 per cent; so that 12 companies, or more than a third of the whole, divided 10 per cent and upwards. We have a dividend of 9 per cent in case of 1 company; 1 gave 8; 1 gave 7; 9 gave 6 per cent; 1 gave 5⅓; and 1 gave 5. So that 14 companies gave dividends from 5 per cent up to 9; and 26 out of the 34 gave dividends ranging from 5 to 18 per cent. A dividend of 3 per cent is opposite 1 company and 2½ per cent against another.

In the first case, that of the Land Mortgage Bank of India, where no dividend was declared, the profits were nearly £14,000. There were good reasons in this case for not dividing any of the profits, as the losses of previous years had to be made up. In the second case of no dividend, the profits were £11,116. Then comes a case with £748 profits; two others with £1,502 each. The only case of absolute loss, the sum being £2,531 is that of the Endogram Company with £40,000 capital; 1,089 acreage; £36 capital per acre; 1,064 mature acreage; yield 272,000 at the rate of 255 lb., the lowest yield recorded. The tea cost 10½d to produce it and sold for only 8d.

Leaving this exceptional case out of view, the results of the working of the leading Indian Companies seems by no means discouraging, especially in view of the considerable fall in the selling prices of teas compared with those which prevailed a few years ago. Not many planters in Ceylon, we suspect, can beat the Indian record of minimum cost of production, 5½d per lb. But in this direction of economical working, so as to reduce cost of production it is evident we must proceed, if the Ceylon tea enterprise is to continue profitable. Meantime efforts to open up new markets must not slacken.

CATTLE DISEASE IN SOUTHERN INDIA, CEYLON AND THE STRAITS.

While waiting for the disposal "a press of other matter," in order to resume our discussion of the question started by our correspondent "Truth" as to the necessity for stringent measures of quarantine, stamping out and so forth, to combat cattle disease in Ceylon, evidence as strong as it was unexpected has been afforded of the correctness of the views we expressed, by a resolution of the Government of Madras. In this resolution the expenditure for a lengthened period in attempting to carry out measures such as "Truth" demanded and the Ceylon Cattle Commission of 1869 recommended is declared to be money wasted, and the whole machinery for watching and segregating cattle has been abolished. The Government of Madras have come to the conclusion we expressed that stringent measures of repression are impracticable, looking at the circumstances of the country and the character of the people, and that we must look for gradual improvement with advancing intelligence. We deem it quite probable that "Truth" will say: "The action of the Madras Government only renders stringent quarantine and other measures on our part the more necessary." What would better please our pro-bovine friend are the details of very stringent legislation in Perak, following that in force in the Straits Government, whereby quarantine precautions are applied equally to cattle and human beings, power being reserved to "stamp out" the former, with or without compensation. The subject is so interesting and in many aspects so important, that we shall devote another article to its discussion. The misery, of course, is that when rinderpest breaks out amongst the wretched native cattle, badly fed and worse tended, it does not confine its ravages to animals comparatively worthless but destroys valuable imported animals, treated in the most liberal and humane fashion as they may be. The following is from the *Madras Times* of August 5th:—

The fiat lately went forth for the abolition of the Cattle Disease Department in this Presidency. Government was led to take this step, on the report of the Agricultural Committee that the money expended upon attempts to cope with cattle-disease had been practically wasted, and that until the spread of education has effected a change in the attitude of the ryots, it would be wiser to suspend the attempts to directly combat the evil. The Agricultural Committee stated, that "in dealing with diseases which, owing to the customs of cattle-management and the conditions of the country, spread with immense rapidity, and find a victim in every stall, we deem it hopeless for many years, to attempt directly preventive and curative work over the whole area of the country, and we are absolutely convinced, that the present method of placing solitary inspectors, themselves insufficiently educated and trained, in charge of a whole district, with but little supervision and no possible chance of obtaining local influence over so vast an area, is radically wrong. We look forward to a time, when

there will be a highly trained Stock Inspector with a staff of salustry subordinates in every taluk, when the sense of the country will be actively on the side of the preventive and cnrative staff, and when better stock management will remove the predisposing causes of epidemics. This is not yet within measurable distance, but we consider that the Department should at once bend its efforts, to obtain as quickly as possible a considerably strengthened staff of Stock Inspectors." But the proposal did not meet with the approval of Government, which considered such a policy impracticable, as it would require a whole army of Stock Inspectors and Salustries, and even then but little good would result, in the present state of opinion of the farming classes, unless the former were entrusted with wide and stringent powers of compulsion, which would be an evil to be avoided; for taking into consideration the classes from which the staff is recruited, their low salaries, and the opportunities they have for oppression, they would gravely ahnse the authority entrusted to them. Government also alluded to the fact, that there were doubts whether the effects of disease are so serious as they are represented. Mr. Robertson, for example, is of opinion, that losses of cattle result from the impoverished condition, into which the stock frequently get and not from the severity of the diseases that prevail. From statistics, it is found that cattle mortality from disease is not high, while cases of epidemics, seriously affecting ploughing cattle, or the more valuable animals, are comparatively rare. Government agreed with Mr. Benson, that cattle must die of something, and as very few in this country are slaughtered for food, they wou d multiply far beyond the means of subsistence, if epidemics were stamped ont, so that besides further deteriorating in quality, they would die from sheer starvation in as great numbers, as they now do from disease. The efforts of officers of the Cattle Disease Department were further handicapped by the passive and even active obstruction offered by the ryots to all efforts to assist them. With this opposition, religious scruples, apathy and ignorance of the ryots to deal with the Department was utterly useless, unless a very expensive staff was entertained, with summary powers, which was not expedient at present, and would be fraught with great danger to the people. Government therefore come to the conclusion that the amount already spent on the Department had been literally wasted, and it directed operations in this direction to be closed at once.

MAIZE OR INDIAN CORN.—"Old Resident" writes:—"No doubt Sir Arthur Havelock was thinking, when he made his remark at matale, of the almost universal cultivation of maize in south Africa, in contrast with the scarcity of the culture here. But the cause of this you have already explained."

NUTRITIVE VALUE OF FOODS.—Speaking roughly, a quart of oysters contains, on the average, about the same quantity of actual nutritive substance as a qnart of milk or a pound of very lean beef, or 1½ ponnds of fresh codfish, or two-thirds of a pound of bread. But while the weight of actual nutriment in the different qnantities of food material named is very nearly the same, the quality is widely different. That of the very lean meat or codfish consists mostly of what are called, in chemical language, protein compounds, or "flesh formers," the substances of which make blood, muscle, tendon, bone, brain and other nitrogenous tissues. That of the bread contains but little of these, and consists chiefly of starch, with a little fat and other compounds, which serve the body as fuel, and supply it with heat and muscular power. The nutritive substance of oysters contains considerable of both the flesh-forming and more especially heat and force-giving ingredients. Oysters come nearer to milk than almost any other common food; their values for supplying the body with material to build up its parts, repair its wastes, and furnish it with heat and energy, would be pretty nearly the same.—*Century.*

BAMBOOS were sold last year by the Forest Department in Bengal to the number of nearly fifteen millions. As compared with the previous year, there was a falling-off of more than a million in the number of bamboos sold. The decrease was pretty general in all the forest divisions, but occurred chiefly in Chittagong, where the fear of raids kept men from going into the forest.—*Pioneer.*

ARTIFICIAL TEA.—The Calcutta *Capital* for May 20 has the following:—"A new industry has sprung up in Germany with the young leaves of the wild strawberry plant. Having been carefully dried, they are used instead of China tea, and are said to approach that beverage very closely in taste. An addition of young bramble and woodruff leaves is said to add to the excellent flavonr of this most inexpensive of teas."—*Grocer.*

SUGAR is cheap enough now, as every sugar-planter knows. But hitherto we have only thought of it as a sweetening agent. Now we are discovering it has other properties, which may tend to raise its market price. An Italian engineer has proved that if sugar be introduced into the water of steam-boilers it will retard (if not prevent) incrustation. In a boiler of 20 horse-power, possessed of 126 tubes, 4lb. of sugar a week was found sufficient to retard incrustation. In Butler's *Erewhon* we have a delightful chapter devoted to the period when our machines will become sensibly automatic, and take the place of supposed rational creatures. The above fact seems to be moving in that direction. Our steam-boilers are getting as fond of sugar as children.—*Australasian.*

ONIONS.—For a cold on the chest there is no better specific for most persons than well boiled or roasted onions. They should be sliced and boiled in milk till soft enough to smash up and form a sort of gruel. Drink or sup just before or after getting into bed. They may not agree with everyone, but to persons with good digestions, they will not only be found to be a most excellent remedy for a cough, and the clogging of the bronchial tubes, which is usually the cause of the cough; but if eaten freely at the outset of a cold, they will usually break up what promised, from the severity of the attack, to have been a serious one. A writer in a medical journal recently recommended the giving of *young* raw onions to children three or four times a week, and when they get too large and strong to be eaten raw then to boil or roast them, but not to abandon their free use. Another writer, advocating their use, says: "During unhealthy seasons when diphtheria and like contagious diseases prevail onions ought to be eaten in the spring of the year at least once a week. Onions are invigorating and prophylactic beyond description. Further I challenge the medical fraternity or any mother to point out a place where children have died from diphtheria or scarletina, ruginosa &c., where onions were freely used."

DISEASES IN PLANTS.—A capital paper appears in the last number of the *Gardener's Chronicle* by Mr. H Marshall Ward, a naturalist who has come rapidly to the front, on the important subject of the diseases of plants. His essay is on chlorosis or "yellows"—that is, the absence of green in leaves, and the substitution of yellow instead. Unfortunately there are several different kinds of chlorosis, but that usually affecting plants is a diseased condition of the leaves, in which the absence of the green colouring matter is due to the deficiency of iron salts in the soil. It should be remembered that leaves affected by chlorosis are incapable of assimilating carbon. It the leaves are young, watering them with a weak solution of iron salts will restore their greenness; although, of course, the best plan is to apply the solution of iron to the roots. There is usually plenty of iron in all soils, but it is in a fixed or stable condition, very little of it being available by the plants in the soluble state. Iron sulphate is, perhaps, the best applicant to the roots of affected plants, inasmuch as it dissolves slowly and yields up its iron in an available condition. Garden or cultivated plants which grow rapidly are much more liable to chlorosis than field and wild plants which grow slowly.—*Australasian.*

CATTLE AND CATTLE DISEASE IN CEYLON.

Our correspondent "Truth" having, apparently, retired from the discussion which he initiated, another writer comes forward with suggestions, some at least of which would be useful, if the combined apathy and stolid prejudice of the people would permit of their being carried out in practice. With the precautions and action now proposed it may be well to compare the recommendations which were the result of the extended enquiry and the voluminous report and evidence of the Commission of 1869. The summary was as follows:—

1. All cattle arriving from India at any port in Ceylon to be subject to a quarantine of fourteen days, which may include the period occupied by the voyage. If during that time disease breaks out, the animals should be treated as in any infected district. If no sickness appears, license to travel may be issued to the owners.

2. No cattle to be allowed to graze on the Crown pastures about the old Irrigation Works, without license from the Government Agent of the District.

3. No bull more than a year old to be allowed to graze on any public pasture grounds.

4. Castration of cattle to be allowed by European mode alone.

5. Owners of cattle to report any suspected cases of sickness. Headmen to inspect the herd, and if murrain exists to separate the sick animals, and report to the Government Agent of the district.

6. Locality to be declared infected and placed in quarantine, and other cattle not allowed to pass through the same.

7. Restriction to be removed only by order of Government Agent or other superior authority.

8. Hospitals and medicines to be provided for sick cattle, and Keepers appointed.

9. Owners of sick cattle to pay for their keep and treatment.

10. Tavelams to be subjected to inspection, and restriction when deemed advisable.

11. Regulations to be made by the several Government Agents suitable for each Province, and proclaimed in the usual manner.

Of all the above recommendations, we believe the only one which was carried out was the provision by Government of male animals of a superior breed for the use of cattle owners; but the result was so discouraging that even this effort at improvement was, after a time abandoned. The quarantining of cattle imported from India seems never to have been seriously entertained by Sir Hercules Robinson's government. At this we cannot be surprised; for although the Commissioners leant to the opinion that murrain was often introduced into Ceylon from India, they yet felt compelled to admit that

Murrain as it exists in Ceylon is not the mere temporary outbreak of an epizootic, as has been the case during the late cattle plague in most parts of Europe, but that it has existed in, we may say (for all practical purposes) on indigenous state for years. This consideration and others equally cogent prevented the recommendation of specially stringent measures. The summing up of the treatment recommended to prevent the outbreak of disease and its spread when it had appeared was:—

Thorough cleanliness, both of the cattle sheds and personally among the attendants. Removal of all filth which is continually accumulating, and the sprinkling the contaminated parts of the floor with lime or wood ashes, or both. The free and frequent use of carbolic acid, for the purpose of destroying all germs of contagion which are floating in the air or contained in the excretions. Or, in the absence or scarcity of carbolic acid, the substitution for it of sulphur vapour and tar. The prevention of all communication with unhealthy cattle. The consumption by fire of all rubbish, whether bedding or dung, as often as possible.

All excellent measures if only the natives, amongst whom ignorance is the parent of so much cruelty, could be induced to carry them out.—In looking over some Administration Reports for 1870, the year after the report of the Cattle Commission had appeared, we find opinions quoted in one of them, which we expressed in 1869 and which, at an interval of twenty-one years, we can but repeat. Mr. L. Liesching was in 1870 Assistant Government Agent of Nuwarakalawiya, a district which, with accretions, was formed by Sir Wm. Gregory into the North-Central Province. Mr. Liesching wrote and quoted thus:—

Cattle disease has been the subject of much discussion and correspondence during the year. It is one on which it is easy to be eloquent; but it is exceedingly difficult to devise any suitable means of checking the evil, and the most plausible theories are easily demolished by those who know the practical difficulties in the way. It is therefore a subject for sincere thankfulness that Government has strenuously refused to pass any Ordinance that would be inoperative because it could not be carried into effect. Much that has been said and written on the subject relates to black cattle; but what is to be done with those incorrigible vagrants and determined fence-breakers, the buffaloes? How are they to be kept from forcing their great bodies through any impediments, and making their way through thorny jungles to their favouritie haunts and much-loved marshes?

In this District all agricultural operations are carried on by means of buffaloes, black cattle are only bred—or, to speak more correctly, are allowed to breed—for sale. It has often struck me on seeing the large herds of these latter running about the villages, of no use for agricultural purposes, and perpetually trespassing on the cultivated lands, whether they really are not on the whole a greater nuisance than an advantage—whether, taking into account all the damage one of them does from his infancy until he has arrived at bull's estate, he has not cost more than he will ever realize. I should not however have ventured to give utterance to an idea so heterodox, but for the following passage which I met with recently, quoted from an Indian Journal:—

"We cannot help thinking that Indian villagers are under some kind of delusion that cattle are in themselves wealth, without reference to their use. At this season of the year, when the most familiar sight is a herd of cattle browsing on the grass and under every group of trees, each accompanied by the never-failing companion, the assiduous bird, *Pastor*, a passer-by cannot fail to be astonished at the number of unserviceable animals he sees grazing around him:—under-sized oxen, that are of no sort of use for the plough; old cows that are a mere framework of bones, guiltless of milk, and long past toil; and numbers of unwieldy buffaloes which are stupid and slow for draught, and whose cows yield a very inferior article for the dairy. Then, too, it must be remembered, that a dead ox is of no value to the ordinary peasant. He cannot eat him, he will not skin him, he knows not that hoofs make glue, and horns combs; and his only wish is to throw the carcase somewhere where the *chumars* or the *pariah* dogs may easily get hold of it. Altogether, it seems to us that there is a large element of the national shiftlessness in cattle-keeping, and that many of the small farmers would only be able to assign custom or village reputation as a reason for the retention of so many animals they do not want, and which are neither ornamental nor useful."

On this the Editor of the *Ceylon Observer* says—

"There is immense cruelty in the insensate ignorance of attempting to rear cattle without the means of properly feeding them. In such cases the wretched animals, with vitality at its lowest ebb, drag on a weary existence, to yield it up at the first attack of inclement weather or disease. * * * * *

"To convince the ordinary jungle natives that they are morally responsible for the proper feeding and sheltering of the animals they attempt to rear, will be a work of time, but the work can be expedited indefinitely by the action of really conscientious servants of Government in the higher positions, who can exercise not only 'moral suasion,' but a good degree of benevolent despotism. That the natives can be kind to their animals, on the principle which actuates slave-

holders—self-interest—is shewn by the attention paid to the feeding, and the consequent general condition of the cart bullocks. It is quite right the Government should be urged to do its best to prevent disease, which originates where natural laws are neglected, from spreading and inflicting loss where those laws are fairly observed. But the difficulties here are greater than in Europe, owing to some extent to climate, but mainly to the gross ignorance and stolid conservatism of the people. While, therefore, demanding that all that is possible should be done, we must not expect the evils of ages to be cured in a day. We have great hope in the extension of irrigation works. They will lead to large supplies, not only of grain for human food, but of straw for cattle. Experimental farms, well conducted, too, ought to do good."

It is not buffaloes alone (the species of cattle really useful for agricultural purposes) which do mischief by straying and trespassing. Ordinary cattle go prowling about of their own accord; and the investigation of cases of alleged cattle stealing are frequently complicated by the fact that cattle-owners, who deliberately turn out their cattle at night to feed on the fields of their neighbours, bring false cases of theft against those who capture and impound such trespassing cattle. As a rule the natives own ar more cattle than they ought, with reference to means of feeding and shelter, the latter often non-existent, and murrain which sweeps away the debilitated animals, predisposed by inanition to attack, may be regarded, often as merely Nature's agent employed to restore a just balance. One of the most extraordinary statements in the report of 1869 was to the effect that "The Pali records of Ceylon contain no allusion to cattle plague or to cattle." As to cattle plague the assertion is probably correct, although the non-mention of the disease is by no means evidence of its non-existence. We may take it for granted that ever since human beings commenced to keep flocks and herds, the diseases to which aggregated animals are liable appeared at intervals and were fatal in proportion to the violation of the natural laws which apply to such cases: neglect of cleanliness and fresh air, or the absence of abundant food and sufficient shelter. But the ancient literature of Ceylon, whether written on palm leaves or recorded on rocks, pillars or brasses, in noticing grain culture by irrigation, does not fail to mention the animals essential to such cultivation. Having referred the question to Mr. D. W. Ferguson, he has furnished us with the following note:—

"In the Mahâvansa there are frequent references to oxen and cows, the former being used for draught purposes in kings' chariots as well as in the farmers' plows. Cows' milk and milch kine are also often mentioned; sothat there cannot have been any prejudice against milking amongst the ancient Sinhalese. One reference to a cow and calf is a curious one. We read that Elâra, the Tamil usurper, was so just, that, his own son hp pening to kill a calf accidently by running over its neck with his chariot wheel, on its mother's coming to make complaint by ringing the bell which the king had caused to be suspended at his bedhead for those who sought redress, the monarch struck off the prince's head on the same wheel! In the ancient inscriptions translated by Dr. E. Müller there are a number of references to cart buffaloes, as well as to cattle. I do not, however, find any reference to cattle disease in the Mahâvansa or the inscriptions."

The Commission obtained evidence that cattle disease was not unknown during the Sinhalese period, and it would be interesting now to ascertain, what notices if any of epizootics occur in the Portuguese and Dutch records of their occupancy of the Maritime Provinces. We have already corrected the statement in the report that ttle murrain was not noticed as prevalent in the early days of British rule. It is "an owre true tale" which the Commission told, true now as in 1869, that native cattle are degenerate, liable to disease, and in many cases have been exterminated by disease, results which they believed to be

Attributable to the following causes:—promiscuous and premature breeding, insufficient and inferior grazing, want of care of animals on the part of villagers, and more frequent work necessitated by reduced herds. The same neglect of ordinary precantions, the same indifference to results which distinguish the Sinhalese in all that regards the cultivation of paddy land, are equally manifest in their proceedings in reference to their herds. Except in certain parts of the Maritime and Kandyan districts, we have seen no instances of cattle owners providing shelter of food for their animals in inclement weather, or during seasons of prolonged and severe drought.

With such utter neglect of all the conditions conducive to the existence of a strong and healthy and useful breed of cattle, the wonder ought to be, not that disease is so frequent and so fatally virulent, but that any of the animals are left to perpetuate their miserable kind. A case is mentioned of a landed proprietor in the Eastern Province who at one time possessed 1,000 head of cattle, and who, in one year of murrain, lost all except 5. It is quite possible that the 1,000 exceeded by at least 50 per cent the proportion which ought to have been kept, with reference to the means of existence available for them. The Report of 1869 said: "Too much stress cannot be laid on the evil results of the existing means of cattle feeding." With this we quite agree, and although other measures of reform are of importance, this question of a better provision of pasture and forage for cattle outweighs them all. Abundance of nutritious food must be available, or all precautions to prevent disease with measures of cure will be in vain. But this question of cattle food must be treated in another article.

FORMOSA AND TEA.

If Formosa were in the hands of the British, it would probably be the most formidable competitor in the world with India and China in the production of tea. But the following details show that this naturally beautiful and fertile island is a scene of internecine strife and anarchy:—

News from China leaves no doubt that the outbreaks of the aborigines in Formosa have culminated in a general rebellion. Disturbances in that part of the island, which is inhabited by the native tribes (mainly the eastern and mountainous half), have become chronic, but the most serious of recent years were those in the south, which it was hoped were settled amicably a few months ago. Simultaneously the tribes in the north-east broke out in revolt, and the expedition despatched against them, although the Governor himself accompanied it, has been compelled to return, having suffered heavily both from the enemy and disease. The general in command has been degraded, a colonel has been bebeaded for appropriating the pay of the troops, and it appears that the Chinese lost seme of their guns. Soon after its return to Tamsui news was received of another formidable rising in the south, where the tribes, it was hoped, had been pacified. It seems to have been produced, like most other disturbances in Formosa, by the treachery of the Chinese local officials. The magistrate of the city of Hungcheng, which adjoins the territory of what the Chinese call "the savages," arrested two of the chiefs after the pacification, whereupon the Bhotans rose *en masse* and besieged the city. The magistrate not only gave up the men at once, but feasted the besiegers with abundance of pork and liquor, and on their departure promptly asked for troops to punish them. Five thousand men were

hurried up by sea and land, the general vowing that he will now exterminate the whole tribe and make a clear way to the east coast. The Chinese are said to he well armed with modern weapons of precision as well as with rockets for jungle warfare, the latter of which, however, they are unable to use. So far "the savages" appear to be triumphant all along the line from the south to the north-east; their borders have of late been extended, and it has only been by means of heavy bribes that they have been induced to keep within them. It is quite impossible to predict the result of the campaign now proceeding in the south. To judge by the majority of recent efforts to subjugate the aborigines the quarrel will be patched up for a moment, the troops will be withdrawn, and then the imprudence and arrogance of some local official will cause the flame to burst out anew.—*Times Weekly Edition.*

THE BRITISH NORTH-BORNEO COMPANY.

Mr. W. D. Gibbon, the local agent for this company, sends us the annual report and balance sheet for 1889, and also the report of the 15th half-yearly meeting held last month. Our London correspondent, in his letter of 11th July, mentioned several of the chief facts given by the chairman in his speech at that meeting; but we make a few additional extracts, as follows:—

From an official return of the tobacco sales in Holland last year, it would appear that no country produced tobacco which sold for more than 70 cents of a guilder per pound, with the exception of British North Borneo; whilst the price of the whole of the 1888 crop from our Territory averaged 125 guilder cents. Large sums of money have been spent in planting experiments in Zanzibar, Ceylon and other countries; in most cases with disastrous results. In Deli land is getting scarcer, whilst the price of tobacco is getting dearer. The sales of Sumatra tobacco this year have realized in some cases over 4s per pound; and I believe that a sample of Borneo tobacco has also been valued at this high figure. Under these circumstances, in spite of the difficulties in the early days of planting, there is every reason to believe in a great future for British North Borneo. ...

Next to tobacco, timber takes the second place in our list of products. This industry has greatly increased during the year. ...

It may he further stated that negotiations are in progress with an influential syndicate which may lead to the formation of an Exploration Company, and possibly also to the establishment of a bank in North Borneo, so that there a prospect of the country being more thoroughly and rapidly exploited in the near future than has been possible in the past. ...

The aggregate tonnage inwards was 67,623, and outwards from Sandakan 70,343, and I am glad to say our ports have been frequently visited by Her Majesty's ships of war, the influence of which is very acceptable, as evidence of the interest of Her Majesty's Government in the progress of the protected State. ...

As a further evidence of increasing business, the returns from the Treasurer-General show a large increase both in the note issue and in the demand for our copper coinage; thus the value of notes issued on the 31st Dec. last was over $100,000, as against $53,494 at the end of 1888. The Sandakan correspondence is returned for the year—in letters 17,998; papers and books, 14,677 parcels, 105; showing a considerable increase in 1888 under all the three heads.

We notice that a number of the shareholders at the meeting expressed dissatisfaction at not receiving any dividend, 12 voting that the report be not adopted, and 22 against this motion.

NUTMEGS IN GRENADA.—A West Indian planter in ordering the *Tropical Agriculturist* and offering to send us an occasional letter—an offer we gladly accept—adds:—"The staple on this estate is nutmegs, and we have lots of trees from 70 to 80 years of age, fine sturdy old fellows which bear enormously and look 'good' for another century."

PLANTERS' ENEMIES IN THE (FAR EAST) THE STRAITS AND WEST (GUATEMALA).

Mr. E. Woodhouse writing, from Penang on 22nd July, says:—

"Read, mark, learn and inwardly digest the herewith-mentioned 'bug,' which I guess is our old enemy (or new one perhaps I should say) green bug. The male, however, of the latter is a very minute little fellow, not more than half the length of a full-grown female. I regret to say I have renewed my acquaintance with the green bug during my travels lately; and saw a remarkably fine specimen of *helopeltis* in Perak.'

A New Insect.—M. Adolf Vendrell, a member of the Agricultural Societies of Belgium and Spain, has at the order of the Government of Guatemala, prepared a report on a disease that attacks the coffee plantations of the department of Amatitlan, in that country. Coffee was planted in Amatitlan at the time of the decline of the cultivation of cochineal. Owing to the poverty, want of depth, and perhaps neglect, of the soil, the coffee disease in question made its appearance about ten years ago, and the farmers attribute to its ravages the annual loss of half their crops. M. Vendrell states that the disease is an insect, "nothing more nor less than a new species if cochineal that has adapted itself to a different existence." M. Vendrell, after carefully considering the manner in which the insect should be clase d places it in the coccidos family named by Dr. Claus of Vienna University. To the individual insect he gives the name of "coccus coffeæ." He describes the female as being "of the shape of a coffee bean, with a central line across the length, three pair of feet, a sucker or spur at the thorax, very conspicuous small eyes, and two or three whitish lines on the body." The male is similar, save that he sometimes, has wings, and is slightly larger. The insect settles upon the tender shoots of the coffee, and absorbs the nourishing juices as they flow towards their destination in the tissues of the plant. M. Vendrell advises the use of nitrate manures on the plantations, and recommends the intervention of the Government on account of the poverty of the cultivators.

CEYLON UPCOUNTRY PLANTING REPORT.

THE NEW "CEYLON HANDBOOK AND DIRECTORY"—A COMPLIMENT.

Aug. 14th.

The reception which your big book has received on all hands must have been very gratifying; for from the Governor downwards testimonials to that work have been both hearty and numerous, if I may judge by what has appeared in the *Observer* columns. No one who has taken the trouble to study the book will think this praise has been misplaced.

There is one remarkable feature in "Ferguson's Ceylon Directory," and that is that every succeeding issue seems to be an improvement on the preceeding one. It goes on too increasing in bulk. I had the curiosity to put the volume for 1887-8 into the scale as against 1890-91, and the latter comes out *nine ounces heavier*. This increase is all new matter, for it seems as far as I could make out that the advertisements in both books are pretty nearly equal; in fact the older volume rather has it. Of course a test of this kind is of no value, in judging the merits of the book as a book; but when you begin to wander through its pages and note the wide range of the information therein contained, and more especially the practical nature of it; also the marked absence of anything which might be classed as "padding," it would appear that these nine ounces of new letterpress have a critical value, even when put in this avoirdupois way. The question is, if over half a pound weight of the book were to be cut out, could an excision of this kind be made without very much impairing its worth?

What one might be inclined to sacrifice another would refuse to: so that on the whole this added weight is all pure gain to the public. Speaking of so many ounces of new letterpress does not perhaps convey to the general reader a very clear idea of the extent of this added matter; but when I say that the ordinary *Observer* weighs somewhat less than two ounces, and that the increased size of the *Handbook* is equal to about FIVE *Observers* or say about a week's newspaper reading, the advantage to the public should be pretty manifest. For all this, there does not seem to be an increase in price. How is it done?

The get-up of the *Directory* is highly creditable to all concerned. When one remembers the style of binding of some of the earlier issues, looking for all the world like a fat boy in a jacket too small for him—and contrasts it with the finish of the 1890-91 edition, the advance is very marked. It adds very much to the pleasure of using a book to have it well bound.

In the "Planting and Agricultural Review," which forms the first portion of the *Handbook*, every product of Ceylon has its share of attention, and the information is brought well up to date. Under the heading "Sugar Cultivation in Ceylon," when, one would hardly have looked for late information, or indeed felt the need of it, there occurs the following passage:—"We had about two years ago (July 1888) an enquiry from a European at Nagpore who wished to try new machinery in manufacturing sugar in Ceylon; while one of the first questions asked by H. E. Sir A. E. Havelock after assuming the Government (May 1890) was, why sugar was not grown in Ceylon with its cheap labour supply." A big book like this, which is issued to the public in August, to bring its information on such a minor matter as sugar up to May of the same year, shows considerable enterprise. Since the last *Handbook* was published, cotton and tobacco have been very much in evidence in Ceylon agriculture, and the articles on these two products are well up to date, and very full in the information given. This is especially so in the article on cotton.

It is not a little interesting—and I would commend it to my brother planters when the rain prevents work and they don't know what to do with themselves,—to go over the Planting Review of the last "Directory" and compare it with the new edition. Although there is not much in the different articles that we don't know, still it is easy in comparing the different summaries to trace where there has been progress or retrogressive; and the marshalling of the many facts and figures, which individually don't seem to count for much, has a pleasing and enlightening effect. It is like a big field-day, with its march-past.

In a book of this size brought out in a busy newspaper office there needs must be errors. Several have been pointed out in the *Observer* columns, and more will be I doubt not. At page 654*, some six surveyors are down as licensed auctioneers—but perhaps they are that besides being the other.

Even with all the mistakes—and their number twice doubled—"Ferguson's Ceylon Handbook and Directory 1890 91" is a credit to the colony, and especially to the hard-working editors who have compiled it.

PEPPERCORN.

A MYSTERIOUS AFFAIR.

With reference to the paragraph under the above heading which appeared in our issue of yesterday we give below all that we can find on the subject in our files of 1875. The following appeared in our issue of February 24th, 1875:—

We are sorry to learn, from the last Ootacamund paper, that nothing has yet been discovered of Mr. Broughton's, the Quinologist's, whereabouts. He reached Madras safely after leaving Ootacamund on the 7th December, for on the 11th of that month he wrote from here to the Manager of the *Neilgherry Courier*. It appears that Mr. Broughton sent in the resignation of his appointment in December, giving six months' notice, but that Government, in reply, offered him the option of retiring before the expiration of that period. It is conjectured, therefore, that he may have taken advantage of this offer, and proceeded to England. The Police authorities at Ootacamund telegraphed to Bombay at the end of last week for information regarding a Mr. Broughton who had taken his passage for England at that Presidency: but the result of the inquiry is not known. In connection with Mr. Broughton's name, it may be mentioned that a sample of amorphous quinine, manufactured by the Quinologist's Department, has been condemned, and that Government have directed the discontinuance of the manufacture: but our Neilgherry contemporary is informed that the condemned sample was prepared during Mr. Broughton's absence, and should not be taken as a specimen that Mr. Broughton's superintendence and skill might have produced.

In the issue of March 2nd, 1875, we find the following:—

We have received the following letter from Mr. O. B. Irvine, the District and Sessions Judge of South Arcot. 'As from a paragraph which appeared in your issue of the 25th instant it would appear that the friends of Mr. Broughton, the Government Quinologist, have cause for anxiety on his account, and that the latest tidings received of him were contained in a letter to the Manager of the *Neilgherry Courier*, dated from Madras, 11th December, I wish to inform you that Mr. Broughton was a passenger with me on board the B. I. S. N. Steamer "Ava," from Madras to Pondicherry on the 14th December, and that he then informed me his intention was to make a tour in Ceylon. This accounts for Mr. Broughton's movements up to a date nine weeks ago, and seems to prove that he did not meet with any misadventure in India. The opinion prevails in Madras that he has returned home in a rather informal manner, and has no idea of returning to the lucrative appointment that he held for some eight years as Government Quinologist at Ootacamund in connection with the Neilgherry Cinchona Plantation.' —*Madras Mail.*

* This is corrected in the Errata.—ED. *T. A.*

MANA-GRASS FROM CEYLON FOR MANUFACTURING BOARD—STANLEY-WRIGHTSON TEA CHESTS—MR. HUGHES ON MR. HOOPER'S ANALYSES OF TEA—TEA TASTING AND WATER—CLOVE CULTURE IN ZANZIBAR AND PEMBA.

Fourteen hundredweights of mana grass having arrived in England from Ceylon, the Stanley-Wrightson Syndicate met on Tuesday last to discuss its future arrangements. It was determined that this shipment of grass should be handed over to Messrs. Ibbotson, who have large mills at West Drayton, to be made by them into quarter-inch boards. The method of preparation consists in boiling the grass under great pressure, and then passing the pulp resulting from that operation through powerful rolling machines. Dr. Evans—who, as you have before been told by me, is the Consulting Chemist to the Paper Makers' Corporation of Great Britain and Ireland, and who carried out the first experiments with mana grass as you have been informed,—is to supervise closely the progress of these operations. Dr. Evans was present at the meeting of the Syndicate referred to above, and

thereat expressed his opinion as to the singular fitness of the grass for the purpose required.

The Syndicate, after coming to the resolution above mentioned, then discussed the after-course to be followed by it, and a proposal,—should Dr. Evans's report be as satisfactory as it promises to be,—to form a company for manufacturing the board in Ceylon and to take over and work the Stanley-Wrightson patents for tea chests therein, was most favourably entertained, and there seems to be every probability that this will be the course which will receive ultimate adoption. You will fully recognize that this arrangement, so full of hopeful promise for the creation of a new industry among you, is dependent upon the success of this second series of experiments; but no one here feels any doubt as to this being achieved, and I shall feel equally surprised as disappointed if, before another twelve months have passed, the new company's mills are not in full work among you.

Intimately allied to the subject treated of in the two foregoing paragraphs is the verdict now obtained as to the condition in which the first shipment of Stanley-Wrightson tea chests has arrived at home; for the prospects of the industry above referred to are, of course, mainly dependent upon the success likely to follow that verdict. You have already been informed in these letters of what I had myself seen of these chests, as also of the satisfactory sales made of the tea which came home in them. We have now further learned that on the shipments made home by the "Cartbage" and "Oopack" there was a gain respectively on the landing and sale weights as compared with those of similar tea packed in the same number of ordinary wooden boxes of the same external cubical measurement, of 2·4 lb., of tea per package, and 3·12 lb. of tea per package. That is to say, that, whereas the 46 lb. of tea packed in the Stanley-Wrightson chests sold (roughly) as 48 lb., the 45 lb. packed in wood chests sold only as 44 lb. Freight and warehouse charges were the same for both kinds of packages, and you will be able to estimate from these figures one very material advantage obtained by the use of the Stanley-Wrightson chests. So far as my inquiries have as yet been replied to, I have not received a single expression of opinion in opposition to their use. It is, however, admitted by members of the Syndicate that, while the boxes seems to be a success, the lead paper linings used instead of lead have not so far proved to be so; but no opportunity has yet occurred for me to learn in what way or degree these last have proved to be defective.

If it had been possible for me to do so I should certainly have endeavoured to be present to watch the process of treating the mana grass during its conversion into board at Messrs. Ibbotson's mills. Unfortunately, absence from London will prevent my doing this, and I regret the fact exceedingly, because I foresee that very probably the introduction of this new industry into Ceylon may have a marked effect on the welfare of many of its inhabitants, for those well acquainted with the various purposes to which strawboard is now applied assure me that it is scarcely possible to over-estimate the many services it may be made to render.

During the present week opportunity has occurred for me to learn from Mr. John Hughes his opinion upon what we had in the *Tropical Agriculturist* not long back as to the efficacy of analyses of tea as stated by Mr. David Hooper in the paper by him abstracted in that journal. Mr. Hughes tells me that he wrote by the last mail but one to the Secretary of your Planters' Association directing attention to Mr. Hooper's paper and the conclusions stated in it, and suggesting that it would afford useful information to planters if some investigations were carried out in order to determine the amount of tannin present in the ordinary domestic infusion of ten minutes. Mr. Hooper, according to Mr. Hughes's view, contends that *elevation* has nothing to do with the proportion of tannin, but the latter gentleman considers that this opinion is in advance of facts ascertained by Mr. Hooper in his researches; for out of the 65 samples reported on in the paper, only 6 were from Assam at an elevation of 600 feet, the other Indian teas analysed representing estates at an elevation ranging from 2,500 feet in Travancore to 7,800 feet in the Nilgiri ranges Most of these Indian teas therefore represent hill estates, and as such it is reasonable to conclude that the proportions of tannin should in such cases represent about the same quantities as are found in tea grown on the hills in Ceylon.

Mr. Hughes continued the expression of his views to me by pointing out further that Mr. Hooper's results give the *total* amount of tannin present in the teas, and not the amount extracted under ordinary circumstances. Mr. Hughes regards this as being a fact to be regretted, because Mr Hooper, in a small set of experiments subsequently made, showed that only about one-third of the total amount of tannin contained in the tea is usually extracted by the ordinary teapot infusion, and he holds that this constitutes the practical side of the question which calls for further analytical investigation. He quoted to me one sample of tea so dealt with by Mr. Hooper which yielded 3·04 of tannin, while another gave twice as much, viz. 6·26. What Mr. Hughes therefore thinks to be desirable is a thorough examination of reliable samples with a view of definitely deciding, not only how far the amount of tannin is influenced by elevation, but also by the various processes of manufacture, the time allowed for fermentation, different conditions of temperature, and other circumstances which effect the flavour and probably also even the constituents of tea. He mentioned to me that tea making depends on chemical reactions carried out under certain conditions of temperature, and that as the strength of tea depends on the proportion of tannin, a careful determination of the constituents would be useful to planters as well as interesting to the general public.

So far as my own very deficient knowledge can justify me in forming any opinion upon the points treated of by Mr. Hughes, it would seem to me that it is the last mentioned body, *i.e.* the general public, to whom such an investigation would prove to be first useful. The utility to your planters would, I should say, follow upon indications of appreciation shown by the public of certain growths which might comply most closely with results obtained by the investigation proposed. As a matter of fact, when A. purchases tea he can receive but little aid to his judgment by any published analysis of it at present available to him. He may buy a pound of tea of a kind said to contain but little tannin under *full* analysis, but from which his system of domestic infusion may extract tannin in far larger proportion than would be yielded by another description of tea stated to contain a far larger proportion under analysis than that bought by him. It is therefore not to be doubted that if a standard for analytical examination was established and worked upon which should approach closely to the ordinary conditions of domestic practice, A would obtain a far more reliable guide than he has at present. We hope your Planters' Association will take this matter up, because it is important for your planters to learn

with some degree of certainty what growths and what processes will the nearest meet the tastes of consumers. These vary so much in different countries that probably tea required by users in America or Russia might demand a different system of curing altogether to that which satisfies the English palate. What your planters want, as it appears to me, is reliable data upon which to found—and vary as need may arise—the practice of their treatment of teas for the several markets, and this it seems natural to expect could best be afforded by the results to such experimenting as Mr. Hughes suggests.

But that gentleman, during the discussion of the foregoing topic, mentioned to me a further circumstance which must have a very important bearing upon the question. A little time back my letters mentioned to you how greatly at variance was the judgment of tea tasters here with those of similar experts in Ceylon. At the time of my then writing, I ventured on an expression of my view that this might be due to the difference in the constituents of the waters used for infusing here and in Ceylon. At the same time such evidence as was procurable in support of that view were mentioned to you; but I had not then secured the authoritative evidence which Mr. Hughes has now afforded to me. He tells me that he has been informed by a gentleman largely interested in the tea trade, that some London firms who do a large business in Ireland actually import Dublin water to London for the purpose of testing teas intended for Ireland. It is scarcely possible to imagine a stronger evidence of the important results which the use of different waters for infusing teas may have than is this. The Irish have a great reputation as connoisseurs of tea, and it is known that they will pay a higher price for particularly fine teas than people on this side of St: George's Channel are willing to give. Very probably, if tea intended for the Irish market were selected here upon tasting done with London water, a shipment so determined might be altogether refused in Dublin.

Indeed it does not seem improbable that water has as important an effect upon tea as it has upon malt and hops in the manufacture of beer. Dublin stout we know to be famous, and Allsopp's has achieved its reputation mainly owing to the character of the water derived from the Trent. Now you cannot select the waters for your customers to use with your teas, but you may prepare for them teas which you can assure them will yield less of tannin according as they are infused with hard or soft water. So important are these two main divisions of water characteristic that Mr. Hughes tells me that along the whole of the south coast of England, where the water is for the most part hard, being derived from the chalk formation, tea grown on hill estates finds a marked preference by purchasers. This fact illustrates pretty accurately what should be aimed at by your planters, and very probably with the experiments suggested by Mr. Hughes others might be usefully combined to show how their results were affected by the use of different kinds of water. I feel this subject to be one of so important a character that no apology is necessary from me for the length at which it has been here dealt with.

Has the culture of the clove ever been tried in Ceylon?* Somehow or other it seems to me that we have heard of such a trial having been made. Anyway, in view of the great usefulness of suggestion for new industries, it may be worth while just to give you the following extract from the *Times* relating to the culture of this spice in and about Zanzibar:—

CLOVE CULTURE IN ZANZIBAR AND PEMBA.—The United States Consul at Zanzibar in a recent report states that the culture of cloves is the principal industry in Zanzibar and Pemba, the latter producing three-fourths of the total harvest, while Zanzibar produces the best quality cloves. The culture was introduced into the island in 1830, and today they are the principal sources of the world's supply. The clove of commerce is the bud of the clove-tree. It takes five or six years from the time of seeding for a tree to bear the buds. At two years of age the trees are 3 ft. high. They are planted 30 ft. apart at that time, and left with only ordinary care until they are ready to produce the buds. The latter do not ripen all at once, but at intervals during six months. They are then spread in the sun until they become brown, when they are warehoused, ready for market. A plantation ten years old produces an average of 20 lb. of cloves to a tree. Trees 20 years old frequently produce 100 lb each. The crop for the present year, which is the largest on record, will amount to 13,000,000 lb., averaging a local value of 5d a pound. A duty of 30 per cent *ad valorem* is levied by the Sultan. The only other parts of the tree which are utilized are the stems, which are gathered and are sold for about a fifth of the price of cloves, and with about the same percentage of strength. These go to make what is known as ground cloves. The plantations have hitherto been worked with slave labour, but the stoppage of the supply of slaves from the mainland involves increased expense for harvesting, as well as the risk of loss from failure to harvest quickly when the buds appear. —London *Cor.*

THE JENOLAN CAVES IN NEW SOUTH WALES

have been described in a nicely got-up publication, by Mr. J. J. Foster, a presentation copy of which has been sent to us, by its recipient, for notice. These marvellously extensive caves are within easy distance of Sydney by railway across the Blue Mountains and otherwise, situated amidst charming scenery, in a district fertile, rich in varied vegetation and salubrious. The formation is limestone in which the shapes of fossil corals, shells and many other interesting marine objects can still be traced, the eroding agencies being mountain-born streams which flow through and form cascades in some of the caves. Stalagmites rise like marble pillars on all sides while stalactites assume the forms of exquisitely beautiful curtains and shawls, striped black, brown, cream color, yellow and white, and which are arranged in graceful folds. In some cases a diamond-like sheen is imparted by light reflected from the facets of thousands of crystals, white and amber-coloured. In one instance a depth of nearly 500 feet has been traced, but it is impossible yet to calculate the extent, size, or depth of the cavities. It is claimed for them that they are amongst the largest, the most numerous and the most beautiful in the world. Portions of the caves are bright with a marble polish, produced by the passage over them, during countless ages, of the numerous animals which made their abode in the caves, wallabies (a small species of kangaroo) especially. In a notice of the geology of the limestone stratum (interbedded with sandstone and shale) in which the erosion of water has produced the wonderful series of caves, it is stated:—

"It is not uninteresting to reflect that the limestone, now a compact grey marble, was once a mass of living corals, "stone lilies," and molluscs, revealing the former existence, in the Siluro-Devonian epoch, of conditions of marine life somewhat resembling those which support the beautiful living forms which buil

* See Planting Review in our new Handbook.—ED. *T. A.*

up the reefs in the coral seas of the present day; and it is significant of the vast changes this part of the surface of the earth has undergone, when we see fresh-water streams, at an elevation of several thousand feet above the sea, now flowing through rocks that were originally formed beneath the waves of the ocean at a very remote period of the earth's history. These silent rock-teachings give additional charm to the many interesting features of these caves."

Again:—

"There appear to have been two distinct periods during which stalactitic growth formed: one of comparatively remote age, and very local in character, being chiefly confined to the caves known as the Lurline and Bone Caves, and another but recent and still in operation. The older growth is essentially of a stalactitic type, and the salactites are remarkably thick; though in one or two cases, as in Chamber No. 1, a huge stalagmite is to be seen. The newer growth exhibits every fantastic and beautiful form known, from the thin hollow reed and transparent veil to the snow-white dome stalagmites, the crystal-fringed pool the wave-lined floor, and the crooked-fringed shapes that are turned in all directions."

Some of the names of the various caves (which, by the way, were discovered by the pursuers of a noted bushranger) are curious and some poetical:—The Grand Arch; the Devil's Coach House; the Nettle Cave; the Imperial Cave; the Lily of the Valley; the Fairies' Paradise; the Bushranger's Cave; McEwan's Hole (the haunt of the bushranger); the Glass Cave; the Mammoth Cave; and the Bottomless Pit! We cannot help quoting a passage from the description of one of the caves:—

"At once the vastness and silence of this chamber will rivet the attention of every observer, also the ripple-marked boulders all over the floor. Blocks of beautiful black marble may be seen in several places; many fossil shells are noticeable, embedded in the rocks; and fine chalk-like rock, both pink and white, may be found here. Now and then the noiseless wallaby may be seen continuing his stealthy flight from ledge to ledge up the walls; occasionally the wild mimicry of the lyre-bird re-echoes through this arch, though he himself may be safely hidden in the forest slopes outside. All these things combined make up one of the most wonderful and exquisitely harmonious pictures of nature's handiworks."

One cave, the specially beautiful objects in which are carefully protected, is lighted by electricity! In exploring the others the magnesium light is used. Mr. Foster, in concluding his description, writes:—

"Having visited most of the important caves throughout the world, viz., the Ajanta, Ellora, and Elephanta Caves in India, the Great Moulmein Caves in Burmah, others in Java and Japan, and the principal ones in Europe, I can with confidence say none of them can compare with the Jenolan Caves for their marvellous variety of formations, dazzling brilliancy of lustre, and exquisite colouring."

There are caves in Ceylon in our ancient limestone, in the modern lime formation near Point Pedro, and in our gneiss, as at Dambulla and elsewhere, inhabited by swallows, bats, and Buddhist priests; but we have nothing with natural attractions to compare with the water-worn caves in the ancient upheaved limestone of New South Wales.—The nearest approach must be the mammoth caves of Kentucky, and those we saw of Luray, Western Virginia, but Mr. Foster in his list does not mention the American caves.

TEA CULTURE IN BURMA during the past year showed a considerable improvement, although the industry is of trifling extent. The area under tea had increased from 14 to 164 acres and the approximate yield of tea from 1,600lb. to 12,250 lb. The cost of cultivation was R30 per acre, and of manufacture five annas per pound. Last year Burma produced no less than 2,764,457 tons of beet sugar.—*M. Mail*, July 29th.

CERTAIN TEA-PLANTERS of the Kangra District have petitioned the Local Government against the proposed assessment of land under tea in their possession, which was formerly held revenue free. The petitioners further ask that orders may be issued completely exempting the acreage under tea from assessment from the present time for a period of at least ten years.—*M. Mail*, July 18th.

EXPORTS OF INDIAN COTTON.—The following table published by the *Times of India* is instructive and useful for reference. It will be observed that there is a considerable increase in season 1889-90 over 1888-89, distributed over all the ports; but as respects the cotton export trade, the figures show that Bombay is first—and the rest comparatively nowhere—holding as it does about 80 per cent of the whole trade? The table is as follows:—

SAILINGS OF COTTON FROM ALL INDIA, TO EUROPE, CHINA, AND OTHER FOREIGN PORTS, INDIAN PORTS EXCLUDED:—

From	1889-1890. July to Dec.	Jan. to June.	Total bales:	1888-1889. July to Dec.	Jan. to June.	Total bales:
Bombay	188,111	1,348,238	1,528,349	143,884	1,151,837	1,295,721
Kurrachee	4,533	28,332	32,865	5,567	41,563	47,130
Calcutta	29,671	129,204	158,875	25,891	88,651	114,542
Madras	51,573	26,215	77,788	34,118	33,639	67,757
Coconada	26,336	7,770	34,106	13,967	2,823	16,790
Tuticorin	64,212	43,415	107,627	47,604	42,456	90,060
Total	364,436	1,575,174	1,939,610	271,031	1,360,969	1,632,000

CEYLON EXPORTS AND DISTRIBUTION 1890.

COUNTRIES.	Coffee cwt. Plantation	Coffee cwt. N'tive	Coffee cwt. Total.	Cinchona. 1890 B'nch & Trunk lb.	Tea. 1890 lb.	Cocoa cwt.	Cardamoms. lb.	Cinnamon. Bales lb.	Cinnamon. Chips lb.	Coconut Oil. 1890 cwt.	Coconut Oil. 1889 cwt.	Plumbago. 1890 cwt.
To United Kingdom ...	46833	100	46933	5326127	30375175	8071	112293	635934	152586	25593	63575	92408
" Marseilles	157	...	157	12500	612	79	...	47100	2800	...	...	...
" Barcelona	...	...	...	...	...	...	...	24500	...	...	...	...
" Genoa	12	...	12	...	1514	...	...	41425	17024	696	908	...
" Venice	71	232	303	70412	1815	...	...	9000	11200	...	...	...
" Trieste	7825	97	7922	252	1270	...	...	3900	8848	10895	5417	...
" Odessa	32	...	32	...	15	...	...	...	...	700	2211	...
" Hamburg	296	...	296	730	30819	787	1131	183800	52772	10265	5257	24594
" Antwerp	17	20	37	108279	1600	...	...	12000	5600	304	1492	11050
" Bremen	18	...	18	...	13389	151	...	18106	...	...	...	4041
" Havre	...	100	100	...	...	...	...	10000	...	...	4578	...
" Rotterdam & Amsterdam	3	...	3	21384	...	55	...	...	11200	10	...	1616
" Africa	16	...	16	...	33030	...	...	5000	...	...	...	...
" Mauritius and Eastward	220	270	490	...	31751	498	...	7500	...	38319	534	...
" India	756	718	1474	...	87390	...	102792	5000	...	54419	22730	210
" Australia & New Zealand	6151	919	7070	...	1411338	9	40	7260	...	1170	1737	342
" America	1924	...	1924	260867	117968	1389	2271	64228	...	20034	77744	80942
" Stockholm	...	...	...	...	173	...	...	...	...	...	...	...
Total Exports from 1st Jan. to 28th Aug. 1890	64331	2456	66787	5800551	32109981	11039	218527	1074753	262030	162405		215203
Do 1889	53499	3869	57486	6544243	22804762	11537	190188	1563313	338555	186183		277074
Do 1888	101194	3891	105185	8305924	15036522	10271	189197	1023320	368621	225636		150830
Do 1887	139081	5844	144983	8832737	8235920	13707	215227	793653	163560	151698		150494

Constantinople 2122 lb. Tea.

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, 14th August, 1890.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White	Slightly softish to good hard bright	£7 a £8 15s
Yellow	Do. drossy & dark ditto	95s a 115s
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 3d
	Twig	1d a 1½d
CARDAMOMS Malabar	Clipped, bold, bright, fine	1s 8d a 3s
and Ceylon	Middling, stalky & 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, bgt.	1s 6d a 2s 8d
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 11d
Chips	Fair to fine plant	2½d a 7½d
COCOA, Ceylon	Bold to fine bold	95s a 105s
	Medium	80s a 90s
	Triage to ordinary	60s a 70s
COFFEE CeylonPlantation	Bold to fine bold colory	106s a 110s
	Middling to fine mid.	102s a 105s
	Low mid. and Low grown	98s a 102s
	Smalls	97s a 101s
Native	Good ordinary	92s a 98s
Liberian	Small to bold	85s a 93s
East Indian	Bold to fine bold	105s a 115s
	Medium to fine	100s a 105s
	Small	93s a 98s
Native	Good to fine ordinary	92s a 98s
COIR ROPE, Ceylon & 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
Cochin	Ordinary to fine	£12 a £36
Do	Roping fair to good	£12 a £15 10s
COLOMBO ROOT, sifted	Middling wormy to fine	14s a 25s
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 38s 6d
Rough	Fair to fine bold	20s a 25s
	Small	14s a 18s 6d
GUM ARABIC, Madras	Dark to fine pale	15s a 55s
NUX VOMICA	Fair to fine bold fresh	9s a 11s
	Small ordinary and fair	6s a 8s 6d
MYRABOLANES Pale,	Good to fine picked	10s a 10s 9d
	Common to middling	8s a 8s 9d
	Fair Coast	8s 9d a 9s
Pickings	Burnt and defective	4s 9d a 6s 3d
OIL, CINNAMON	Fair to fine heavy	1s a 2s 6d
CITRONELLE	Bright & good flavour	⅝d a ¾d
LEMON GRASS	,, ,, ,, ,,	1½d a 1¾d
ORCHELLA WEED	Mid. to fine, not woody	20s a 33s
PEPPER, Malabar, blk. sifted	Fair to bold heavy	4⅝d a 5¼d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White	,, ,, ,,	1s 1⅝d a 1s 2¼d
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	6s 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 good flavor	£30 a £58
Do. chips	Inferior to fine	£9 a £30
SENNA, Tinnevelly	Good to fine bold green	5d a 8d
	Fair middling medium	2d a 4d
	Common dark and small	1d a 2d
TURMERIC, Madras	Finger fair to fine bold	15s a 17s
Do.	Mixed middling [bright	14s a 15s
Do.	Bulbs	10s a 12s
Cochin	Finger	10s a 11s
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.		
ALOES, Soccotrine	Good and fine dry	£4 a £7
Zanzibar & Hepatic	Common and good	40s a £5 5s
CHILLIES, Zanzibar	Fair to fine bright	32s a a 35s
	Ordinary and middling	28s a 31s

FROM BOMBAY AND ZANZIBAR.	QUALITY.	QUOTATIONS.
CLOVES, Zanzibar and Pemba, per lb	Good and fine bright	5¾d a 5¾d
	Common dull to fair	4¾d a 5¼d
Stems	Common to good	1¼d a 1½d
COCULUS INDICUS	Fair	8s 6d a 10s
GALLS, Bussorah & Turkey ℔ cwt.	Fair to fine dark blue	52s 6d a 57s 6d
[cwt.	Good white and green	40s a 50s
GUM AMMONIACUM per	Blocky to fine clean	20s a 50s
ANIMI, washed, ℔ cwt.	Picked fine pale in sorts,	£12 a £13 10s
	part yellow and mixed	£8 a £11
	Bean & Pea size ditto	£5 a £8 10s
	amber and red bold	£8 a £11
scraped	Medium & bold sorts	£4 a £7
ARABIC E.I. & Aden	Sorts	32s a 75s
per cwt. Ghatti	Sorts to fine pale	20s a 70s
Amrad cha	Good and fine pale	50s a 65s
	Reddish to pale brown	25s a 45s
ASSAFŒTIDA, per cwt.	Clean fair to fine	26s a 38s
	Slightly stony and foul	16s a 25s
KINO, per cwt.	Fair to fine bright	25s a 30s
MYRRH, picked ,,	Fair to fine pale	£5 a £6 10s
Aden sorts	Middling to good	72s 6d a 80s
OLIBANUM, drop	Fair to fine white	35s a 55s
per cwt. ,,	Reddish to middling	25s a 34s
pickings	Middling to good pale	12s a 20s
siftings	Slightly foul to fine	10s a 15s
INDIARUBBER Mozambique, red hard		2s a 2s 6½d
per lb. Ball & Sausage, white softish		1s 5d a 2s
unripe root		1s a 1s 11d
liver		1s 3d a 2s 3d

FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts per lb.	Nearly water white	4d a 4¼d
2nds ,,	Fair and good pale	3⅝d a 3¾d
3rds ,,	Brown and brownish	3⅛d a 3¼d
INDIARUBBER Assam, per lb.	Good to fine	2s a 2s 6d
	Common foul and mixed	9d a 1s 10d
Rangoon	Fair to good clean	2s a 2s 4d
Madagascar	Good to fine pinky & white	2s 6d a 3s
	Fair to good black	2s a 2s 4d
SAFFLOWER	Good to fine pinky	60s a 70s
	Middling to fair	40s a 60s
	Inferior and pickings	15s a 25s
TAMARINDS	Mid. to fine *black* not stony	10s a 12s 6d
	Stony and inferior	4s a 6s

FROM CAPE OF GOOD HOPE.		
ALOES, Cape, per cwt.	Fair dry to fine bright	22s 6d a 24s 6
,,	Common & middling soft	12s a 21s
Natal	Fair to fine	none here
ARROWROOT Natal per lb.	Middling to fine	2d a 3½d

FROM CHINA, JAPAN & THE EASTERN ISLANDS.		
CAMPHOR, China, ℔ cwt.	Good, pure, & dry white	160s
Japan	,, ,, pink	
GAMBIER, Cubes, cwt.	Ordinary to fine free	32s a 41s
	Pressed	nomina
Block [per lb.	Good	27s 3d
GUTTA PERCHA, genuine	Fine clean Banj & Maca-	3s 6d a 4s 6d
Sumatra	Barky to fair [sar	2s a 3s 4d
Reboiled	Common to fine clean	4d a 2s
White Borneo	Good to fine clean	1s 10d a 2s 9d
	Inferior and barky	1s 4d a 1s 9d
NUTMEGS, large, per lb.	57's a 80's, garbled	2s 10d a 4s
Medium	83's a 95's	2s 8d a 2s 9d
Small	100's a 160's	1s 6d a 2s 7½d
MACE, per lb.	Pale reddish to fine pale	2s 6d a 2s 10d
	Ordinary to fair	2s 1d a 2s 4d
	Chips and dark	1s 6d a 2s
RHUBARB, Sun dried, per lb.	Good to fine sound	1s 3d a 3s 2d
	Dark ordinary & middling	8d a 1s 3d
High dried	Good to fine	9d a 1s 1d
	Dark, rough & middling	3d a 7d
SAGO, Pearl, large, ℔ cwt.	Fair to fine	17s a 18s
medium	,, ,, ,,	15s a 17s 6d
small	,, ,, ,,	10s 6d a 13s
Flour [per lb.	Good pinky to white	8s a 12s
TAPIOCA, Penang Flake	Fair to fine	2d a 2½d
Singapore	,, ,,	2d a 2½d
Flour	,, ,,	1¾d a 2⅛d
Pearl	Bullet, per cwt.	10s a 15s
	Medium ,,	21s a 21s 6d
	Seed ,,	16s a 17s

THE MAGAZINE

OF

THE SCHOOL OF AGRICULTURE,

COLOMBO.

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

The following pages include the contents of the *Magazine of the School of Agriculture* for September :—

NITRIFICATION.

IN the year 1877 Schloesing and Müntz gave to the world the results of their interesting experiments which went to prove that the conversion of nitrogen found in the soil in an inorganic form as ammonia, and in an organic form as decayed vegetable matter, into nitrates was effected by the agency of a living ferment. While these experiments have been verified by the English chemists, Warrington and Munro, no further light has been thrown on the nature of this germ since the continental chemists made their discovery concerning the minute organism which they considered assignable to the family of bacteria, though much interesting information has been gained as to the conditions under which the nitrifying germ works.

It is well known that different forms of nitrogenous substances applied to the soil act at different rates. Nitrate of soda acts more quickly than sulphate of ammonia; sulphate of ammonia than the nitrogen in guano, bone-dust, dried blood, &c. But what is the explanation of this difference in the rate of action of manures as plant food? Plants absorb the nitrogen they take as food from the soil in the form of nitrates, and in the first-mentioned manure the nitrogen is of course in this form. In the second the nitrogen exists as ammonia, which has first to be converted into nitrate before it becomes available as plant-food, and time is required for this conversion. The production of nitrates either from ammonia or from organic nitrogen is by the agency of the minute bacteria, whose importance was, as mentioned, only discovered in 1877. Till that year the production of nitrates in the soil was believed to have been brought about by a simple process of oxidation. The following experiment supplies the grounds for belief in the existence of the nitrifying germ as the cause of nitrification. If we take a dilute solution of ammonia, containing other plant food, and sterelize this solution, *i.e.*, kill any living germs that it may contain by submitting it to a high temperature for a lengthened period of time, we will find that such a solution will keep for any length of time without showing, on being chemically tested, any traces of nitric acid. Introduce, however, a very small portion of fresh soil, and nitrification will at once set in.

By experiment also it has been found that the nitrifying organisms are almost entirely limited to the surface soil, and that they are not uniformly much below a depth of 9 inches. They may, however, exist at a greater depth, but when they do so, they are found in a very feeble condition. Even in the surface soil their distribution depends on the nature of the soil, for the presence of these bacteria is favoured by certain conditions which may obtain to a greater or less extent in different soils. For one thing they require a large amount of oxygen, and hence it is only in the surface soil that their

complete development takes place. Here then we see one important reason for the need of the plough and other tillage implement for breaking up and thoroughly aërating the soil. Other conditions being equally favourable then, the more thoroughly the soil is aërated the more freely will nitrification take place. The presence of moisture is another necessary condition, and hence during a period of extreme drought nitrifioation is at a standstill. On the other hand if the soil be unduly charged with water, nitrification is again reduced to a minimum, as in the case of heavy, badly-drained clays, and this for more than one reason. Proper aëration cannot go on in a soil of this nature; while the presence of a large amount of moisture in a soil tends to reduce its temperature, and the temperature of the soil is another very important consideration. The action of the germs totally cease at a temperature below 12° C., while it goes on best at blood heat, that is about 98° F., and ceases again if the temperature be raised to 55° C., the germs being totally destroyed at 90° C. They are not killed by frost in the winter time in temperate regions, but only remain inactive and revive when the temperature rises, their action to any appreciable extent commencing above freezing point. Of course the presence of nitrogen in an organic or inorganic form is necessary, as also that of some salifiable base to combine with the nitric acid and form nitrates, the form in which plants take in their nitrogenous food. Thus we see the importance of preserving a proper mechanical condition in soils by ploughing, harrowing, draining and such operations as bring about this very necessary result; for, the elaboration not only of nitrogenous plant food by the agency of nitrifying germs, but also that of mineral food by oxidation is greatly dependent thereon. With regard to the theory—claimed severally by Hellriegel and McAlpine—that special organisms, to which the name of bacteriods has been given, are contained in the root tubercles of leguminous plants, whose function is to work up the nitrogen in the atmosphere into compounds and fix these in the soil. A great deal has been written of late; and much as one is inclined to favour this plausible theory when the peculiar feeding habits of this order of plants is considered, yet a good deal has yet to be proved before it can be accepted as an agricultural fact, and this is the view of Sir John Lawes in his latest deliverance on the subject in which he details his own experiments to test the theory.

INDIGENOUS FOOD PRODUCTS. CULTIVATED AND WILD.

By W. A. De Silva.

Leguminosæ.

24. *Dolichos Biflorus*, L.; Sin. Kollu.

This is a cultivated legume largely grown in the warmer parts of the island in chenas and other open spaces, generally with other crops. The leaves which are compound and somewhat large are green in colour and are hairy. The legumes are small and flat, and contain from 3 to 6 seeds. The seeds when ripe have a reddish polished appearance, and they are flat. In cultivation the crop is gathered three months after sowing. This legume is considered to be good cattle-food, the seed being boiled and given to stock for fattening. The stalks and leaves of the plant, when preserved, also form good and nourishing food for cattle.

As a food product this grain is not much used, except in some localities where it is boiled, and eaten.

25. *Cassia Fistula*, L.; Sin. Ehela.

This is a tree growing abundantly in the warmer parts of the Island, and is especially abundant in the dry districts of the South-east and North-west. The trees attain to a good height, the leaves are compound (pinnate), and the leaflets which are green and entire have a smooth appearance on the upper surface, and are slightly greyish on the lower surface, being pointed and of an ovate shape. The fruits are long cylindrical pods from 9 to 18 inches long, and sometimes more. The pod is divided into partitions inside, and the seeds are found in these. Along with the seeds a black pulpy substance is found which is of a peculiar sweet taste.

The young leaves are cut into small shreds, and a dry curry (mellun) is made with scraped coconut and other curry stuffs. The whole plant, including the leaves, have slight purgative properties. The bark as well as the root is given in native medical practice in cases of rheumatism.

The heartwood of the tree forms a good timber and is used for various purposes.

26. *Cassia Occidentalis*, L.; Sin. Peti-tora.

This plant is very abundant in the uncultivated places of the lowcountry. Though found in uncultivated places, it always prefers patches of land which are fertile. The plant is very small and much branched. The leaves are compound pinnate, and the leaflets are smooth. In shape the leaflets are obovate, having the ends round and the margins entire. The flowers are yellow, and the pods which are cylindrical, are thin and from 3 to 4 inches long. The seeds are rounded in appearance and long.

The tender leaves are made into dry curries, and sometimes they are boiled and eaten along with coconut, &c. The seeds roasted and pounded are used like coffee, and are said to possess medicinal properties. The leaves have cooling properties, and are used, boiled in water for fomenting in cases of swellings and wounds. The seeds also are used externally in skin diseases. The decoction of the leaves is held as a good remedy for purifying the blood. The dry twigs are used in making brooms.

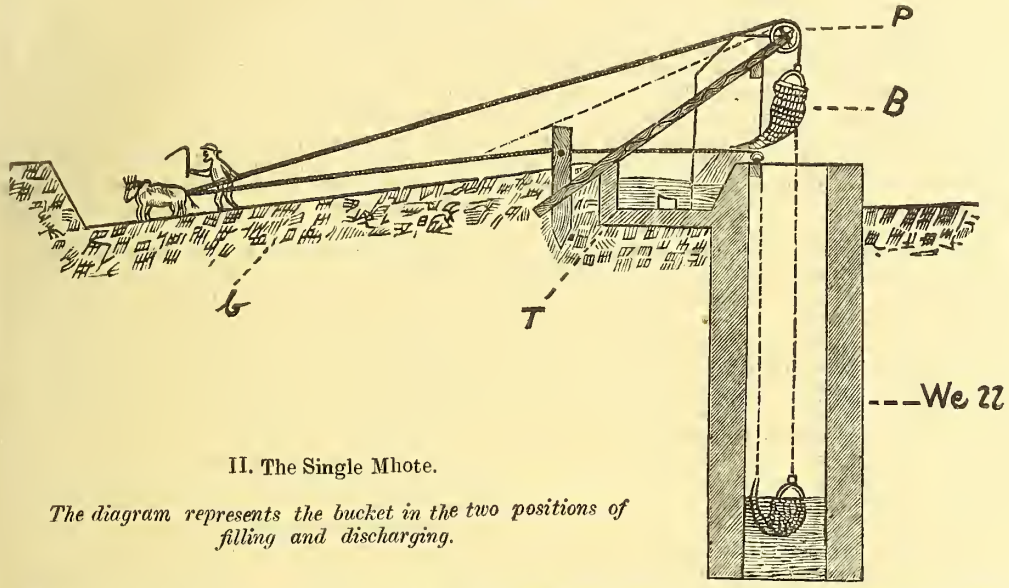
27. *Cassia Tora*, L.; Sin. Peni-tora.

This plant resembles the one described above in its habits, but the plants themselves are a little more erect and less branched. They grow to the height of about 3 feet, and the pinnate leaves are attached to a dark coloured stem. The base of the petiole is swollen at the place of attachment. The same character is observed in the attachment of the leaflets. The leaflets are pointed and ovate, and the veins show a black streak. The flowers are yellow and are borne in panicles.

The tender leaves are used in making a dry curry. The seeds are externally applied in skin diseases, and the leaves are used in cases of cough.

WATER-LIFTS. II.

By Aba.



II. The Single Mhote.

The diagram represents the bucket in the two positions of filling and discharging.

The single mhote or inclined plane water lift which is well known throughout India has been described as follows :—

"The water is lifted from the well in a skin bucket (B.) (those used in the Sydapet Farm are iron ones); to the bucket is attached a rope which is fastened to the yoke of a pair of cattle; a roller or pulley (P.) is fixed about 4 or 5 feet higher than the discharging trough (T.), over this roller or pulley the rope travels as the bucket ascends or descends. The bullock path (b.) is an incline. When raising the bucket the cattle walk down the slope until the bucket reaches the full height and discharges its contents; the cattle are then backed up the slope and the bucket sinking into the water, to be again raised by the forward motions of the cattle, and then the process is again and again repeated. This arrangement is certainly very simple, it is however equally certain that the cost of raising the water by it is very great. With this machine a pair of cattle while raising only 6,900 gallons of water in a day are exceedingly hard worked in doing it; whilst backing up an incline with a slope of about 45 degrees, about 40 times per hour, is a most effective way of rendering cattle worthless."

I am not aware of this water-lift being in use anywhere in Ceylon. The above illustration is from a set of models presented to the School Museum by Mr. C. Krishna Menon of the Madras Agricultural College.

NOTES FROM A TRAVELLER'S DIARY.

I lately had the pleasure and advantage of visiting, in company with an Agriculturist of some repute, the successful estate known as "Crystal Hill" situated about four miles from Matale on the Rattota road. The estate is about 320 acres in extent, and represents nearly all the products grown in the island. The first thing that strikes the eye of the visitor is the picturesque grove of areca-nut palms in full bearing, which covers about 30 acres. Annatto and cocoa are among the principal products, while several varieties of cotton have also been grown—the Egyptian having been found to be the best suited to the district. A large quantity of annatto is prepared for export, while the cultivation of the plant among the villagers is also encouraged by the estate buying up all the seed. Much credit is due to the energetic superintendent, Mr. A. Van Starrex, for the economical and successful manner in which he is working the estate, and the natives of the surrounding villages have an admirable example to copy, for on this estate they see how a variety of minor products may be remuneratively cultivated if they go about it in the right way.

I also touched at a place called Laggala, about 30 miles east of Matale. A part of the journey thither was made through splendid tea land, which at one time possessed some of the finest stretches of coffee in the island. The forests through which I had to pass were as grand as they were interesting from a botanical point of view, but as my journeys need to be expeditious (for I do not travel from mere love of travel) I could not make more than a few cursory observations.

Terminalia chebula (Sin. Aralu), Terminalia Belerica (Sin. Bulu), and Phyllanthus Emblica (Sin. Nelli) which are so much used in native medicine were plentiful here, while ebony and other timber trees were also common. The inhabitants of the district are comparatively ignorant and uncivilized. Kurakkan is their chief food, though paddy is also cultivated after a primitive fashion. Much damage I was told is often done to crops by wild elephants. The ubiquitous

Moorman is often met with even here, carrying goods in *tavalams*, with the object of bartering.

Wahakotte is a place about 20 miles to the North of Matale. The inhabitants are supposed to be the descendants of some Portuguese who settled here during the persecution by the Dutch—a large number being Roman Catholics. Here I had the pleasure of visiting the garden of Father Assauw of the R. C. Mission, who has by a judicious system of cultivation, converted an abandoned area of coconut property into a charming estate.

The palms on this estate are as healthy and fruitful as any I have seen, but the most interesting result of his agricultural operations is his vegetable garden, where a large number of English vegetables have been grown to advantage. Father Assauw's success is almost phenomenal, considering the dry climate of the district and the other odds he has to contend against. Carrots and turnips grow almost to perfection, tomatoes bear profusely, and cabbages show well-formed heads. The cultivation of these are, of course, limited to a certain part of the year.

What struck me most was a robust grape vine, which had been grown experimentally, laden with fruit. Pruning appears to be the secret of successful cultivation. Father Assauw encouraged by his success, is about to extend his vineyard. In truth, the garden I have described is "a model farm" for the district.

A VISIT TO A TANNERY.

In the course of last month the students of the School of Agriculture took advantage of the opportunity of visiting a tannery, and making themselves acquainted with the process of tanning hides. Few of the meat-consuming public in Ceylon can be aware of what becomes of all the skins of the animals that are slaughtered for food. Only a part of the hides produced in Ceylon find their way to the hands of our Ceylon shoemakers, the larger balance being exported mostly to England, though some reach France and Germany. The skins obtained in and around Colombo are all used up in the tanneries established by native traders (some four or five at the most) in the capital. The establishment about to be described is about the largest and most complete of these, turning out nearly 2,000 prepared hides per month, and employing about 30 coolies. A place of this description would compare unfavourably as regards size with an English tannery, such as may be seen in Bermondsley, but we must recollect that in Ceylon the supply of skins is very limited, and that there is no scope for extending the enterprise. It is with the greatest difficulty that Mr. D. Carolis, the courteous proprietor of the tannery situated not far from the Jawatte Asylum, gets a sufficient number of skins to keep the work going in his establishment, and he finds it necessary to go far from Colombo and make heavy advances to butchers and others before he can get what he requires. Mr. Carolis' tannery is admirably situated in a part remote from dwelling houses, the road leading to it being little availed of by the public.

The principal tanning materials used at this establishment are, the bark of Cassia Auriculata (Sin. Ranawara), Rhizopora Mucronata (Sin. Kadol), and gall-nuts from Terminalia Chebula (Sin. Aralu). The first costs 3 cts. per lb., the second only 2½ cts. The skins of neat cattle, buffaloes, dogs, deer, and cheetahs are all prepared here. In tanning the skins three methods are adopted. The skins which produce the best hide are tanned by means of Cassia Auriculata, another coarser variety by the use of Rhizopora Mucronata, while the white leather used for some kinds of ladies' shoes is prepared by using alum.

The skins which are bought from the butchers and others every day, are steeped in water for a night, and next morning the fleshy tissues are scraped off. They are then immersed in tubs containing lime and water and kept in that condition for a week, the water and lime being frequently changed. The skins which are now swollen and soft, are washed well and subjected to a process of scraping with knives to remove the hair &c. If the skins are to be tanned by means of the two barks abovementioned, they are put in small tanks holding 30 to 50 skins, and the bark, which has been reduced to very small pieces, is spread in layers between the skins. The tank is then filled with water and covered up, the skins getting fresh bark and water once or twice, and being finally removed after four or five days and well washed. If up to this stage R. Mucronata (Kadol) has been used, the skins are subjected to no further process except drying; but if C. Auriculata (Ranawara) has been used (and a really good quality of hide is arrived at) the skins are tanned further by means of gall-nuts. The gall-nuts are smashed and placed in a tub in which boiling water is poured, and when the water is tepid the skins are put in and steeped for one or two days. Gall-nuts cost 3 cts. per lb.

The skins being now finally removed from tanning materials, are well dried and undergo oiling. The hides are spread on a large table and well-rubbed with gingelly oil. They are again air-dried and then put away for baling. Only good skins got from neat cattle undergo this latter process, and the preparation of a pound of hide of this sort costs on an average 12½ cts.

Those skins which are prepared only with R. Mucronata are said to cost on an average only 2 cts. per lb.; and buffalo-skins are only prepared in this way. The market price in England is about 6 pence per lb. for this latter variety; the first quality fetching 10 pence per lb.

The alum process is used for sheep-skins and dog skins, no other material for tanning being there used. The dog skins are got from the animals condemned to death by Municipal authority—the value of a carcase being 3 cents. Dog skins are much used in England for gentlemen's gloves. The buffalo hides are used for saddlery and harness manufacture, while the first quality leather is utilized for shoes, boots and other purposes where finer leather is required.

Buffalo skins are also prepared for exportation without tanning them. In this case the skins are soaked in water, and after the flesh is removed, they are salted (8 lb. going to a skin). The saline liquor left was found when sprinkled over the surrounding coconut land to keep the land free

from grass and weeds. In this mode of preparation the hair is left on the hide.

The skins of very young calves and *fœtus* are also beautifully prepared with the fur on. They are used for slippers and fancy articles, fetching 5 shillings and upwards per skin. Bellows-skins are also prepared.

The offensive odour of a tannery is almost proverbial, but medical men give it as their opinion that it is by no means noxious. The coolies who were seen working were, according to the Manager, never the worse for the foul smells they inhaled.

This visit to a tannery impressed one with the idea of how much may be gained by energy and perseverance. Mr. D. Carolis has no easy time of it in working his establishment, and he well deserves the reward which he gains for his labour. In him his countrymen have an admirable example to imitate. We should not be surprised to hear in time of the by-products of Mr. Carolis' tannery yielding such valuable substances as glue and compost-manures.

CRUDE THEORIES REGARDING THE ORIGIN OF CERTAIN PLANTS. II.

By W. A. De Silva.

In my first instalment of this paper I gave the mythological origin of the paddy plant; in this, I propose to deal with the coconut tree which is only second in importance to the people of Ceylon.

The story runs, that at one time, there lived in a kingdom of the East a mighty king, resplendent with glory and surrounded by a large retinue of ministers, among whom were several wise men—both physicans and astrologers. These latter, by observing the stars and the courses of the heavenly bodies, professed to predict events and fix on "lucky" days and hours, and made reports of the results of their observations to the king. The astrologers royal, though well remunerated, were in no little dread of His Majesty who, if ever their predictions proved incorrect, immediately condemned them to be beheaded.

One day a learned astrologer of the Berawaya (tom-tom beater) caste, noted for his erudition, discovered after careful observation and calculation, that a certain day was exceedingly "lucky" for planting trees—in fact he went so far as to declare that anything, no matter what, planted at a certain hour on that day would be sure to grow into a tree which would be a great boon to humanity. The king being informed of this, though much gratified, was yet not altogether pleased with the bold assurance of the man, and thinking to puzzle him, enquired whether the astrologer's head, if laid on a stone, would there develop roots and grow into a tree. The answer was in the affirmitive, and to the great astonishmcnt of the astrologer, the king forthwith ordered the experimcnt to be carried out. The severed head was accordingly laid upon the stone, and after a time lo! the noble coconut palm—the tree of a thousand uses—sprung up. And to this day, it is supposed the resemblance of the coconut to the head of the astrologer is preserved, for taking the husked nut as representing the head, the fibre represents the hair with the top knot (kondè), while the eyes and mouth are also supposed to be represented by three depressions.

There has been a good deal of discussion as to what was the original home of the coconut palm. Some claim this honour for Egypt where it was grown some 2,000 years ago, others for the Eastern Archipelago. There are reasons for believing that the coconut was first known in Ceylon, and its uses recognised in the 13th century of the Christian era, as no mention of the palm is made previous to this in the *Mahâwansa* and other standard native works, though mention is made of the palmyrah. Its introduction to Ceylon is attributed to a king of South India, who visited the southern part of our Island, suffering from a skin-disease, and whose image is still found sculptured in a rock near Weligama, where he is said to have resided, to which the name of Kustarajagala was given in remembrance of the great service he has rendered to Ceylon.

OCCASIONAL NOTES.

The newly-issued number of the Royal Society's Journal contains an article on the ten lessons of the "Eighties" by Prof. Wrightson, the Principal of Downton College. The first lesson which the Principal deduces is the value of combination and association by means of Societies, Chambers of Agriculture, and such like. The second lesson is the necessity for systematic instruction in agriculture in all its branches, and notes in this connection, the power and influence of the Agricultural press as an educational agency. The third lesson is the necessity for having the most improved systems of dairying taught and practised. The fourth lesson is that pasture land is now a more profitable investment than arable land. The fifth, that the withdrawal of three million acres from arable cultivation to one of pastoral inactivity must be an indication of the increased value of all fodder crops, including roots. The sixth lesson, that farmers must now look to their livestock rather than to their corn crops for their profits. The seventh, that economy in farm management must be better attended to than it has been in the past. The eighth, that ensilage may be made successfully and at very small cost and is decidedly useful. The ninth lesson is that science has done much for the farmer. And the tenth, that infectious diseases amongst stock must be rooted out.

"What," asks the *Agricultural Gazette*, "is the true position of an Agricultural teacher, and what is the class of knowledge which he should endeavour to impart? The question is a difficult one, for certainly is very large indeed, and there is in it scope for any amount of scientific lore. Of one thing we may be certain, that no knowledge can come wrong to an agriculturist. Even politics, political economy, astronomy, mathematics, engineering, &c., all on agriculture, so that the teacher's range cannot be too extensive or varied. And yet it is necessary to limit him, in some degree, in what he has to teach, if only to save him from despondency. First, he must be what he pretends to be—an agriculturist. If he is this, he is at least qualified to speak on

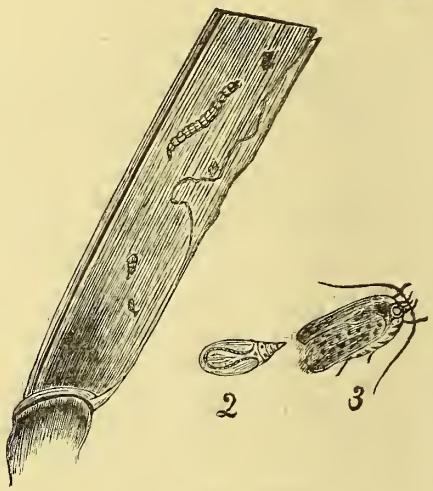
agriculture. He must also be so trained in the sciences as to be able to explain the methods of agriculture. This is not asking too much, as the same thing is successfully done in many other branches of knowledge." What the *Agricultural Gazette* insists on is that the agricultural teacher must not be expected to range beyond such limits as are placed on science, so as to include only so much of it as he requires for explaining the principles and phenomena of agriculture.

The *Law Journal* for January 25th reports a case decided by Judge Barber at Bakewell, Derbyshire, which is interesting from an agricultural point of view, and teaches the lesson, that an occupier of land who does not fence for himself must take his chance of his neighbour's cattle straying on his land, unless he can show by a long coarse of practice that the occupier of the neighbouring land has not only repaired the fence but was repaired for his neighbour's advantage as well as his own. We are ignorant of the law on this point in Ceylon, but it is well known that those who are annoyed by trespassing cattle generally take the law into their own hands and levy fines on the owners of such cattle —whether there be boundary fences or no—if they do not shoot the poor animals.

"Let me attempt to show," says Professor Drummond in his paper on the White Ant, "the way in which the work of the termites bears upon the natural agriculture and geology of the tropics. Looking at the question from the large point of view, the general fact to be noted is, that the soil of the tropics is in a state of perpetual motion. Instead of an upper crust moistened to a paste by the autumn rains, and then baked hard as adamant in the sun: and an under soil hermetically sealed from the air and light, and inaccessible to all the natural manures derived from the decomposition of organic matters—these two layers being externally fixed in their relation to one another—we have a slow and continued transference of the layers always taking place. Not only to cover their depredations, but to dispose of the earth excavated from the underground galleries, the termites are constantly transporting the deeper and exhausted soils to the surface. Thus there is, so to speak, a constant circulation of earth in the tropics, a ploughing and harrowing, not furrow by furrow and clod by clod, but pellet by pellet and grain by grain."

The *National Farmer and Home Magazine* in enthusiastic terms writes thus of the "pleasant phases of farm-life":—It is a common complaint that the farm and farm life are not appreciated by our people. We long for the more elegant pursuits or the ways and fashions of the town. But the farmer has the most sane and rational occupation and ought to find life sweeter, if less highly seasoned, than any other. He alone, strictly speaking, has a home. How can a man take root and thrive without land? He writes his history upon his field. How many ties, how many resources he has: his friendships with his cattle, his teams, his dog, his trees: the satisfaction in his growing crops, in his improved fields, his intimacy with nature, with bird and beast and the quickening elemental forces; his co-operation with the clouds, the sun, the seasons, heat, wind, rain, frost. Nothing will take the various social distempers which the city and artificial life breed out of a man like farming, like direct and loving contact with the soil. It draws out the poison. It humbles him, teaches him patience and reverence, and restores the proper tone to his system.

Dr. De Laval whose cream separators are now so well-known wherever dairying is carried out on a large scale, has invented an Instantaneous Butter-maker. Hitherto it has been generally held that a speed of more than 50 revolutions per minute was fatal to the making of good butter, but since the Plymouth Show it has been shown that butter of the very highest quality can be produced by the Instantaneous Butter-maker, the dasher of which revolves at the rate of 3,000 revolutions per minute. As a cheap and very simple labour-saving machine, and one that will enable any one to produce, at all times, a uniform and first-class quality of butter, its introduction to the dairy public at the Royal Agricultural Society's Show may well be said to mark an epoch in the history of dairying.



1, Caterpillar. 2, Chrysalis. 3, Moth (*Depressaria Cocos Nucifera*).

[The illustration of the coconut-leaf caterpillar which we are enabled to lay before our readers this month was drawn from life by J. P. Manchanayeka, a student at the Agricultural School. We are indebted to him also for most of the other illustrations appearing in these pages.]

It would be interesting to ascertain how many broods of the coconut-leaf caterpillars are produced in a year, and we shall be obliged to any of our readers for information, as to how many times a year the blight appears on trees. The scorched appearance of coconut trees in Captain's Garden and other parts of Colombo is also due to this caterpillar.

Before any definite suggestions could be made by way of prevention, it is desirable that more information about the life history, habits, &c., of the insect be gained. In the meantime it may be mentioned that the natural enemy of this

caterpillar, as also of a great many others, is the yellow and black-striped wasp called by the Sinhalese Kumbala (කුඹල). These wasps, as our readers are aware, collect caterpillars for the food of their own larvæ. Their nests are built of mud and are found attached to doors, windows, &c. of dwelling-houses. The nests are composed of several cells or chambers, in each of which the parent wasp lays an egg, and fills the cell with caterpillars. It is considered a very great fault by the Sinhalese to destroy one of these nests, not from any superstitious belief, but from the great service these insects render to the agriculturist.

DESTRUCTION OF CATERPILLARS.

Miss Ormerod, Consulting Entomologist to the Royal Agricultural Society of England, reporting on the infestation of trees by caterpillars, says that much attention has been lately directed to ascertaining what reliable measures could be adopted in order to destroy the hordes of caterpillars which now appear almost as a regular yearly recurring cause of serious loss to fruit growers. "It has become more and more plain each year," she says, "that although sticky banding is so far of services, that in many cases the foliage of orchard trees would have been totally destroyed if the banding had not been done, yet still it is only a partial protection against wingless moths gaining access to the trees for egg-laying, and is no protection at all from the many kinds of attack originated by winged infestations; also it is expensive, needs renewing at intervals, and, without special arrangements to insure safety to bark, is detrimental to the health of the trees. Measures were found to be absolutely necessary of a kind which could be brought to bear on any or all sorts of caterpillars together (whatever their various natures or previous histories may have been), and would kill the whole collection of ravaging hordes at once, but without damaging the leafage. . . . . In my own suggestions as to applications I limited myself to advising trials of "Paris green" spray, as with this application we had clear information from the U. S. A. and Canadian Government reports of the exact proportions in which it was to be used, and of every detail concerned, and also of its success, and warnings as to requisite caution in use, it being a poison; for those who did not care to try it (by advice of the Dominion Entomologist) I suggested the use of washes of soft soap and mineral oil."

The Experiment Committee wisely made a trial and recorded the results of many applications, and of these the Committee recommended the following for spraying on infested trees:—Paris green paste one ounce to from 8 to 20 gallons of water (strength varying according to nature of tree); London fluid (that is a mixture of a preparation sold as "London purple") one part to twenty parts of water. Both of these the Committee recommend as effective in destroying the caterpillars, while they do no material harm to the foliage. The value of Paris green (arsenite of copper) has been attested by numerous private correspondents of Miss Ormerod. The syringing, according to the recommendation of the Committee, should be done when the leaf-bud is first developed, before the blossoming period, and then again after the blossom had disappeared and the fruit was forming. More than one correspondent concerned in fruit-farming says that, "Paris green is the only thing which we have found really efficacious—it has not damaged the foliage, but killed the caterpillar." The spraying is done by means of a pump and nozzle. It is noted by the Secretary of the Experiment Committee that were no such precautions were taken, "the trees were looking desolate—as bad as if fire had been scorching the trees." Messrs. Salmon, the well-known fruit-growers, writing to Miss Ormerod, says: "All that we can say about it is to its advantage. It has succeeded admirably. The trees look healthier and better, with as much (if not more) on, as anywhere else. They are beautifully clean. It has not injured them in the slightest degree. We shall always use it in cases of blight."

The above information comes most opportunely at this time when caterpillars are threatening harm to products in this island. The only objection to the spraying remedy in the case of coconut is the height of the trees which would require powerful pumps to do the work. One spraying ought however to be sufficient when the leaf bud is first developed, as no injury is to be apprehended to the fibrous drupes of the coconut palm as in the case of succulent English fruits. A gentleman writing from Batticaloa district mentions that smoking the trees by means of large smother fires showed an appreciable effect on the caterpillar blight.

GENERAL ITEMS.

Prof. McAlpine of Edinboro', botanist to the Highland and Agricultural Society, has invented an apparatus for testing the germinating power of seeds. By the ordinary system, from three to five weeks are required before a reliable decision can be arrived at, but by this new method Prof. McAlpine claims to be able to tell in five minutes not only the percentage of seeds that will germinate in any sample of grass seeds, but also the percentage of chaff, the percentage of seeds affected with parasites, and the number of weakly seeds. Already there is a deal of testimony from independent sources proving the accuracy of the claim.

We are in receipt of the following:—Journal of the Royal Agricultural Society of England, part second of vol. I, Third series; Report of the Stewards and Judges at the Kempton Park Show; and No. 6 of the "Universal Market," the International Journal of Industry and Commerce; the new Trinity College Calendar, and the Richmond College and Jaffna College Magazines.

The following were the subjects treated of and discussed at the meetings of the Agricultural Improvement Society during the month:—"The Opening of New Lands in Ceylon," "Is it Advisable for Ceylonese Agriculturists to Colonise Abroad?" "The Improvement of Poor Soils."

We cannot, (says the *British Medical Journal,*) hear that any satisfactory progress has been made in

starting the investigation which Mr. Chaplin promised some time ago should be undertaken into the very grave question of the prevalence of tuberculosis in cattle and milch cows used for human food. The frequency with which such tuberculous cattle have been seized in the market, the certainty that a much larger amount is sold and enters into our daily food, the grave consequences which are believed to follow the drinking of uncooked milk from tuberculous milch cows, invest this promise of the Minister of Agriculture with serious importance. It is very desirable that the matter should not be indefinitely hung up.

Veterinary Surgeon Robert Mitchell states that ten ounces of chloroform and six ounces of ether were required before a bull (on which he operated for tumour in the throat) succumbed to the influence of the anæsthetics.

Prof. Duncan of Glasgow gives two instances of food adulteration which came under his personal observation. An analysis of a sample of milk proved that it was a compound of about 70 per cent of pure milk, 30 per cent of water, and an emulsion composed of borax, and coloured with annatto. The other case was one of adulteration of preserved vegetables with sulphate of copper—a subject which was engaging the attention of the French authorities. As a matter of fact, the Professor states, every large grocer in Glasgow sold green tinted articles of that kind which owed their colour to sulphate of copper. The vendors alleged that their customers would not buy peas unless they had the green colour, and they could not have that colour without the sulphate of copper. Many cases were on record where poisoning had occurred through the partaking of food containing the salts of copper.

Mr. N. N. Banerjie, M.R.A.S., and F.H.A.S. having studied Pasteur's system of inoculation for anthrax has been employed at Seebpore in experimenting on Indian cattle with great success. He is now working for the Government of India, and his laboratory has been transferred to Poona.

The lint which clings to cotton seed, after it has gone through the gin, is being utilized to make felt, which it is said, will be greatly used for hats &c., as the process of felt-making in this manner is inexpensive and the material used has up till now been considered a waste product

The Indian Agricultural Conference at which representatives from all parts of the Empire will be present, is expected to meet at Simla about the end of November.

Fromentine is the name given to a new alimentary material which consists of the embryo-plant to be seen as an oval structure at the base of the wheat grain, which is discarded in the process of milling. By analysis it has been shown to contain 51·30 per cent of albuminoids, 29·08 of carbo-hydrates other than celiulose, 12·03 of cellulose, and 6·98 of mineral matter or ash. The richest kind of meat—that of sheep—contains only 21 per cent of nitrogen. The digestible matter in fromentine is 87 per cent of the total weight. Owing to its high nutritive value and easy digestibility it is claimed for fromentine that it possesses special qualities as a food for infants, convalescents, and anaemic subjects. It is suggested that the germs of barley, oats, maize, &c. may be similarly utilized. It is, in any case, interesting to learn that in fromentine, a substance of exclusively vegetable origin, there exists a percentage of nitrogen much higher than those contained in the best kinds of meat.

The latest horse-shoe in Berlin is constructed of layers of paper glued together and subjected to hydraulic pressure; each layer is treated with oil, turpentine, &c., rendering it impervious to moisture, and the specially manufactured glue is insensible to the influences of moderate heat and water. This paper shoe is attached securely to the hoof by means of gutta-percha, and being very elastic, permits of the expansion of the hoof. It is very tough and durable, and wears rough, this greatly preventing horses slipping.

S. W. H., in the Jaffna College "Miscellany," says that the word "paddy" (corresponding to the Tamil word *nellu)* is evidently the same as the word *batta*, which is used to denote the allowance for money for daily food to persons away from home. They are both the Tamil word *padi* which means a measure. A measure of rice is the daily allowance for a man; thus the word came to mean the rice which is allowed and hence rice in general; and further (as *batta)*an allowance whether in rice or its value in money.

Received with thanks for the School Museum, samples of coffee (parchment, peaberry, and Liberian), and a mature miniature coconut about the size of an ordinary marble.