

THE RUBBER INDUSTRY.

Planters of Rubber of one or other kind in Ceylon are now to be counted by scores and hundreds, and we have been pressed for some time to afford them fuller information than any yet available, by republishing in pamphlet form the opinions of different authorities under the title of "All about India-rubber." Such a compilation is in hand; but we have not concealed from ourselves the fact that cultivators in Ceylon will have to make up from their own experience a truly reliable guide for Rubber planters. All that has hitherto been written is theory, rather than practice, and in respect of the cultivation of this product, as well as of many other tropical products, to Ceylon should belong the credit of leading the way and showing the world of would-be cultivators "how to do it." By far the most practical paper that has yet appeared is that of Dr. Trimen which was included in our last Handbook. This was based partly on Mr. Cross's Report, and in some respects Mr. Cross has not been found a reliable authority by local planters. Some of his statements are now generally discredited, but, although not borne out by experience in Ceylon, they are no doubt in accordance with what is seen of the plant in its native habitat. Mr. Scott Blacklaw described Ceará rubber as a weed in the coffee plantations in Northern Brazil, and he gave a word of warning as to the value of some of the seed imported thence to England. We are glad to learn that Dr. Trimen will shortly be able to publish some more useful information for Rubber planters the result of his cultivation and experiments in Peradeniya Gardens, and we shall endeavour to supplement the papers already available by the results so far as they can be obtained of local experience. One planter has very courteously placed his experience at our service, in the following practical form:—

"CEARÁ RUBBER.—*Germinating the seeds.*—File each seed carefully on both sides, until the kernel is just visible. The two ends may be rounded off a little, but the operation requires care. When the filing is finished, have ready a solution of kerosine oil and water (one to ten) and immerse the seeds in it for a second or two. This prevents ants and other insects from coming near them. This operation over, the seeds should be thrown into a tin box containing some coir fibre refuse, procurable in Colombo. Cover them well over with a further supply of the same material and shut down the box. In two days' time, they will be found, on examination, to have commenced to germinate. Take them out and put them (germ downwards) into Wilton's transplanters filled with good soil, on a table, with its legs in saucers of water. Three or four days more will suffice to let the seedlings develop into nice, healthy little plants, and ten days from the date of the commencement of the operation they can be finally transplanted. When the seeds are in the box of coir refuse no water is required, and even when put into the transplanters very little moisture is needed.

"The young plants are remarkably strong and love the sun. They are however, very impatient of moisture, and should therefore be placed under cover during a shower of rain. The filing operation may be done on a grind-stone; but to ensure perfect success each seed should be rasped carefully with a file.

"Some planters lose as many as 60 and 70 per cent, and in one instance, which has come to my know-

ledge, five plants only were secured out of 300 seeds. I am indebted to a gentleman in Colombo for the above simple but effective way of germinating the seed, and can confidently recommend its general adoption. Not a single seed need be lost if the directions are carefully followed.

"*Planting out.*—It being important that the Ceará species of rubber should be induced to grow coconut fashion with a tall, clean stem, it will be found necessary to plant them pretty close to each other, say 500 to the acre; and so far as my experience goes, plants grown from seed are more likely to develop into this style of tree than those propagated by cuttings. The latter grow faster, perhaps, and blossom earlier—a matter of some importance in cases where a supply of seed is required: but, for a permanent plantation, I am of opinion that every tree should be raised from seed.

"Mr. Cross's statement, that the Ceará rubber may be expected to grow and flourish in soils where hardly anything else will live, is not supported by Ceylon experience. On the contrary, there is no tree I can name that enjoys more thoroughly richness of soil, and the difference between plants in good and bad land is very marked.

"*Collection; Value and Quantity of Produce.*—Nobody is yet in a position to say which is the best way to tap the tree when it reaches maturity; but, from experiments I have made, I believe it will be found impossible to improve upon the method adopted by the natives of Ceará. They bare the trunk of the tree and allow the milk to trickle down the stem. Two or three days afterwards the gum or caoutchouc is pulled off in strings and sent to the market. As may naturally be supposed, the rubber reaches England in a very impure state. Hence its value is less than the Pará kind, which is prepared with the greatest care. My reason for thinking it impossible to improve upon the native method of collection is because the flow of milk from a Ceará tree is very slow, and any other system would increase the cost, a contingency which must be guarded against. It may, perhaps, be found possible to purify the caoutchouc in Colombo before shipping it to England. Labour is cheap and the machinery necessary for the operation is by no means complicated. As regards the yield per tree, a very small quantity will pay, provided the cost of production is restricted, and an inexpensive method of collection adopted."

The Rubber industry is yet destined to be one of considerable importance in Ceylon, and we trust to be able to aid intending planters as much as possible, by laying before them "All about India-Rubber." The title may be deemed misleading, since so much has yet to be learned about Rubber, but of course we can only give such information as is available up to the time of publication.

In this connection we may draw attention to the Papers already published (pages 393 to 399) referring to the New Products Commission—if it may be so called. Dr. Trimen's "Memorandum on the part taken by the Royal Botanic Gardens in the introduction of Useful Plants into Ceylon" is especially interesting, and he shews there very clearly how much indebted we (in Ceylon) have been to India for the introduction of the Pará and Ceará rubbers. In such matters however, Ceylon may well be considered an integral part of India, and the authorities here ought always to be ready to reciprocate by the supply of any seeds and plants from our Gardens required by the Government of India.

CEYLON TEA IN AUSTRALIA.

It will be seen from the full report of the last Melbourne sale of Ceylon teas that the highest price (1s 9d) was realized for a parcel from Rookwood estate. Loolecondura failed to maintain its former pre eminent reputation, and we suppose it is with reference to parcels from this and from other estates which sold as low as 7½d and 6½d per pound that an authority in the Melbourne tea trade writes to us:— "Your planters want stirring up about the manufacture of their teas. The liquor is right; but some of the leaf is miserable in appearance; some dust sent us was finer than oatmeal, and with the prejudice on this side it gives a bad name to Ceylon teas generally." We have received the following from a Colombo merchant:—

"The Australian mail delivered this morning brings particulars of the sale at public auction in Melbourne on 16th August of 625 packages of Rookwood, Loolecondura, and Deanstone tea, sold by Messrs. Greig & Murray under instructions from Messrs. James Henty & Co

"Rookwood tops the list with 1s 9d for pekoe, and 1s 5d for broken pekoe; pekoe souchong fetching 1s 0½. The average for this estate is 1/2-58 per lb., on 6,385 lb.

"Loolecondura averages on 15,878 lb. 1/1-08, or 1½d less than Rookwood. Prices range from 1s 3d for Broken Pekoe to 6½d for Pekoe Dust.

"Two lots of Pekoe Souchong from Deanstone realized 7½d and 7½d respectively, the former price being paid for chests, the latter for half-chests. This tea was not well made, and had become musty.

"The average for the three estates is 1/0-65 per lb. in bond, on a total of 25,863 lb."

Our Colombo friend is also able to inform us that, on the 12th ultimo, Messrs. Fraser & Co. sold 40 boxes of Ceylon Tea, each 25lb., pekoe souchong, from Agar's Land Estate, at 1s 0½d per lb.

It is interesting to know that the finest lot from Rookwood was valued by a competent tea dealer at from 1s 10d to 2s per lb. For all the other lots of Rookwood the prices realized were slightly above valuations. So, generally, with the Loolecondura and Deanstone lots, the sale-prices being slightly over or very close to valuations. Of the 14th half-chests of Loolecondura pekoe dust which went for 6½d, one broker says "as fine as sand"; and opposite the two Deanstone lots we have the remark: "bad sample, musty flavour." We trust great care will henceforward be taken to maintain the good reputation of Ceylon Teas in the Australian market.

CEYLON TEAS IN AUSTRALIA.

LARGE SALE IN MELBOURNE.

(From Our Own Correspondent)

MELBOURNE, 29th Aug. 1881.

A large number of the trade attended Messrs. Greig & Murray's auction rooms, Melbourne, on the 16th Aug. attracted by the sale of Ceylon teas. The whole of the lots submitted, consisting of 30 chests, 514 half chests, 85 quarter chests, were sold at prices ranging from 6½d for dust to 1s 9d per lb. in bond for Pekoe. For details, see below.

Buyers objected to the dusty-looking appearance of the bulk of the teas and the very large leaf of

others; but the Rookwood pekoe was generally admired, and I expected it would have realized 2s per lb.; but a large grocer near me, at the time of the sale, said it was not strong enough in the pot to obtain that figure.

Whilst on this subject, I cannot too strongly impress on your Ceylon planters the prejudice that exists in Melbourne against dusty, broken, or large leaf samples of tea, and that outside the blenders there is really no sale for such class of teas.

The Calcutta Tea Syndicate are determined that Australians shall have plenty of Indian teas, for I notice another sale of some 847 half chests advertised for the 2nd September. On the catalogue are some 200 half chests of Ceylon teas from the Dundelin estate to be sold on the same day.

Indian teas are steadily growing into favour with Melbourne people. A new firm has just started here for the exclusive sale of Indian teas in ½ lb. or 1 lb. packets, 18 and 20 lb. teas and 40 lb. half chests. The business will be wholesale or retail. I presume India will include Ceylon teas.

You will regret to hear that Mr. Josiah Mitchell died at his residence, Skelsmergh-hall, Kyneton, on the 25th Aug. This gentleman was an authority amongst us on all matters pertaining to agriculture. Mr. Mitchell also showed Mr. A. M. Ferguson, Commissioner for Ceylon, considerable attention, and they visited many parts of Victoria together. The *Argus* of 26th Aug. which I post to you contains a full account of Mr. Mitchell's career.

CEYLON TEA IN MELBOURNE.

Tuesday, 16th August 1881.—Ex "Almora," "Malwa," &c., from Ceylon, choice Ceylon Teas 625 half-chests, from the well-known gardens of Rookwood, Loolecondura, and Deanstone. Greig & Murray will sell by auction at their rooms, on Tuesday, 16th August, at half-past eleven o'clock, under instructions from Messrs. James Henty & Co., agents for the above Ceylon Tea Planters.

CEYLON TEA.

Ex "Almora," "Malwa," &c., per lb. in bond from Ceylon

65 quarter-chests Rookwood Pekoe 22lb. Perfect leaf black neat wiry full of gold-n tips. Choice-malty very rich and full ripe Pekoe flavor.	1s 9d.
29 half-chests Rookwood Pekoe Souch. 45lb. Very even but small choppy greyish leaf. Strong rather pungent brisk full flavory.	1s 0½d.
70 half-chests Rookwood Pekoe Souch. 45lb. Greyish black neat even small fairly twisted leaf. Brisk full ripe rich very strong flavor.	1s 0½d.
20 quarter-chests Rookwood Bro. Pekoe, 25lb. Handsome small black neat leaf full Orange Pekoe tips. Richly fired dull deep malty Pekoe flavor.	1s 5d.
37 half-chests Loolecondura Pekoe, 40lb. Greyish black fairly curled very even leaf few tips. Thick full heavy pungent brisk Pekoe flavor.	1s 1½d.
30 half-chests Loolecondura Souchong, 40lb. Well made greyish black even leaf. Pungent and strong full brisk Pekoe Souchong flavor.	1s 1d.
2 half-chests Loolecondura Bro. Pekoe, 49lb. Very small neat blackish brown leaf. Very full ripe brisk with strong deep infusion.	10½d.
14 half-chests Loolecondura Pekoe Dust, 55lb. Very small brownish open leaf. Rich deep fall Pekoe flavor.	6½d.
29 half-chests Loolecondura Souchong 40lbs. Evenly twisted greyish black wiry leaf. Pungent strong rasping brisk flavor.	1s 1½d.
31 half-chests Loolecondura Bro. Pekoe, 40lb. Showy black small neat leaf full Orange tips. Great strength and character a splendid mixing tea.	1s 3d.
38 half-chests Loolecondura Souchong 40lb. Greyish black well twisted and curled leaf. Very rich full pungent and strong Pekoe flavor.	1s 0½d.
32 half-chests Loolecondura Pekoe, 40lb. Neat even greyish black small leaf few ends. Full rich strong briskly fired and very flavory.	1s 1½d.

- 33 half-chests Loolecundura Souchong. 40lb. Greyish black well made very even leaf Choice tea in the cup great strength and character. 1s 1½d.
- 29 half-chests Loolecundura Pekoe 40lb. Hand-some showy small leaf full of golden Pekoe tips. Fragrant full bodied liquor rich strong Pekoe flavor. 1s 2½d.
- 31 half-chests Loolecundura Souchong 40lb. Greyish black well curled and twisted even leaf. Very pungent and strong brisk showy infusion. 1s 2½d.
- 24 half-chests Loolecundura Pekoe 40lb. Rather small but very even blackish leaf few ends. Flavour delicate infusion brisk and ripe. 1s 1½d.
- 40 half-chests Loolecundura Bro. Pekoe 44lb. Rather small but very even broken leaf. Strong and pungent full ripe Pekoe flavor. 11½d.
- 15 half-chests Loolecundura Bro. Pekoe 46lb. Very small neat brownish black leaf. Strong thick heavy deep in usion—a fine mixing tea. 8d.
- 30 half-chests Deanstone Pekoe Souch. 40lb. Rather bold and loosely twisted evenish leaf. Brisk full flavory. 7½d.
- 30 chests Deanstone Pekoe Souchong 80lb. Bold blackish rather loosely twisted leaf. Fairly strong full flavor. leaf. 7½d.
- A sale was announced for Friday, 2nd September 1881. at half-past two o'clock of Indian tea, just arrived from the celebrated districts of Darjeeling, Kangra Valley, Assam, and Dohra Doon; also Ceylon tea for sale by auction, ex "Rollo," etc. and R. M. S. "Bokhara," from Calcutta and Ceylon. 725 half-chests Indian tea, 10 half-chests each 40 lb. packets, Indian tea, 80 cases each 22-lb. tins India tea, 31 boxes Indian tea, 200 half-chests Ceylon tea by Fraser & Co., under instruction from Messrs. Jas. Henty & Co., Agents to the Calcutta Tea Syndicate, and in connection with the Government of India.
- The particulars of the Ceylon tea were as follows:—
Ex R. M. S. "Bokhara," from Ceylon.
- 10½ half-chests Ceylon Pekoe Souchong Black even wiy leaf, Pekoe tips very strong full rich ripe, dark-red infusion.
- 33 half-chests Ceylon Broken Pekoe Small even black broken leaf, Pekoe tips very powerful rich ripe Pekoe flavour.
- 67 half-chests Ceylon Broken Pekoe small even black broken leaf, Pekoe tips Very powerful rich Pekoe flavour. Grown on the celebrated Dunedin Estate.

LIBERIAN COFFEE IN THE WEST INDIES.

We have received from Messrs. S. W. Silver & Co. of London a copy of the pamphlet "On the Cultivation of Liberian Coffee in the West Indies," by Dr. H. A. A. Nicholls, a notice of which, extracted from the London Times, has already appeared in our columns. As our readers will have seen from that notice, Dr. Nicholls is not able to add much to our knowledge of the subject, his book being intended for planters in the West Indian islands. One or two points however we may notice. For instance, Dr. Nicholls is not an advocate of clean weeding. He says:—

"I think a thin carpeting of low plants has a beneficial effect by protecting the ground from the scorching rays of the sun, and by preventing the surface soil from being washed away during heavy rain. The system adopted at St. Arment is to keep a space of about two or three feet round the tree constantly clear of weeds, and to "cutlass" the rest of the ground. The "cutlass," or "matchete," is a long, broad, heavy knife, and the weeds and grass are by it mowed or chopped close to the ground. In the hands of a strong man the cutlass is a most useful and powerful agricultural implement; and for the expeditious clearing of the "bush" in the West Indies it is almost indispensable.

He is in favor of alternating the rows of coffee with plantains and other food plants. As to topping, and gathering of crop, he says:—

"I have not yet satisfactorily determined whether Liberian coffee trees should be "topped," for as the plant is so much larger in every respect than the

creole coffee, to endeavour to dwarf it to a convenient height for picking is scarcely likely to be followed by success.

"Unlike the creole coffee, the main stems of the Liberian species bend very readily, and do not split or break even with rough treatment; but the bending of the boughs will not permit the berries to be gathered from the upper branches of my biggest trees. I have, therefore, had constructed two ladders connected at the top by strong hinges, so that they may be inclined to each other at various angles; the degree of separation of the lower ends being regulated by a chain permanently fixed to one ladder, and capable of being hooked to the other. The contrivance answers admirably, for by using the ladders between the rows the berries are picked from the highest branches of the trees with the greatest ease."

He cannot speak from experience of the preparation of the coffee for the market, but he says that Dr. Imray found Gordon's breast-pulper unsatisfactory for the large berries, and the old "rattletrap" has been found to succeed much better. As we have mentioned, however, the Fairfield Ironworks have made to the order of Messrs. Aitken, Spence & Co. a special machine for pulping the large-berried coffee, and we believe Messrs. Walker & Co. have also prepared a special machine which has worked well. In an appendix Dr. Nicholls gives a letter addressed by him to the Dominican, in which he says:—

"For some time past stories have been in circulation in the Island to the effect that the cultivation of Liberian coffee is a mistake, inasmuch as there is very little sale for the produce on account of the coarse flavour of the bean. I have endeavoured as far as possible counteract these mischievous stories, for I fear they have deterred persons from embarking in the new cultivation; but as I am considered to be interested in the matter, my contradiction has not as yet borne much weight.

"By last mail I received a letter from Mr. Morris, the able botanist, who has lately been appointed Director of the Public Gardens and Plantations in Jamaica; and, as will be seen from the foll wing extract from this letter, the question of the great value of Liberian coffee is now authoritatively answered in the affirmative. Mr. Morris writes:—"From the enclosed extract from the Ceylon Observer you will notice that Ceylon-grown Liberian coffee has lately obtained 93s per cwt. in the New York market. This is a most encouraging result, and, as we are so favourably situated as regards the American markets, the West Indies ought certainly to compete successfully with the East Indies in the future culture of this coffee."

"I enclose the clipping from the Ceylon paper kindly sent by Mr. Morris for my information, and the news it contains is so important and welcome to coffee planters generally that I will ask you to be good enough to publish it *in extenso*."

The extract referred to is from the Observer of 21st Jan. 1881 recording the sale of Putupowla coffee in New York at 20c. per lb. We have no doubt Liberian coffee will succeed in Dominica and other West Indian islands and will be able to withstand the white fly, hurricanes, &c., which proved so fatal to the Arabian or creole coffee.

NEW PRODUCTS.

LOWCOUNTRY GENERAL REPORT.

LEAF DISEASE ON LIBERIAN COFFEE—THE DIFFERENT VARIETIES OF THIS COFFEE—HOW TO PLANT CACAO IN THE LOWCOUNTRY—WHITEANTS—WEATHER.

WESTERN PROVINCE, September 1881.

During the month of August, no twenty-four hours passed without more or less rain; and now, on the 12th

September, it is pouring in bucketfuls, the rain having increased daily in volume and duration for ten days past.

The weather being so favourable for planting, all the open land has been occupied, and all failures filed in. The coffee plants were, as usual attacked by crickets, immediately on being put out; but after the first week their ravages gradually ceased and are now almost entirely at an end. About five per cent of the plants were cut, but more than one-half of those are growing again. Indeed, on this occasion, the cutting has been chiefly of leaves, instead of stems, but the former is probably the worst evil of the two, as the loss of leaves is almost certain to be followed by disease.

Hemileia, I am sorry to say, is appearing at more points than is at all agreeable. On plants that have lost their lower leaves from any cause before they begin to branch, it is almost certain to appear, and recently I have found it bad on those that were in most vigorous growth. I stump every plant on which I find it, so as to give them the chance of making a fresh start. Some of them, however, have become too weak to make an effort, and die off, while others shoot out at once; but since I began stumping none so treated are sufficiently advanced to show whether the disease has been carried forward to the fresh shoots. Many of the older trees suffer more or less from the disease, but it is not so virulent on them as on the young plants; but once settled it remains always. Some of the varieties are absolutely proof against its attacks, but others are peculiarly liable. The stout, thick, leathery leaf is unaffected, while the long, smooth, thin leaf is spotted all over. Trees with close foliage are less liable than those with the branches wide apart on the stem, and the leaves wide apart on the branches. Trees partially shaded are more liable than they are in the open field, and even the shelter of a rock seems to render them more susceptible. When a young plant under one year old is attacked, the fungus seems to ripen very rapidly and the yellow dust covers the back of the leaf in large quantities—in fact, if any use were found for it in the arts, it might be collected to pay, at 10s an ounce. On the older trees, it never covers the whole leaf, but appears in spots, while no yellow dust is found. A few days ago, while inspecting a six feet tree a good deal spotted with the disease, I observed on a newly fallen kahata leaf the same spots and perforations as on the coffee. On further examination, I found all the kahata trees on the place affected with the same disease. It may be something other than the *Hemileia*, but the effect is the same. I will send you a leaf or two of each for scientific inspection and comparison.

The growth of the plants put out from nine to eleven months ago is highly satisfactory. Seed sown in June last year; plants with three pairs of leaves, put out in October, November and December, are now from 15 to 30 inches high, and the most forward have as many as five pair of branches. There are probably fewer varieties than the imported seed sown. Still there is a very decided difference in the height at which they begin to branch, though much less in the size and leaf. Generally the largest pair of leaves are those that precede the first pair of branches, and I have them here 12 inches long and 7 inches wide.

I have not sufficient experience as yet to offer an opinion as to which of the numerous varieties are likely to be most profitable to the cultivator. The first object will be to reject all that shew themselves most susceptible to leaf disease; and this will include all that have smooth thin leaves, all that have the lighter shades of green, and all that are of peculiar open foliage. Other characteristics may appear undesirable hereafter, but this is the extent of my present knowledge. Some months ago, I described a dwarf va-

riety, that turned up on another plantation, and which would be amply provided with room at three feet apart. But this is not the only small variety. Some early bearers are not larger than the Arabian species of the same age, and others are even smaller. On the whole, I should say that 100 superficial feet is too large a space even for the largest kinds, and the space allowed should be regulated by the size attained by the selected variety. As for the pioneers who have planted with such plants as they could get, they must make the best of the results of ignorance. I have here several plants that have produced pure white or variegated leaves in the midst of otherwise healthy growth. I do not suppose this to be a settled variety, for some of them have returned to the normal green after sporting the white on several leaves and even on several branches. I have here one curious plant with variegated leaves green and white, six inches long and little more than an inch wide, no doubt a permanent variety, for the results of which we must wait.

I by no means pronounce the soil and climate here unsuited to the cultivation of cacao, but we must pay for our ignorance and presumption in one way or another. I ignorantly presumed that I could cultivate Liberian coffee and cacao on the same ground with advantage to both. The truth turns out to be, that cacao needs shelter, and has no objection to absolute shade. Liberian coffee utterly rejects shade, and retains or regains its upright position in the fiercest wind that blows. If any friend of mine wanted to plant cacao in the low lands of the Western Province, I would say: clear your land, put down plantains at 12 feet the first year, and put out your cacao in the interspaces in the second year. The plantains will wear out in four years, and the cacao will then be able to shift for itself. After all, there may be some necessary fact that my experience has not caught: for I had congratulated myself that some of my trees were out of danger from the enemies of their infancy, when all at once the patch of finest trees I had, began to drop their leaves, and within a week branches that had extended to four feet from the stem had not a leaf left. That it was not to failure of the roots that this phenomenon was due appeared within a few days, for the lower part of the branches became clothed with fresh and luxuriant foliage. Some of the branches I pruned down close to the stem; some I cut entirely down to the stem; and some I left untouched. I will report the results in each case as they appear. They were the largest trees I had, due to the most sheltered situation, and their failure at this stage I dare not attempt to account for, as trees much less sheltered and nearly as far advanced have not so suffered. Finding that I would have plants over after all the open land was planted, I felled between three and four acres in July. Rain came the day it was finished, and it has rained every day since. I, however, caught an opportunity of getting a tolerable fire through it, and cleared it up; but the wet and stormy weather now in force has left some of the heaps unburned till the arrival of forty-eight hours of dry weather. After all, the whole work has been done twenty per cent under the lowest tender for contract. I would have been glad to have it ready for planting in this weather, but I still hope to complete the operations on it before the end of this month. I am lining so as to put 605 plants to the acre. This will make the new piece uniform with a former planting in the event of its being finally settled to quincunx the latter—an operation I am now convinced will be advantageous in the face of the failure of so much of the cacao.

I am sorry to say that the last planted cacao has suffered even more than the former plantings from whiteants. In six weeks two-thirds have disappeared,

and the danger is by no means over. I have still five or six hundred fine plants in nursery, but I cannot put them out, till I can put quicklime into the holes with them. The vermin do not like to meddle with this substance: at least, while it retains its caustic quality, and till that departs they will be pretty safe. I read of cacao trees bearing heavily elsewhere within their third year. I have here a few fine flourishing plants over two years, that have flowered abundantly for nine months past without forming a pod.

13th Sept.—For the last four days rain has been heavy and frequent, and work is almost at a standstill, half-a-day yesterday and none to-day.

COTTON will be king once more. That crop is magnificent, fully 7,000,000 of bales, it is said. The only deficiency is in the Southwest. It is the Southern, not the Western merchants who will be the great patrons of New York during the coming year.—*New York Hour*.

MR. A. J. THOMAS'S TRANSPLANTER.—We should ere this have called attention to the latest form of transplanter, that patented by Mr. A. J. Thomas of Agra, Lindula, and manufactured by the Fairfield Ironworks Co. A specimen can be seen at our office, with pan and bag of tins, and we have heard planters who have used this transplanter speak very favourably of it. As far as simplicity is concerned, certainly it can scarcely be surpassed.

ANCHOR BRAND TEA.—The Hon. Mrs. Deane writes to her nephew of Kintyre, Maskeliya:—"It was very good of you to send me the tea, I consider myself a judge of tea, and really that is very good. I doubted at first what it would be like, as the leaves seemed rather large, but on drinking some found it quite *delicious*. It has none of the coarse rank taste which you so often find in the Indian teas." This opinion, from one so well qualified to peak of teas, should be cheering to the pilgrim pioneers on Buayan estate: it shows what goodering and supervision can accomplish.

SALE OF PURE CALISAYA LEDGERIANA SEED.—Under instructions from Messrs. Aitken, Spence & Co. Mr. C. E. H. Symons sold by auction today 45 boxes and one parcel, each containing 2 grams (*i. e.* 31 grains) fresh Calisaya Ledgeriana cinchona seed just arrived from Batavia. The whole was sold for R2,438, or an average of R54.18 per 2 grams. According to these figures the first boxes realised at the rate of R774 the ounce; the second at the rate of R929, and the third small lot at the rate of R1,361 the ounce, or equal to R21,792 per pound! Perhaps about a rupee per seed.

"**THE CINCHONA PLANTERS' MANUAL**" is the subject of high, but we consider not undeserved praise from the Calcutta *Englishman*, as may be seen on page 411. There can be no doubt that it is the most complete and practically useful book available to the cultivator of cinchona. Our Ceylon planters should understand that Mr. Owen has not written from his own knowledge and experience alone. He has had the advantage not only of aid from Dr. Trimen (as is acknowledged), but of consulting every Government Report (whether from India or Java), and all the modern books published on the subject. He carefully consulted the files of the *Observer* for the past four or five years, and he had, besides, the great advantage of the written opinions on controverted points of planters in nearly every district of Ceylon, India and Java, including Mr. Gammie, Mr. Rowson and Mr. Moens himself—which were given in answer to a circular we issued with a special list of questions prepared with reference to the Manual. There is, therefore, good reason for saying that, at this moment, there is no more reliable or more practical work on the subject than "**THE CINCHONA PLANTERS' MANUAL**."

PERUVIAN BARK AND COCA.*

"Replenish the earth, and subdue it: every tree in which is the fruit of a tree yielding seed, to you it shall be for meat." From far off down the ages comes the echo of the voice which spoke through the Hebrew seer, and comes to us with all the freshness of a new message, as we close the utterly prosaic pages before us. Mr. Clements Markham has laboured long, earnestly, and successfully at his difficult task, and before attempting to follow him in his researches, we would state briefly what that task has been, and what has been accomplished. Mr. Markham set before himself no less an object than the introduction of the cultivation of Peruvian bark trees on an extensive scale into British India and Ceylon. The object he had most at heart, undoubtedly, was to supply in the very heart of fever districts "a cheap and efficacious febrifuge to the people of India," but his scheme has succeeded beyond, not his own hope probably, but certainly beyond the wildest expectations of onlookers. The enterprise, begun twenty years ago, has for observable result that there are now 847 acres under cinchona cultivation in the Government plantations on the Nilgiri Hills, besides 4,000 acres of private plantations on the Nilgiri, in Wainad, Coorg, and other hill districts of Southern India. In British Sikkim, the Government cinchona plantations cover an area of 2,242 acres. The annual bark crop from the Government plantations of British India alone is already 490,000 lb. In Ceylon, 5,578 acres were under cinchona cultivation in 1877. In 1879-80, the quantity of bark sold in the London market from British India and Ceylon was 1,172,000 lb. The labourers, who, with desperate toil and herculean energy, have given to the millions of India the trees which are emphatically for the healing of the nations, have deserved more recognition than their services have as yet met with,—but of this more by-and-by; at present, we will follow Mr. Markham for a moment in his earlier wanderings, while collecting cinchona plants and seeds in South America. His narrative, though stiff as a Blue-book (the reader who opens it at random will assuredly believe it to be stuffed with dry statistics), is full of interesting matter. Before entering upon the narrative of his search, Mr. Markham pauses to give an account of the early use of the plants he seeks, and the origin of the name now applied to them. He tells us the Indians though probably aware of the fever-healing virtues of their Peruvian bark, were prejudiced against its use. There is some evidence that European travellers were headed by it as early as the year 1600, and it was in 1638, more than seventy years after the conquest of Peru, that the Countess of Chinchona, wife of the Spanish Viceroy of Peru, "lay sick of an intermittent fever in the palace of Lima." It was this same Count and Countess of Chinchon, remarks Mr. Markham, who at an earlier date entertained Prince Charles and the Duke of Buckingham at the alcazar of Segovia. Subsequently, when appointed to the Government of Peru, the great event of their viceroyalty was the cure of the Countess of Chinchon of a tertian fever by the use of Peruvian bark. The Countess returned to Spain (we are still quoting from Mr. Markham's account) in 1640, and brought with her a supply of the "quina" bark which had worked her own cure, determined to use it for the sufferers from tertian ague on her father's and husband's estates," in the fertile but unhealthy *vegas* of the Tagus, the Tarama, and the Tajuna." The powder was long known as "the Countess's Powder" (*Pulvis Comitessae*), and Linnæus in her honour called it by her title. The Jesuits appear

* *A popular Account of the Introduction of Cinchona Cultivation into British India.* By Clements R. Markham, C.B., F.R.S. London: John Murray. 1880.

to have been the great promoters of the further introduction of the bark into Europe, and the new medicine shared the fate of all medical or other innovations. A storm of prejudice was raised, 'it would kill more than it would cure,'—may be taken as a rough estimate of conservative thought concerning it in the seventeenth century, while even those who admitted its efficacy and valued it as a boon were profoundly ignorant of the tree from which it was taken. This being so, we confess we turned with considerable curiosity to the next chapter, in which we learn how the people of Europe really became first acquainted with the chinchona trees. Mr. Markham tells us the first description of the quinquina tree is due to the memorable French expedition to South America which, on May 16th, 1735, sailed from "Rochelle," to measure an arc of the meridian near Quito, and thus determine the shape of the earth. MM De la Condamine and the botanist Joseph de Jussieu were amongst the principal members of the expedition. Both made laborious efforts to collect and take home young plants, but the fate which for some inscrutable reasons at ends so many early efforts befell theirs. The plants La Condamine had for eight months preserved with loving care were washed from the deck of his little vessel by a wave, and Jussieu, "after fifteen years of laborious work, was robbed of his large collection of plants by a servant at Buenos Ayres, who believed that the boxes contained money." Poor Jussieu! the blow struck him heavily, and he returned to France deprived of reason. But glancing over the narrative of his work, we notice that "he was the first botanist who examined and sent home specimens of the coca plant, the beloved narcotic of the Peruvian Indian."

Further on, Mr. Markham devotes a chapter to the history of the cultivation of the coca, a chapter which seems to the present writer full of interest. Mr. Markham states that the coca leaf is to the Peruvian Indian what betel is to the Hindu, kava to the South Sea Islander, and tobacco to the rest of mankind. So much, perhaps, was already pretty generally known; but we imagine that, at least outside a very limited medical circle, it was not known that "its use produces invigorating effects which are not possessed by the other stimulants." While reading carefully the history of the marvellous virtues of this plant given by Mr. Markham, the present writer came accidentally across a recent prescription, in which a preparation of it was given in minimum doses, the efficacy of which was tested, with good result, on headache caused by mental worry. On further inquiry, we found its use was the subject of careful consideration and even administration amongst some of our ablest physicians. The Peruvians, says our author, look on it with feelings of superstitious veneration, and the old Incas sacrificed it to the Sun. The plant can be cultivated from 5,000 to 6,000 feet above the level of the sea; but we have no space to follow the interesting details of its cultivation, we can only add Mr. Markham's testimony to its medicinal use. He says:—"Applied externally, coca moderates the rheumatic pains caused by cold, and cures headache. When used to excess, it is, like everything else, prejudicial to health; yet of all narcotics used by man, coca is the least injurious, and the most soothing and invigorating." And he adds, "I chewed coca, not constantly, but very frequently, from the day of my departure from Sandia, and besides the agreeable, soothing feeling it produced, I found that I could endure long abstinence from food with less inconvenience than I should otherwise have felt, and it enabled me to ascend precipitous mountain sides with a feeling of lightness and elasticity, and without losing breath."

But we have left ourselves small space to touch on what, after all, is really the subject-matter of the work before us,—the author's labours in the, as it has proved, successful attempt to introduce the cultivation of chinchona trees into British India. The work, as he tells us, was accompanied by this difficulty, from which similar undertakings have been free,—the plant to be transplanted had never been cultivated. "When tea was introduced into the Himalayan districts, it had been a cultivated plant in China for ages, and experienced Chinese cultivators came with it, but the chinchona had remained a wild forest tree." In 1852, the proposal to introduce chinchona plants into India was made official. In 1852, and again in May 1853, Dr. Boyle drew up a long and valuable report on the subject; and at the same moment Mr. Markham was actually exploring some of the chinchona forests of Peru, in ignorance of any desire on the part of the Indian Government to procure chinchona plants, and his objects, he tells us, were of an antiquarian and ethnological character. But the subject of chinchona cultivation being in 1859 brought under his notice by Mr. Henry Deedes, of the Indian Office, he gave the subject due consideration, saw the inestimable benefit that might be conferred on India and the world generally, and resolved to undertake its execution. Mr. Markham was, indeed, well qualified for the gigantic task he set himself. He knew the region, the people, and their languages, and having to consider whether the undertaking should be a private or a Government one, he wisely, as we think, submitted his proposal to Lord Stanley, then, in 1859, First Secretary of State for India, and was entrusted with the commission he executed so thoroughly, namely, to introduce chinchona cultivation into India. The plan for which he applied for sanction was as follows:—

"To make a collection of plants and seeds of all the chinchona known to commerce, through the instrumentality of qualified agents. This would entail the despatch of five agents; to Bolivia or Carabaya for the Calisaya plants, to Huanuco in Peru for the grey barks, to Loxa in Ecuador for the brown barks, to Huaranda in Ecuador for the red barks, and to Popayan for the Colombian barks. These five agents were to work simultaneously under my general superintendence, and a special steamer was to be supplied to convey the collections of plants and seeds from the five ports of Islay, Callao, Payta, Guayaquil and Buenaventura, direct to India across the Pacific Ocean. If the scheme failed at one or more points—which, considering the enormous difficulties, was quite probable—my plan was to repeat the work in the next season, and, if necessary, in the next and the next, until complete success was secured."

He adds subsequently:—

"The measures which I thought necessary from the first, and which I have since continuously striven to bring to perfection, were:—1. The introduction into India of all chinchona species known to commerce, because it was uncertain which would eventually prove to be best adapted for cultivation in the new country. Even species which do not yield quinine were collected, because, the other chinchona alkaloids also possess febrifuge virtues. 2. The establishment of Government plantations wherever suitable sites could be found in India, to form centres for the distribution of plants and seeds, and for ascertaining the best methods of cultivation. 3. The manufacture in India, of a form of the febrifuge combining, in the highest attainable degree, efficacy and cheapness; so that there may be abundant supplies within reach of all classes of the people."

Mr. Markham was eminently happy in the fellow-labourers who assisted him in his huge work; through

lands everywhere bright with flowers, amid magnificent mountain scenery, they found the primeval chinchona trees; it was no easy, summer day's task. In dense forests, on the verge of giddy precipices, with hornets stinging, ground choked with creepers, and fallen masses of twisted bamboo, they steadily, for many a day, fought their way, and the record of their work is well worth reading. Their collection was made at last; but their work did not go on undisturbed by vexatious interruptions, even danger of arrest from local magnates, though carried on with the free permission of the Peruvian Government; and probably, no one who has not personally assisted at such a task knows the infinite labour and care required to transport in safety a large mass of plants, seeds, and seedlings from one country to another. In April, 1860, Mr. Markham commenced his work; in February, 1873, he is able to record that his original plan had been carried out in its entirety, and the species of the five regions whence the barks of commerce are derived were converted from a wild to a cultivated state, and brought together in the plantations of British India,—the health-giving trees into the land which numbers "a million and a half of deaths from fever annually." At least half these deaths may, says Mr. Markham, be prevented by putting some cheap form of the chinchona alkaloids into every *pansari's* shop in the country, and thus countless multitudes be saved from death or grievous suffering. It remains but to add, in this brief, imperfect sketch of Mr. Markham's work, to which we can but call attention, that the English Government with the short-sighted negligence which but too often accompanies its sanction to scientific research, has left unrecognised and unrewarded many of Mr. Markham's most able helpers,—men who risked, not only their lives, but what was, perhaps, more valuable, permanently their health and strength in the undertaking; while the justification for such negligence is certainly not to be found even in the market value of the work accomplished, since we find "on the Nilgiris the whole expenditure has been repaid with interest by the sale of bark in the London market, and the Government is now deriving large profits of many thousands a year from bark harvests."—*Spectator*.

SCIENTIFIC AGRICULTURE AND AGRICULTURAL EDUCATION.

There is no subject which is attracting more general attention in civilized countries in the present day than that of Technical Education. In this utilitarian age, the direct value of the Education imparted to the mass of the rising generation is being very closely criticized, and the cry is spreading on every side that a great deal has yet to be done before it can be said that European, American or Colonial youth are taught or trained in the way best adapted for the work lying before them in life. Perhaps of all branches of technical Education, that which is the most important, namely, the direct teaching of practical and scientific Agriculture has been about the last to receive the attention it deserves. In England this is especially the case. On the Continent of Europe and in the United States of America, a great deal has been done by the establishment of Agricultural Schools and Colleges, Schools of Forestry, &c., to meet the requirements of a large proportion of the population; but in England, Colleges or Schools of Agriculture may be counted

on the fingers of one hand, and as a consequence the British Colonies (which look to the Mother Country as their Educational guide) have been slow to realize the importance of affording a special training for their young people in the one supremely important section of Colonial industries. The depression of the past two or three years has done much to open the eyes of the British public to the backward condition of agriculture in the majority of English farming districts, and to the need of a special training, if future generations of landlords and tenants are to be enabled, with Tennyson's farmer, "to do their duty by the land." The one question which often lies at the centre of all others in social economy or political administration, is how can the greatest amount of produce be secured at the least expense from an acre of ground? The attainment of this result is a matter of science and art, and in regard to Britain it is pointed out that a wide distinction should be drawn between the science of agriculture and the art of farming. In the latter we are told the British farmer occupies no mean position, even though his art be based on empirical principles or on old precepts which will scarcely stand the strain of scientific investigation. But the great want of England is scientific agricultural research. Save for the work of Messrs. Lawes and Gilbert at Rothamstead, and more recently of Mr. Jamieson for the Highland and Agricultural Society, little or nothing has been done by way of experimental inquiries. Very different is the case on the European Continent, and especially in Germany. There, we are told, numerous experimental stations, largely subsidized by Government, are exclusively occupied in working out researches which may eventuate in results of vast practical importance. We may feel sure, however, that scientific research into abstruse agricultural questions will never be encouraged as it ought to be in England until the British farmer, like the British engineer or doctor, receives an appropriate scientific education. It is pointed out that even the well-educated men who take to farming in their youth as a means of future livelihood know little or nothing of the sciences which more particularly bear on their profession. In politics, literature, or art, they may be well able to hold their own; but their knowledge of chemistry and physics, of botany and physiology, is miserably bare, if not a total blank. Of course, there are exceptions due to the Agricultural College at Cirencester and a few similar institutions; but it is now felt that, if the want is to be at all adequately supplied, an "agricultural curriculum," so to speak, must form part of every school worthy of the name in England, and especially of all Colleges and Universities. The problems of medicine are complicated enough, but even they, we are reminded, appear simple when compared with those of agriculture, and yet the tilling of the ground with due knowledge and art must always be one of the most important of human duties. There is no resisting the argument, therefore, that the youths of Britain who are destined, whether as cultivators, tenants, or landlords, to live by the land, should be furnished with the knowledge best calculated to promote scientific agriculture.

If, however, the mother-country does not awaken to an adequate sense of the necessities of the case, she will most certainly be speedily distanced by her daughters at the ends of the earth. In Canada and throughout Australasia, a perfect *furor* has set in for the establishment of Technical, and, especially, Agricultural Schools. Bills to establish "Schools of Agriculture" are among the most popular measures of Colonial politicians, and already much has been done in the far South. New Zealand occupies the foremost position with its Agricultural College, to which is attached a model farm, a learned Director, and a well-organized teaching staff; Victoria has an Experimental Farm with a School attached; and South Australia and Queensland have Experimental Gardens and Forest Establishments. New South Wales lags behind, but she is speedily to make amends, and very shortly Agricultural Schools or Colleges will be found in all the Australian Colonies. The plan adopted may be judged from the following extracts from Australian papers referring to the New Zealand establishment:—

"Our neighbours in New Zealand are wisely aiming at tilling the field of youthful thought and sowing seeds of knowledge in the practice and science of agriculture. With this laudable object in view a school of agriculture has been established, in connexion with the Canterbury College, on a farm of 500 acres, 12 miles distant from Christchurch. The school buildings comprise lecture-theatre, library and museum, chemical laboratory, separate bedrooms for 20 students, with all the other requisite conveniences, together with quarters for the director. Stables, granary, cowhouses, dairy, piggeries, &c., have been erected on the farm. The best of labour-saving machinery and implements have been selected, and the dairy utensils, include the most recent improvements connected with the manufacture of cheese and butter. A portion of the farm is devoted to experimental purposes, to test the merits of different methods of cultivation, the effect of manures on various crops, the qualities of native and exotic grasses, the suitability and comparative worth of new varieties of cereals, roots, fodder, and other plants. The students will take part in the work of the farm, and will thus acquire a practical knowledge of all kinds of farm work, the management of stock, and the making of butter and cheese. Land surveying and levelling will also be taught, and the course of instruction will include the theory of agriculture in all its bearings—the origin and physical properties of soils, the effects of air and rain on fallowed soils, use of manures, draining, cultivation and harvesting cereal and other crops, &c. Also chemistry as applied to agriculture; biology, physiological botany and entomology, geology and physical geography, veterinary medicine and surgery, mathematics and book-keeping. The course of instruction is to extend over three years, and there will be three terms in each year. Six scholarships have been established, which entitle the holders to board, lodging, and instruction at the school free of all cost. These scholarships will be open to public competition. Candidates may reside in any part of the New Zealand, and must be between 15 and 19 years of age."

The Director says:—

"To the end that the instruction imparted in the school should be, in the first place, eminently practical, farm work, on the part of the students, must be compulsory, and its proper performance be made a condition of studentship that must be rigorously enforced. It is found in America difficult to enforce

this condition without some payment for results; and for this, as well as for another obvious reason, I would strenuously advocate the adoption of payment for work done by the students during the second and third year of the course, and also for harvest work done during the first year, providing that such work be efficiently done. I think payment should be made by the hour, or by the piece, according to quality and amount of work done." Twenty students will be received, and these with three practical farm-hands are to do the entire work of the farm. What this work will consist of is very clearly detailed in the sketch time-table for the first year. We quote from the report:—
Monday: 8 to 10, ploughing or other work with horses; 10 to 11, dairy (utensils); 11 to 12, lecture (agriculture); 2 to 3, lecture (chemistry); 3 to 4.30, arithmetic; 4.30 to 5, milking. Tuesday: 7 to 7.30 milking; 8.30 to 10, laboratory; 10 to 11 lecture (biology); 11 to 12, arithmetic; 1 to 3, ploughing or other work with horses; 3 to 4, field class (botanical); 4.30 to 5, milking or pig-feeding. Wednesday: 7 to 7.30, milking or pig-feeding; 9 to 10, arithmetic; 10 to 12, ploughing or other work with horses; 1.30 to 2.30, farm class; 2.30 to 4.30, hedging or other farm work. Thursday: 7 to 7.30, milking, &c.; 9 to 10, arithmetic; 10 to 11, laboratory; 11 to 12, lecture (agriculture); 1 to 2, dairy (utensils); 2 to 3, lecture (chemistry); 3 to 5, ploughing or other work with horses. Friday: 8 to 10, ploughing or other work with horses; 10 to 11, lecture (physical geography); 11 to 12, arithmetic; 1 to 3, hedging or other farm work; 3 to 4, arithmetic; 4 to 5, milking, feeding pigs, &c. Saturday: 9 to 11, examination. Thus the time of the students will be about equally divided between outdoor and indoor work, and the object plainly is to be turned out thoroughly practical men. An experimental field is to be provided, so that the effects manuring may be closely noticed. A meteorological report will be published weekly, and chemical analyses of such substances as manures, soils, and mineral substances will be undertaken. The farm year is to be divided into three terms, two of these being contemporaneous with the college to which the school is attached, and on the whole it would seem an excellent work is about to be performed."

It is not alone though in Anglo-Saxon communities that we find special attention now given to the need of providing Agricultural Education and of the State encouraging the development of scientific Agriculture. In Japan a Minister of Agriculture and Commerce was recently appointed, and one of his first duties was to organize an exhibition of national Japanese industries. In China it has been determined to establish Colleges for technical as well as general education, and the Chinese authorities are to send no more students to Europe or America for their education. In India perhaps the most notable event of Lord Ripon's régime has been the re-establishment, with a considerable flourish of trumpets, of Lord Mayo's Agricultural Department, and much attention is promised henceforward to all that concerns the development of agricultural industries, the improvement of existing tillage, and the provision of a suitable training for the youth belonging to the classes of representative landholders or cultivators. How all this bears upon the present condition of agriculture in Ceylon and the attitude of the Government, we must leave for a future issue, when we shall endeavour to make suggestions calculated to benefit the great agricultural industries on which the prosperity of the island so entirely depends.

Correspondence.

To the Editor of the Ceylon Observer.

THE ARTIFICIAL DRYING OF COFFEE.

Samarang, Java, August 22nd, 1881.

DEAR SIRs,—As you are likely to have heard, it being mentioned in the Singapore papers, a method for drying coffee in an artificial way was invented by me in the beginning of this year. My making a secret of this invention, which is going to make such a great revolution in the prospects and future of the coffee planting, made me have many a struggle before getting listened to by the planters here in Java. I, at last, found some who consented to see an experiment which greatly satisfied them all. The fact of a method for drying coffee, being invented was mentioned in all the Java newspapers and at last, in May, a commission was sent by the Chamber of Commerce at Samarang to assist at an experiment which I was invited to make. The result of that visit and the official report given by that commission is literally to be found in the circulars which I took the liberty to send you by this mail.

You, being editors of the *Ceylon Observer*, a paper which takes so much interest in everything concerning coffee planting, made me take the liberty to send you some circulars, about 200, with the kind request to distribute them amongst the coffee planters in Ceylon and the principal planters in British India, and to mention the invention in your esteemed paper. I trust you will have the kindness to receive all letters which the planters in Ceylon might write to me and to forward them to my address.

Apologizing for the liberty I have taken, being unknown to you, and thanking you before hand for your complying with my request, I have the honour to be, dear sirs, yours obediently, T. MAANEN.

The pamphlet, after stating the difficulties attendant on the drying of coffee in the ordinary way, and also the drawbacks of the Guardiola system, says:—

“In order to provide in all those difficulties, I lately took some experiments on Pendem estate, belonging to Messrs. A. M. & F. Engelken, for drying coffee on an artificial way, and was fortunate enough to obtain, after many trials during the last season, a complete success. Therefore, I am now able to make you acquainted with the results of my experiments and with the inestimable advantages to be obtained by my drying process.

1. The construction is very simple and may be done by everyone within 4 weeks, if materials are at hand.

2. No yearly repairs are wanted.

3. No complicated machinery.

4. The drying process can be surveyed by any workman.

5. The quantity of wood depends on the quality and size, but will not exceed 5 or 6 cubic metre for drying 50 piculs of coffee,—any wood may be used and the roots of bamboo will do the best

6. Two or three men are wanted for drying any quantity of coffee.

7. The heat can be regulated as required.

8. The whole costs for installation will be about 2,000 to 2,500 guilders = £170 to £200— which may depend upon local prices of materials.

9. By my process about 50 to 100 piculs of dry coffee, ready for shipment, may be obtained in 22 or 24 hours at 104° to 140° Fahrenheit (100 piculs = 6,200 kilogram).

10. The coffee is perfectly dried by my process.

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The evaporation goes on very equally and the coffee is not exposed to injurious vapours or extraordinary heat. The quality is not in the least affected and the whole is better dried than on masoned drying floors.”

After pointing out the advantages of this system, Mr. van Maanen says: “For an amount of £200,— for each estate, I am inclined to give you every information wanted, drawings a. s. o. on condition that no one else shall profit by your knowledge of the process. Every information about the experiments is to be got, besides by myself, by the Chamber of Commerce at Samarang and by Mr. A. M. Engelken at Pendem estate, Solo, Java.”

Then follows a report by Messrs. Engelken and Croes on the merits of an experiment made at Pendem estate with this process; this is followed by the report of the Commission appointed by the Samarang Commercial Association, which we have already published in the *Observer*.

CEYLON, INDIAN, AND EUROPEAN OLIVES, AND CEYLON “WERALUS.”

Colombo, 12th Sept. 1881.

DEAR SIR,—In a letter in your issue of the 9th instant, headed “New Products, Aloe Fibre, Castor Oil, and Olives,” occurs this passage respecting the last named:—“I may mention that the jungles here abound with the ‘Varloe’ or Ceylon olive the half-ripe fruit of which preserved in brine are equal to the Spanish. Have any of your readers tried them?” This subject was discussed in the columns of the *Ceylon Observer* several years ago, and that of the real olives one or two years ago, but perhaps it would be well to give a sort of final notice of the Weralu at least. In 1857 I examined in the British Museum several specimens, and a very fair figure of this plant, in the collection made by Paul Hermann in Ceylon in 1670-77, and in his *Musaeum Zeylanicum*, a somewhat barbarous catalogue of the volumes containing his dried plants, said to have been first published in 1717, my copy being the 2nd edition of 1726, he refers to this plant at pp. 9, 10 and 22, and to the specimens of it in volumes 1, pp. 50 and 57, and 2, p. 33, in every place of which the old Dutchman spelled the word 200 years ago as it is pronounced by the Sinhalese, and ever has been, viz. *wralu*, and hence no doubt the origin of Weralugastenna, a well-known place where I resided when surveying in Ambegamuwa in 1841. I believe that the Sinhalese have eaten the olive-like pulpy matter of its drupe when ripe and pickled, time out of mind. Hermann alludes to the drupes as of the size and shape of an olive, and as to the pickling of them by the natives in 1670, he refers thus:—“Fructus immaturi conduntur, muria ab incolis, addito pauxillo oleo olivarum, ad concitandum saporem olivis propinquorem.” (*Mus.* p. 9.) Burmann, *Thesaurus Zeylanicus*, 1737, p. 93 and plate 40, gives a fuller description of it, and the figure of the leaves and flowers gives a fair idea of the plant.

It is the *Elaeocarpus* No. 206 p. 92 of the *Flora Zeylanica*, of Linnæus, 1747, in the appendix to which the description of this genus is first given p. 10, the meaning of which is *elaia*, an olive and *karpos*, a fruit, the fruits resembling those of the olive, but otherwise far removed from it. In the *Species Plantarum* it was named *Elaeocarpus serratus* Lin. the specific name indicating the serratures on the margins of the leaves. It belongs to the Lime or Lunden family. Tiliaceæ, and its wide separation from the true olive is indicated by the fact that in Thwaites, *Enum. Plant. Zeyl.* the weralu is given as order 31, and the order Oleaceæ-Jasminaceæ, as No. 104, although the sequence of the orders in this work may not indicate this wide separation. Roxburgh *Fl. Ind.*, 2,

596, wrote:—"Without success I have tried to extract oil from the fruit. They are dried and used in curries by the natives and also pickled."

The fleshy exterior of the ripe drupes of the weralus are freely eaten by the natives, and by Europeans who are fond of acid fruits. The taste is about midway between those of an unripe plum and a sloe. No pickle is better known in the streets of Colombo than that from the weralu fruits, and it is hawked about by Sinhalese boys when the fruits are in season.

Moon *Cat.*, pt. 2, p. 36, No. 565, gives the following Sinhalese names for weralus, viz.: æmbul (sour), kana (eatable), kahata (astringent), gal (rock), and titta (bitter), and for *Elæocarpus serratus*, he gives the third of these kahata, but this is evidently a blunder as no such distinction is made respecting the common and edible one which is simply the *weralu* par excellence.

The endcarps of several species of *Elæocarpus* are used as necklaces and rosaries by the Brahmans, several strings of the different kinds being often worn by the same person. They are scented with sandalwood and sold all over India and Ceylon. I can imagine how much of the time of the Director of the Royal Botanic Gardens at Peradeniya is taken up in answering questions like that put by your correspondent, and the labor lost in doing so.

Two species of *Olea*, one of *Ligustrum*, and four of *Chionanthes* belonging to the real Olive family, are indigenous to Ceylon, and the *Olea fragrans*, a native of China, was said to be in Peradeniya Garden in Moon's time. The leaves of this latter plant are said to be used in China for scenting tea with. "*Olea cuspidata*, Wallich, a tree abundant in Afghanistan, Beluchistan and Western Sind, has been supposed to be a wild form of *O. Europea*, but is regarded by Dr. Brandis as a distinct species. It is not known to have been ever cultivated, yet its fruit which is of small size and but sparingly produced, is capable of affording a good oil." (Fluckiger and Hanbury.)

The *O. Europea* has been introduced to different parts of India, but I am not aware that it has borne fruits.—Yours truly, W. F.

SILK IN CEYLON: PRACTICAL HINTS FOR SILKWORM REARERS.

DEAR SIR,—Perhaps, with reference to the remarks in your issue of Saturday, the following hints may be useful to any of your readers who are attempting to rear silkworms. *Firstly*, keep the worms as much as possible at a temperature of 70° and 75°. *Secondly*, always give them their food dry; avoid waste, but let them always have some food to go on with. The youngest worms must be fed on the small, succulent leaves from the tips of the branches. *Thirdly*, as far as possible allow fresh air to circulate round the trays in which they are kept, but avoid sudden changes of temperature. *Fourthly*, feed the worms regularly and do not disturb them during moulting. *Fifthly*, avoid crowding the worms, and keep each batch separately, according to age. *Sixthly*, guard against the attacks of rats, mice, green lizards, bronze and "house" lizards, birds (especially robins and titmice), earwigs, spiders of all kinds, and hornets. *Lastly*, put not your trust in eggs imported by anyone but yourself. It is the custom in Ceylon as elsewhere, to purchase experience with other people's money, and recent importations of eggs from China have, so far as I know, not been more successful than the African palm nuts offered some while ago. If there is one thing more than any other in the rearing of silkworms that requires regularity, it is the hatching of the worms as much as possible at one time. It is the custom in large rearing establishments

to keep only the worms that hatch out on three or four days, so as to obtain the systematic feeding and regular growth of many thousands, without which success is impossible. It follows then that if the worms emerge only by tens their rearing necessitates an enormous amount of extra time, trouble and expense, and must lead only to still greater irregularities in the following generations, (if there are any).

Irregular emerging from the eggs is a sign of great debility in the parent stock: the rearing of worms under such circumstances is almost worse than useless, and the greatest care and discrimination will be required to prevent the present attempts at Sericulture meeting with the same fate as has attended others.—Yours faithfully, NO FRAUD.

ENEMIES OF CINCHONA.

Dikoya, 16th September 1881.

DEAR SIR,—By this post I send you in a small box the remains of a poochie, regarding which, I think, any information you can give will be useful to cinchona planters.

I found him in the heart of a healthy young *succirubra* tree, to which my attention was first drawn by observing a clotted mass of eaten wood-like saw dust round the tree. Taking this off, I found a hole large enough to put a little finger into, going into the tree about 10 inches above the ground. On cutting the tree down, above the hole, I found that the poochie had worked downwards, and on rooting the tree up, I found he had worked his way down to the very bottom of the stems, or a couple of inches below the surface of the ground. Perhaps the portion of the stem which I first cut may be of interest to you, so I send that also by parcel post.—Yours faithfully, K.

[The "poochie" sent is precisely the same as that described in our issue of the 7th instant, when a specimen was sent to us from Upper Dimbula. It is believed to be the larva of a moth belonging to the family *Hepialidae* which has hitherto shown a great liking for casuarina trees.—Ed. C. O.]

THE GOVERNMENT AND THE CINCHONA ENTERPRIZE IN CEYLON.

Maskeliya, 20th September 1881.

DEAR SIR,—With reference to Mr. Talbot's resolution before the P. A., it would be well that Government should be made to understand that the appointment of an analyst is the only way they can now make up for the neglect which the cinchona enterprize (an enterprise on which the fate of the Colony may be said to depend) has met with at their hands.

Hakgala is in such a state that money spent on it can do the planter no good in any way. The stock-in-trade there may be said to consist of an *imposing* gate, avenue, and bungalow, a couple of honest propagating houses that pretend to be nothing better than they are—dingy, unwholesome, dens—an acre or so of sickly Java Ledgerianas, about a year old, and a few miscellaneous dying *succirubras* and *officinalis*. Dr. Trimen is probably anxious to effect a reformation, but the money so spent can never make up for the years wasted, and any ordinary estate in the Island will always have better cinchona to show than Hakgala. Grafting from stocks of ascertained value seems to be the only practically useful work to be done, but the non-existence of such stocks is an obstacle. If, therefore, Government refuse to engage an analyst, let them never quote the expenditure on reclaiming Hakgala as being any help to the cinchona industry.—Yours truly, NEGLECT.

THE "ENGLISHMAN'S" REVIEW OF "THE CINCHONA PLANTERS' MANUAL."

We have to acknowledge the receipt of "The Cinchona Planters' Manual," by T. C. Owen, published by Messrs. A. M. & J. Ferguson, Colombo.

It is one of the most complete works of its kind that we have come across, and far surpasses both in manner and in matter any similar manual that has yet been offered to the planter. The writer goes to the very root of his subject, the first part of his book being devoted to an exposition of the physiology of plants in general. Part II. contains two chapters, one dealing with the chemistry of the alkaloids derived from cinchona bark, their relative values, and the proportions in which they exist in different parts of the tree; and the other giving a detailed account of the various species and varieties and their characters, regarded both from a botanical and a practical standpoint. Part III. treats exhaustively of cultivation and harvesting, and their accessories; Part V. deals with the diseases to which the plants are subject; while in Part VI. the writer gives us a series of elaborate estimates of outlay and returns. In Ceylon, we observe, the diseases are less serious than in the case of either coffee or tea, the most formidable being canker. But in Java the trees are said to be liable to the attacks of a pest identified by the writer with the red spider of tea-bush notoriety. We regret to add that he suggests no remedy for the evil.

If the estimates given in the Manual can be depended on, cinchona cultivation holds out prospects which the tea planter may well envy. They show at the end of five years, for the *Officinalis* variety, a profit on the uprooting system, of R1,344 on an outlay of R1,179, and on the mowing and renewing system a profit of R3,047, on an outlay of R1,822, per acre; and for the *Succirubra* variety profits of R860 and R2,509 on outlays of R993 and R1,795 respectively. As regards the first of these results, Mr. Owen says:—

"The profit of R1,343 per acre includes the cost of land, R150, and the proprietor finds himself in this position. He has purchase money and expenditure returned to him, with profit as above; he has 100 acres of cinchona land planted up by self-sown seedlings; a quarter of this acreage being two and a half years old, and ready to cut during the middle of the ensuing year, one-fourth the year after, and one-half the third year; shewing a profit at the end of nine and a half years greater than that shewn at the end of the first five years. by the saving of original purchase of land and opening expenses, R27,945, besides other little savings in upkeep and first building, always provided that the land is found capable of producing a second crop."

No estimates of results are given in the case of *Calisaya* or other species, for want of data to go upon.

CUPREA CINCHONA.—Further information concerning the "cuprea" cinchona bark has been contributed by Dr. Charles A. Robbins, of New York, to the *Oil, Paint, and Drug Reporter*. He has visited Santander, United States, Columbia, where the bark is collected. He says that the tree grows on the lower mountain ranges adjoining Buccaramanga, at a much lower altitude than any of the known marketable kinds, the good trees not generally growing at a level below 2,000 or above 3,500 feet. The first lots of bark that were shipped were obtained from the higher altitudes, 2,000 to 3,000 feet, and was in most cases of fine quality. A good deal of that which has recently been collected is of very inferior quality, and it is stated that the greater part of it will not yield half as much quinine as the first shipments to London, which sold at 3s. 6d. to 3s. 8d. per lb.—*Phar. Journal*.

ABSTRACT OF PEKING GAZETTE.—July 16th.—(1) Memorial from Ming An, Governor of Kirin, reporting that he has succeeded in obtaining from amongst the hills ten large plants of wild ginseng weighing about two taels nine mace five, and ten small plants weighing about one tael four mace five. The ginseng supplied to His Majesty last year was paid for out of the public funds by the memorialists, but the expense of procuring it is so large that he cannot continue to draw upon the public funds for the necessary amount. The four ounces odd that have now been procured involved an expenditure of Tls. 404, and he would suggest that now that the sale of cultivated ginseng is no longer prohibited, and duty is levied upon it, the sum required to procure the wild ginseng for the Court may be drawn from the duties levied on the cultivated plant, should His Majesty demand a further supply.—Rescript: It is noted.—*North China Herald*.

JOHORE TEA has been characterized as "Good blackish leaf, strong, Pekoe flavour." This, to begin with, is encouraging, and it may be that at no distant day we may see tea plantations on the Malay Peninsula. The experimental tea gardens belonging to H. H. the Maharaja are flourishing excellently. A tea planter from India who recently visited them, stated, that the "soil and climate was all that could be desired," for the successful cultivation of the tea plant. Samples sent to London have been reported on as ab ve- and valued at from 1/7 to 2/1 per pound. Indian teas are increasing in favour, the deliveries in London reaching nearly 50,000,000 lb. annually. Apart from the export trade, Messrs. Thomson, the tea Brokers, state that the deliveries of China tea are about 116,000,000 lb. The quality has deteriorated. Java tea is not esteemed in the home market, and the same may be said of much that is exported from Japan. There are thousands of acres in Johore admirably suited for this industry, and judging from the quantity and quality of Gambier leaf and the general superabundance of foliage everywhere on the territory, there seems to be nothing wanting to guarantee success to the planter except cheap Indian labour. The nearness of Johore to the Singapore market is in itself a great advantage to the planter.—*Straits Times*.

FIBRES.—In the annual report, which has just reached us, of another valuable institution in Calcutta, the Royal Botanical Garden, it is mentioned, on the authority of the Superintendent, Dr. King, that the cultivation of *rheca* is not likely to prove a commercial success in Bengal. The prizes offered for an efficient machine for cleaning the fibre have hitherto failed to create much interest in the subject, and it is unlikely that zemindars and ryots will undertake the cultivation of the plant until there is a cheap and effective means of bringing it into marketable condition. During the past twelve months various kinds of grasses were examined with a view to test their capability of yielding a paper fibre, but the results in no case appear to have been hopeful. Dr. King recommends that attention should be given to the utilization of the plantain, which, so far as the manufacture of paper is concerned, promises to be the best of the fibre-producing plants in India. Sir Ashley Eden, who is always ready to encourage local enterprise, expresses his readiness to assist any mercantile firm or private persons wishing to try experiments with the plantain in the Chittagong Hill Tracts, or elsewhere in Bengal, by supplying them with wild plantain stems, free of cost, at the out-set of the experiment, and afterwards at reasonable rates. The manufacture of paper is an industry that it is very desirable should be encouraged in India, and, we hope, some one will come forward to avail himself of the assistance of the Bengal Government.—*Times of India*.

A NEW KIND OF PALM has been discovered in some of the South Sea Islands, or else cultivation has improved the already wonderfully productive powers of the coconut palm. In a leading article a few days ago a contemporary spoke of the "copra-bearing palm" as one of the natural products of those islands. Ready-made copra, hanging in graceful clusters from the tree, would indeed be a striking proof of the effects of scientific agriculture.—*Colonies and India.*

CARDAMOMS.—During the past month, Bengal cardamoms, the produce of *Amomum aromaticum*, Roxb. and meni seed, the spindle-shaped fruits of *Lophira alata*, have been offered at the London drug sales. The latter belongs to the natural order Dipteracæ, and occasionally presents one of the wings of the calyx, to the development of which the order owes its name. An oil obtained from these seeds is said to be used by the natives of tropical Africa under the name of "meni" oil.—*Pharmaceutical Journal.*

MEDICINAL PLANTS IN JAMAICA.—The cultivation of chinchona bark is being vigorously carried on in Jamaica under the able direction of Mr. D. Morris. The true *Cinchona Ledgeriana*, the most valuable of all the Peruvian barks, has been grown from seed supplied by Mr. Moore, of Java; and there are now in Jamaica some 60,000 seedlings raised from this seed, beside 20,000 more from seed obtained from Dr. King, of Calcutta. This quantity will, it is hoped, enable the Jamaica plantations to compete successfully in a few years with those of the East Indies. The Columbian barks lately introduced into Jamaica are also thriving. The cultivation of jalap in Jamaica, again, promises to be a success. About 2,000 lb. of this root are being now sent to the London market, partly in the form of split and dried tubers and partly in slices. Should the latter meet with acceptance at a fair price, the cultivation promises to be remunerative, as the roots can, in this way, be dried without artificial heat, and 2d. per lb. cost of production saved. The roots are said to lose about 70 per cent. in drying. The roots are being analysed, and the results will probably soon be published.—*Colonies and India.*

THE WATER POWER OF NIAGARA RIVER.—The recent visit of the American Society of Civil Engineers to Niagara Falls has drawn renewed attention to the works for utilizing some of the enormous water power of Niagara river which are now in progress under the auspices of a new Company. The canal was originally constructed by Horace H. Day, of New York, in the year 1850, at a cost of \$250,000. The canal debouches from the river above the falls, and discharges into the reservoir below them, being about three-quarters of a mile in length. Its dimensions at present are about 35 ft. in width, by 10 ft. in depth; but the new Company have land enough secured to enlarge it, when necessary, to 100 ft. wide. There is a fall of 2 ft. in the length of the canal. It is arranged to extend the reservoir, as required, to a mile in length along the river bank, its width being 70 ft., and depth same as the canal. Four wheels, owned by private individuals, were in operation formerly. The new Company, formed some four years ago, bought the old undertaking at a mere song, and is now developing the scheme into a thoroughly organized water-power Company. They have nearly completed a wheel pit, not far from the lower extremity of the present reservoir, 40 ft. long by 20 ft. wide, sunk in the solid rock 86 ft., from which a tunnel, 10 ft. by 6 ft., has been bored for discharging the waste into the river. It is proposed to ultimately place three wheels in this pit, but for the present only a 50 in. Risdon turbine is in position, under a head of 86 ft., developing some 1,100-horse power. The water is led from the reservoir to the wheels by huge iron pipes. The total available head is about 220 ft., which, after deducting the 86 ft. at present employed, leaves some 134 ft. yet available. The possibilities of power appear at first sight to be inexhaustible.—*Iron.*

QUEENSLAND PEARL FISHERIES.—From a report recently issued on the pearl fisheries of Queensland by Lieutenant de Hoghton, of Her Majesty's ship "Beagle," we learn that 11 firms are engaged in the trade in Torres Straits of whom ten have their headquarters at Sydney, employing nearly 100 boats in the work. The amount of pearl-shell exported in 1878 was 449½ tons, valued at from £60,000 to £70,000. The price of the shell fluctuates a good deal, ranging between £120 to 280 per ton. The divers principally consist of Kanakas, Maories, and Malays, only some 20 white men being engaged in the operations, with a few Australian blacks. Generally speaking, the divers make an excellent thing of it, their earnings seldom being less than £200 a year, while in very good years, such as 1878, they have been known to make £340 each. Although there are a good number of sharks in these seas, the loss of life on the part of the pearl fishers is very small, averaging about two per annum; and it is a curious fact that the sharks almost always best a retreat as soon as the fishing operations commence.—*London Times.*

ARTIFICIAL HONEY.—When "artificial honeycombs" made of paraffin wax and filled with "glucose"—i.e. the sweet syrup of common corn—are manufactured in large quantities in New York, and eagerly bought up as the best clover honey," it is hard to say where Yankee ingenuity and human credulity are to end. But cannot many of our Colonies take the hint thus offered to them, and step in to supply the demand for honey with the real article? In the garden isles of the West Indies, on the flowery slopes of Botany Bay, amid the groves of Tasmania, in Canada itself—with all its "terrible winters"—the "busy bee," if properly housed, would manufacture illimitable quantities of best honey in purest wax cells without the necessity for machinery to copy the combs in solidified paraffin, "so beautifully as to defy detection"—to quote the words of the *Graphic*, which reports this latest Yankee dodge—and without calling into requisition hot irons to close the cells. Wooden nutmegs, oleomargarine, and glucose honey, are all very well in their way, but when it is worth while to make imitations of any article there must be a market for the real thing and the real thing will always bear the palm.—*Colonies and India.*

THE ENGLISH COMMUNITY IN IOWA.—A per pawith this title, by Mr. Robert Benson, in *Macmillan's Magazine* for May this year, gives an account of the English settlement referred to by a correspondent in our issue of last Friday. It appears from this that the founder of the colony (which now numbers 500) was Mr. Close, the well-known Cambridge oarsman, who in 1877 bought 3,000 acres in north-western Iowa, his reasons for choosing that part in preference to Canada or other American states being that there was plenty of railway carriage, the land was prairie and would grow both staples, Indian corn and wheat, and as the eastern half of the state was thickly populated and the land there was worth £8 to £15 an acre it was to be expected that the next year of immigration would overlap the eastern half and equalize prices. 120,000 acres have already been cultivated by this colony, representing a capital of about £250,000. The land is divided into farms of 160 acres each, every 40 farms or so being placed under a steward. A farm ready for the tenant would cost now from £340 to £400. Labour is plentiful, the wages being £3 10s a month and board. Nothing but success has met the colony so far, but the test will come when there is a bad harvest from burst, or drought, or storms, or other causes; or when a good harvest in Europe corresponds with one in America. Meantime however persons with moderate capital can scarcely do better than follow the example of the former Colombo merchant whose experience is given in Friday's paper, and buy a farm in Iowa.

TEA AND SILK FARMING IN NEW ZEALAND.

For the Tea Industry.—(1) The necessary supply of one-year-old tea plants and fresh seed from China, Ceylon, Assam, the Neilgherries and Darjeeling, delivered at the nearest port to the proposed plantations at cost price, or free. (2) Facilities for the importation of labour from China, India, or elsewhere; and reasonable legal protection to the planter against the non-fulfilment or evasion of labourers' engagements. (3) A proportion of forest-land to the acreage purchased or rented, at a reduced figure, or free. (4) The admission without duty by the Customs of all material, implements, tools, and machinery necessary in tea cultivation, manufacture, and packing, for a short term of years. (5) Freedom from duty or excise impost for all tea grown and prepared within the colony for the first ten years.

For the Silk Industry.—(6) The necessary supply—four hundred plants per acre—of five-year-old white mulberry bushes grafted on black mulberry stocks, or other approved kinds and seed from Sydney or elsewhere; also the needful quantities of any other silkworm-feeding shrubs, such as the castor-oil plant, the terminalia and jujube trees, the ailanthus, &c., delivered at the nearest port to the proposed plantations at cost price, or free. (7) Facilities in regard to labour, land, and freedom from duties, as in the tea industry. (8) And such encouragement as would lead to the speedy settlement of skilled reelers from France and Italy, silk throwsters from England, and the purchase in time of all the elaborate mechanism required in the higher branches of the silk industry.—W. COCHRAN.—*Chambers's Journal*.

CASUARINA CULTIVATION.

TO THE EDITOR OF THE "MADRAS MAIL."

SIR,—Referring to an extract from *The Eurasian and Anglo-Indian Advocate* which appeared in your issue of 20th July, regarding the cost of planting casuarinas, the writer says:—"It is estimated that under very unfavourable circumstances as much as R100 per acre will be required for the first year." On referring to his estimate for planting six acres I find, after deducting an item 'cost of watering and all sundries' which I will suppose is expenditure incurred after the first year, the cost of raising, planting and tending for one year, on six acres, to be R156 or R151 per acre.

The writer of the extract also says:—"Land for casuarina cultivation may be had for R10 per acre. I shall say R20 to be on the safe side." On going to his estimated abstract of receipts and expenditure, I find R1,400 as gross expenditure on 6 acres; but on referring to detailed account, I cannot find any charge for cost of land. Again, a profit of R7,600 on an outlay of R1,400 would, by my calculation, be 542.8 per cent instead of 550 per cent. Will the writer of this, or the editor of the paper referred to, be so good as to explain, and if I am wrong put me

Travancore, 3rd Sept.

RIGHT.

THE CULTIVATION OF CASUARINAS.

At the meeting on the 3rd ultimo, of the Madras Agri-Horticultural Society there was read an article on "The Profit of Casuarina Cultivation," published in the *Madras Mail* of the 20th July last, as an extract from *The Eurasian and Anglo-Indian Advocate*, in which it is reckoned that 18,000 trees may be grown on six acres of land to produce 8 annas each in four years, at a gross expenditure of R1,400 resulting in a net profit of R7,600, or a return in four years of

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550 per cent. The Honorary Secretary, who has had considerable personal experience in this matter, stated that such estimates are liable to cause much mischief by inducing people to speculate without the means. "The most successful casuarina planters in the neighbourhood of Madras, where the land is specially adapted to the industry, plant only 300 trees to the acre, and consider themselves very fortunate if, after being twelve to fifteen years without return for their money, they can cut an average of anything over forty tons of firewood to the acre; or if, in other words, they get their wood to market so as to give a net return, at R6 per ton, of R240 per acre. Multiplying this sum by 6 we have a return of R1,440 for six acres, against the writer's estimated expenditure of R1,400. Thus, the business is only really profitable when worked on a large scale; when the trees are allowed to grow for much more than four years; when there are very good acres to make up for those that fail; and when water is close enough at hand to allow of the expenses being reduced to the lowest possible amount." We have been informed that no area under 100 acres will pay Europeans, and that these 100 acres must be good land. Natives who plant small plots make profit because they use only the unpaid labour of their own families. Last year as an experiment a correspondent of ours cut an acre of seven year old trees—an average one. Its produce was just under 7 tons, and the net value of the wood was about R5 a ton, so the acre yielded but R35 after seven years' waiting for returns.—*Madras Mail*.

SILK IN THE PUNJAB.

The cocoons from imported seed are said by the manager of Messrs. Listers' filature to have been as fine as any in the world. This is an extremely satisfactory result, and one that the Lieutenant-Governor hopes will be maintained. It is to be regretted that the country seed should have become generally diseased, but his Honor does not think that it is necessary to take any special steps in this matter as proposed by the Financial Commissioner and the Commissioner. From the facts stated by the Deputy Commissioner that very few country cocoons were exhibited this year, and that Messrs. Lister gratuitously distributed foreign seed to all breeders who agree to sell the produce to them, it appears certain that the foreign seed will supersede the country seed without any effort being made in this behalf. It is not likely that the moths and worms of the two classes are allowed to mix, but unless this is the case, the infection cannot spread.

The return attached to the Deputy Commissioner's report shows that the produce of 2 mauuds 26½ seers of seed was 347 maunds, 2 seers of cocoons. The rough outturn of silk is put at 80½ maunds, but at the rate used by the Deputy Commissioner, viz. 10 41 seers of silk per maund of cocoons, the amount would appear to be 90 maunds 12 seers. This seems to be a satisfactory result, but it is not possible to compare the figures with those of previous years, as the former statistics of one or the other of the districts are always incomplete in some particular. The Lieutenant-Governor trusts that this information will be carefully recorded in the future, and an effort should be made to gauge roughly the proportion which the cocoons exhibited bear to the whole number produced in the two districts.

The development of mulberry plantations during the past year has been satisfactory. The Irrigation Department has been addressed as suggested by the Financial Commissioner, and requested to plant mulberry trees as far as possible on the banks of the Bari Doab canal and its main distributaries in the Gurdaspur district.—*Indian Agriculturist*.

TOBACCO-GROWING IN THE EASTERN PROVINCE OF CEYLON.

TO THE EDITOR OF THE "CEYLON TIMES."

SIR,—Mr. A. Shaw, a Sumatra Planter, whose services we secured at great expense to cure our Tobacco, is now engaged on that work. It is necessarily a lengthy process anywhere, but we have found it more so here—our climate during the months that the curing is going on, is very dry, and fermentation is therefore not so quick and strong, as it otherwise would be. That this is any disadvantage, except that it makes the curing a little more expensive, and that we lie out of our money the longer, we are not prepared to say.

Last year we had more difficulties to contend with than we will ever have again. Still, we got a considerable acreage planted with tobacco, from which we have secured a large quantity of leaf. Regarding its quality, I can only at this stage, quote from Mr. Shaw's report. "Much of the tobacco grown this season, which I am now engaged in curing, is of excellent quality." "The great point, therefore, has been gained in Trincomalee in proving so satisfactorily, that the soil and climate are suitable for producing tobacco of the wished-for quality." The tobacco is now being sorted and pressed into bales for export to London and Amsterdam—a few bales being sent elsewhere on the continent through Messrs. Frudenberg and Co.

I see no reason why tobacco should not grow equally well at Tissa—if my ideas of its soil and climate are correct. It certainly is worth a trial, as there is no crop more paying. Your correspondent wished to know why we were planting up last year's tobacco lands with coconuts. The natives of Trincomalee cultivate tobacco more extensively than anything else, year after year on the same land, using cattle manure alone; in Sumatra, after the first crop, the land is manured with lime and guano. We desire to get as much land opened up here as we can, as the more we open the healthier the place will be, and having plenty of land we can afford to plant up our first year's clearings with coconuts. Awaiting the result of the sale of our first tobacco crop before we plunge. Besides which coconuts are a very paying product here. And we are not over burdened with money, and I think we shall find it cheaper to fell and clear new land than to manure the old. The upkeep of the coconuts, is next to nothing, the planting we do simultaneously with, and at the expense of, the tobacco.

A. H. MACARTNEY.

TOBACCO CROPS OF 1880 AND 1870.

J. R. Dodge, special agent for the collection of statistics of agriculture, has issued from the Census Office a report showing the tobacco crops of the United States for the census years 1880 and 1870. The comparative statement in the report shows an apparent increase in the production of 80 per cent during the decade, the product in 1880 being placed at 473,107,573 pounds, and that of 1870 at 262,735,341 pounds. This apparent increase, Mr. Dodge says, exaggerates the real advance in tobacco cultivation; at the preceding census the crop was a small one, and the fear of taxation may have operated to prevent a full crop of tobacco in 1870. The crop reported in 1880 was one of medium production, not in excess of present requirements for home demand and export. Fifteen States produce now, as in 1870, more than 99 per cent of the tobacco of the United States, although it is reported in twenty-two other States and six territories. Of these fifteen, only Missouri, Illinois, Indiana, and Massachusetts produced less than in 1870. Kentucky occupies the first position, produc-

ing 36 per cent of the total product of the country. Virginia then holds second place; Pennsylvania has advanced from the twelfth to the third; Wisconsin from the fifteenth to the tenth; and North Carolina, Connecticut, and New York have each gained one point in the rank of tobacco States. Those that have retrograded in relative production are Massachusetts, Maryland, West Virginia, Indiana, Illinois, Missouri, and Tennessee. The average yield per acre is shown to be 731 pounds, varying from 1,599 pounds in Massachusetts to 471 pounds in North Carolina. This variation in the rate of yield, the report states, is due in differing degrees to the use or neglect of fertilizers, the habit of growth of different varieties and vicissitudes of season.

The following table shows the total product in pounds and yield per acre in 1880 in fifteen leading tobacco-growing States:—

States.	Total Yield.	Average.
Kentucky	171,121,134	756
Virginia	80,099,830	553
Pennsylvania	36,957,772	1,340
Ohio	34,725,405	1,001
Tennessee	29,965,652	707
North Carolina	99,286,448	471
Maryland	26,082,147	683
Connecticut	14,044,652	1,620
Missouri	11,994,077	773
Wisconsin	10,878,463	1,234
Indiana	8,872,842	742
New York	6,553,351	1,327
Massachusetts	5,369,436	1,599
Illinois	3,396,700	699
West Virginia	2,296,140	564

—*Indian Agriculturist.*

THE STATE OF PERAK.

(*London and China Express*, 26th August 1881.)

As evidence of what the result would be were the Malay States under British rule, there is an announcement in the *Straits Settlements Gazette* of the increase which it is thought desirable to make in the price of land in the district of Larut. The order referred to has of course been made at the instance of the Regent and Council, who direct the Resident to see that it is carried out. This goes without saying so far as its appearance in the order is concerned; but one is very much inclined, on seeing Legislation of that kind, to imagine that the circumstances as just put, ought to be reversed. This, however, has nothing much to do with the alteration made, except so far as to show that the British Resident's presence, coupled with his *advice*, is bringing about a state of things very different to that which existed only a very few years back. As to the advisability of the change, that is a matter in which there is likely to be a good deal said, because it may with justice be contended that anything resembling a diminution in the easy terms offered by the Government must to some extent stop the otherwise very rapid development of the country. This opening up in that part of Perak, south of the Kreean and Kuran rivers, must have been more successful than was anticipated. But what the object can be in putting a higher price on the land is rather difficult to see, unless it is to divert enterprise more to Perak proper, in which very little has as yet been done beyond prospecting.

On the other hand, there cannot be, comparatively speaking, very much land left in Larut. Ever since the mines were opened there the influx of Chinese has been very large, while since the war the cultivation of rice and sugar has increased to a very great extent. The low-lying portion of the country included in the water-shed has always contributed to the rice products; the yield in some parts being so

great as to utterly eclipse the neighbouring lands, and now that the opening of the fresh water canal from above the tidal influence of the Kreean supplies the one want, the whole of the lands have no doubt been applied for. Further up the river, also, much enterprise has existed for a considerable period, and Selama and its neighbourhood, besides producing large quantities of tin, is in a high state of cultivation. On the banks of the river again, near Province Wellesley, a very extensive sugar estate exists, the energetic Chinese proprietor of which has gone in for machinery, so that there is a continuous line of settled cultivation from the mouth of the river for some considerable length of its course, and again near its source. Now is this enhanced price for the land a wise act on the part of the Regent and his advisers? It will, of course, if it does not put a stop to the opening up, add considerably to the funds in the Treasury; but is this pecuniary advantage likely to be nullified by the uncertainty which will arise in the minds of capitalists with reference to the acts of the Perak Government? When other States are contending for the patronage of capitalists, it is questionable whether it is a wise policy to pursue. Time will show; but if the result is disadvantageous, more harm than a return to the easy terms can remedy will be done. Surely it would be far better to adhere to one set of conditions, and not change it because it has been beneficial. We should have thought that was the greatest argument in the system adopted. There may be local circumstances which justify the alteration, and we can only hope there are, otherwise the change is assuredly a penny wise and pound foolish one.

DECAY OF EUCALYPTUS AT CHANGA MANGA.

(*Indian Forester*, July 1881.)

I see that Mr. J. C. McDonell draws attention to the destruction of Eucalyptus at Changa Manga Plantation. It is a pity that he does not state what species have suffered, or whether only one kind has been affected. I was reading lately a paper "On the Timber-supply of Australia" by the Hon'ble Mr. Krichauff. He says:—"I heard at different times the gum trees died without any apparent cause in many parts of the colony, especially in the south-east. I observed once, many years ago, that our blue gums died suddenly over an area of perhaps fifteen or twenty acres, in the Bugle Ranges in the midst of a well-wooded district. Last summer, however, my attention was called to the following alarming fact:—On a very large tract of timbered country on the Hundred of Strathalbyn, said to be about fifteen or twenty square miles in extent, not a blue gum remained alive. All other gums—white, yellow or red—were luxuriant, while the blue gums, from the largest tree to the smallest sapling, were dry, and the bark, already cracked, ready to fall down this winter. It was remarkable and perplexing to observe the exactly straight boundary line on one of the outskirts of this tract of land which I visited. Within a few yards all blue gums were dead, and outside the line they were as vigorous as ever. My time being short, I could not examine the trees properly to ascertain anything further; but such an examination ought yet to be made. At all events, inexplicable as it is to me, I thought it right to mention it, so that one or other of my hearers or readers may venture an explanation, or the enigma may be solved by comparing the observations of a number of persons at different localities and times, and perhaps as regards different kinds of trees."

In the instance quoted it is the blue gum (*Eucalyptus Globulus*) which alone suffered. Was it also this species at Changa Manga?

Above, the blue gums were growing in their native climate along with their accustomed associates; the blue gums suffered but the others flourished. The cause might have been supposed to be frost or drought, but that blue gums were said to be unaffected on the other side of a boundary line.

Again, one would expect that, if the cause were drought, the older trees with roots penetrating more deeply would have resisted longer than young sapplings. The other trees, too, even though of hardier constitution, would have probably suffered to some extent.

Thus, though without the opportunity of observing the facts, it is rash to hazard an explanation. I should imagine that the damage was caused by an inroad of animals, perhaps rats and mice, or other rodents. I should examine the roots of a tree that had shown signs of suffering, to see if it had been gnawed, and also search for any other indications of the presence of animals, such as their holes, droppings, &c. Or the evil might be due to fungus; and perhaps this is more in accordance with the fact of the boundary line separating the invaded tract from the flourishing tract alongside. The intervening few yards of cleared land forming the boundary line might readily be crossed by such animals as rats and mice, but the mycelium of fungus would take some time to cross it, or be stopped for want of nourishment.

White ants are generally credited with forbearing any living tree, and besides they are certainly not exclusively partial to blue gum. So I think we must seek the cause of death in some peculiarity of the species. The malady may have attacked other vital parts, for instance the cambium; but the roots, I think, are most vital—the most likely seat of the evil.

The *Revue des Eaux et Forêts* for November 1880 contains an interesting paper on the "Maladie ronde" which ravages the pine forests in Sologne. The writer comes to the conclusion that the malady, which attacks the Maritime and Scotch pines, is due to the mycelium of certain fungi, notably the *Rhizina undulata* (Fries.)—F. B. M.

SILK GROWING IN AMERICA.

The rapid growth of the silk manufacturing interest in the United States was recently made evident in these columns by a review of the census statistics gathered by Mr. Wycoff. Commenting upon the same facts, and the superior quality of American manufactured silk, the Philadelphia *Public Ledger* gives a large amount of interesting information touching the production of raw silk and its possibilities in the United States.

"It is as easy to raise cocoons as sheep—easier. The intermediate stages between the cocoon and the factory have yet to be undertaken, but cocoons and eggs are both raised in this State, in North Carolina, and in Missouri, for sale and export. The shearing of the cocoons or the filature is the step that has to be taken on an extended scale. The great cocoon market for the world is Marseilles. The silk filatures are grouped in the departments around Lyons, and the French raised cocoons are consumed in the immediate neighbourhood in which they are raised; but the foreign cocoons, coming from all countries, are distributed from Marseilles, and there they are purchased to the best advantage. Consul Peixoto points out in a private letter to the American Minister at Paris, in answer to some enquiries made through Mr. Noyes by the Philadelphia silk school, that American-grown cocoons can be sold at Marseilles as readily as any others, as soon as the quality and especially the uniformity of the cocoons become known in the markets. By the efforts of this school American-grown cocoons will doubtless soon be placed on sale in this

important depôt to direct the attention of American silk raisers to this point. There have been already given in the *Ledger* such details of silk growing under the management of this school as will satisfy any one that all that is needed is such a point to which the numerous little harvests all over the country can be gathered and forwarded. Here is one experience from Gwynedd, Pa., representing six weeks' care of one crop. There were raised in one farmhouse, just as an experiment and to see how it would work, thirty pounds of cocoons and fifteen ounces of eggs. The cocoons are worth at a market two dollars a pound; the eggs, from three to four dollars an ounce. From a North Carolina farmer comes a letter on a larger scale. He has put up one hundred and fifty racks this year, four feet long by three wide, and each rack is to accommodate two thousand worms. He expects to raise this summer one thousand barrels of cocoons (North Carolina cocoons, pure white, took a premium at the Centennial); but this grower raises also from the French eggs the large flesh-coloured cocoons, of which about one hundred and ninety weigh a pound, and from the Japanese eggs also a fine cocoon.

"But why, asks the protective and otherwise thoughtful reader, need the cocoons be sent abroad to be sold, and this golden fleece sheared by French hands? Why can they not be kept at home, seeing that the silk manufacturer can, or at least could, take all that can be raised for years to come? That is the point which is now occupying the minds of *sericulturists*—seriously occupying them. Cocoons and eggs and all that they know. They know that the mulberry will grow wherever the apple tree does, and that the osage orange does about as well as the mulberry. They know that the season begins on the 11th of May and lasts six weeks, and that it is possible, by skilfully retarding some of the eggs to make two seasons in the year. What they have not yet reached is the perfection of reeling, although they are experimenting upon it. The hand reeling of Italy and France is an old story. Silk has been reeled by hand here, and is still, and if the farmer's daughter puts her reeling at the same price as her knitting or crochet to fill up the unemployed time, and not for an occupation to live by, hand-reeling would pay to that extent. For an extended business the great filatures are needed, where American cocoons can be reeled at home by machinery, the only thing that can come into competition with the cheap day labour of the Italians, French, and Japanese hand-reelers. A young American engineer is at this time in France, experimenting on the reeling of silk by electricity, which is the motive power destined to lighten labour as well as streets. This is the one missing link that is needed to complete the chain between Hortsmaun's fringes and ribbons and the New Jersey silk dress goods and handkerchiefs, the Connecticut sewing silks, &c., and the cocoon racks in American farm-houses. The Philadelphia school that has done so much in gathering up these threads of detail, and in sending out its cocoons and instruction over the country is a real credit to the city and the State."—*Indian Agriculturist*.

TEA PLANTING IN THE MALAY PENINSULA.

(*London and China Express*, 26th August 1881.)

Tea planting in the Malay States is about to receive an impetus by the opening out of two estates in Johore, the managers for which will in a short time proceed to Singapore. This has no doubt been caused by the favourable report issued on a small sample of tea received in England, and now that a beginning is to be made on a large scale, it will not

be long before the cultivation is widely extended. We have very frequently pointed out that there is a great field for tea in the Malay States, and it is somewhat surprising that nothing has been done for so long. The soil in the interior is admirably adapted for the plant, and the experiments which have already been made in Province Wellesley were so successful, that a following up of them was well justified. The Maharajah of Johore very naturally desires to have his country opened up, and H.H. has with admirable foresight announced his intention of facilitating by every means in his power agricultural enterprises. This policy if steadily adhered to must attract capitalists, and as the territory is rich there is no reason why it should not contribute largely in time to the European markets. The Maharajah of Johore is an energetic and enlightened ruler, and has done much to make his State a model native one, although we have on occasions differed from his policy when we have deemed it our duty to do so. Many of his efforts have perhaps been curtailed from want of an inexhaustive exchequer; but nevertheless much has been accomplished. As a very much favoured protégé of the British Government, his Highness has many opportunities which are denied to the less patronised Malay princes, and this will probably tell a great deal in such enterprises as tea, coffee, cinchona, and sugar cultivation. The influence he can bring to bear on the authorities ought to be directed successfully towards obtaining labour which will be the one great want on the estates. A good opportunity now presents itself for settling the question of Indian labour in the Malay peninsula. Johore leading the way, and obtaining a licence to import coolies from India will be a good precedent for the States where there are British Residents, and it is hardly likely that the request of the Maharajah when he makes it will be refused.

With regard to tea planting itself, it may not be out of place to draw attention to one or two points which will materially influence the results of the cultivation. First and foremost, something more than ordinary care must be bestowed on the selection of land. Virgin forest, slightly elevated or undulating, with a good depth of surface vegetable mould, and a light subsoil, should be chosen. The situation must be such as to be within easy reach of water carriage, but at the same time not likely to be submerged by inundations. Next comes the important question of choice of the variety of plants. As to this, experience in the Darjeeling Terai district has shown that nothing succeeds so well as the hybrid. This and no other must be selected, the seeds being obtained from some of the gardens situated at the foot of the hills. The ordinary methods of clearing, planting out, and general cultivation it is not necessary to touch on, as they are matters well known to every planter of any experience. But there is one point which must not be forgotten with regard to the climate, namely, that its great humidity and equable temperature will necessitate a slightly different treatment in plucking to that practised in India. There is hardly any doubt that when the tea plants have grown to a sufficient height to allow of plucking that the "flushes" will be almost continuous, and that tea may be manufactured nearly all the year round. This is an enormous advantage in one sense, and if properly worked ought to place the Malay States in the foremost rank of tea-producing countries. But there is a danger of too much plucking, and it is against this that even now we would give a word of warning. The moderate success of the Java gardens has undoubtedly been due in a great measure to this constant drain on the plant. It is absolutely necessary to check the growth, or let it rest occasionally, and to do this the plant must be allowed to grow without being plucked for at least three months out of the twelve, at the time

when the flushes are ascertained to be weakest. So much for the plucking. Now with regard to the extent of cultivation. This is a rock on which many enterprises have split in India, and we should be sorry to see the promoters of tea gardens in Johore come to grief from the same cause. The expenses of clearing the land, planting, and cultivation, will necessarily be very heavy, on account of the dearness of labour, and a return must not be expected within three years. That period of time must therefore be at once provided for as outgoing. We would therefore suggest that any one garden be not opened out to a greater extent, under any circumstances, than 200 acres. This will afford ample means of testing the full capabilities of the place, and will tax the resources of ordinary associations quite sufficiently. When that amount yields well the garden can be extended gradually in a way to leave a good interest on the capital from the balance between the returns and expenditure. Nothing like failure from exhaustion of capital must be risked, for the speculation, with care, is certain to be a success. If this is exercised, and Indian labour is allowed to be introduced, it will not be long before English markets have a good supply of tea from the Malay States. There is an ample field for it here, as well as in Australia, and locally. The demand for tea is growing all over the world, and as new countries are opened up, so will the consumption increase, especially for those kinds which are well grown and carefully manufactured.

AGRICULTURE IN TRAVANCORE.

(*Colonies and India*, 20th August 1881.)

Manufactures being few and insignificant, agriculture is the principal industry of Travancore. Almost every one secures for himself a small area of land, sufficient at least for the site of a dwelling, and small garden around it. Indeed, in some parts of Malabar there are scarcely any compact towns, each house being separate, and situated in its own grounds. Agriculture is carried on with some measure of practical skill and success derived from lengthened experience, but with most primitive instruments, and needing much improvement as to manuring, rotation of crops, and the preparation of produce for the market. With a view to national progress in these respects, two students have recently been sent by the native Government to the Agricultural College at Madras, who, it is hoped, will be able on their return to introduce more scientific methods of husbandry.

The principal native agricultural products are rice, coconut, and other palms and farinaceous roots for food, besides coffee, which is cultivated by European planters with the aid of native labour. Fruit-trees also are grown more or less by every one, and invariably planted as the beginning of an estate when waste land is cleared.

Rice is grown chiefly on irrigated or swamp land, though dry or "hill" rice is also grown wherever the soil is sufficiently rich to give a crop, and the rain sufficiently abundant to bring it to perfection. Most of the landed wealth of the country consists of rice or "paddy" lands, which vary greatly, however, in quality and produce, and consequently in value. The price of "paddy" lands varies according to the soil, facilities for irrigation, distance from the centres of population, and the returns they are capable of yielding. Some are worth only 30rs. to 40rs. per para,* others cost up to 70rs. (say, £24 to £56 per acre).

* A para of land is equivalent to from one-eleventh to one-eighth of an acre, according to locality. It is assumed here to be equal to one-eighth of an acre.

The Government compensation for rice lands taken for public purposes is only 14rs. per para. Land may be said to be worth generally about 15 years' purchase. The proper soil for rice is found in valleys or plains irrigated by water-channels, often with a supply for the dry season in a tank at the head of the valley. The varieties of rice suited to different soils and seasons are numerous. The produce of rice lands in Travancore ranges from fivefold up to thirtyfold. There is a popular complaint that the land is deteriorating and the return less than in former days, which the old people ascribe to diminished attention to sacred rites and duties, but which arises from exhaustion of the soil through want of proper cultivation. In the southern districts, where tillage is more careful and manuring better attended to, and the sun hotter, the clouds and rainfall being less, the increase has sometimes been known to be fortyfold; but farmers think they are well off with fifteenfold at each harvest—i.e. twice in the year—and throughout the greater part of the country seven or eightfold, or in the south twelve to fifteenfold must be put down as the usual return. Of course, in unfavourable seasons the crop may be almost nothing. As it costs at least two paras† of grain in wages to sow one para of seed, a return of at least three times the seed sown is necessary to repay expenditure. A tenfold increase would be 80 paras, or 32 bushels of "paddy" or rice in the husk. When cleaned of the husk, this is reduced to half the quantity—say 16 bushels—weighing on an average 64½ lb. per bushel when raw. Old rice would be lighter, down to about 59 lb. The produce, therefore, of an acre of good rice land may be averaged at 1044 lb. Paddy is usually sold at 12 chuckrams per para. The Government rate for commutation of taxes payable in kind is 7 chuckrams. When slightly boiled and beaten from the husk, the price is 32 chuckrams per para, or about 2½rs. per bushel. The total acreage of rice land under cultivation in Travancore is not exactly known, but a fresh survey and re-assessment are about to be undertaken. The survey of eighty years ago places it at about 400,000 acres; but since then much waste land has been brought under cultivation, and the total acreage cannot probably be taken at less than 500,000 acres. Whereas at the beginning of the century Travancore exported large quantities of paddy and rice (in 1843 no less than 281,000 candelies of 654 lb. each), and imported but a small quantity, the case is now totally reversed—exports being only about 70,000rs. to 80,000rs. in value, and imports (duty free) having risen from 4½ lacs of rupees seven years ago to 13½ lacs in 1879. The produce of the country is, therefore, not sufficient for home consumption at the present time. This arises not only from the diminished production already referred to and from increase of population, but also from the general improvement of the circumstances of the lower castes, who can now afford to eat more rice in place of, or in addition to, fruits and vegetables, coarse roots, and inferior grains.

Supposing the cultivated area of rice to be 500,000 acres, and the joint produce of the two crops fifteenfold, or 1,566 lb. per acre; this divided amongst a population of 2½ millions would give 312 lb. of rice per head per annum for consumption. Imported rice to the value of 13½ lacs of rupees would give (at a chuckram per pound) 15 lb. per head additional. The consumption in Ceylon of rice (and fine grain) is estimated at 5 bushels, or over 300 lb. per head, besides fruits, vegetables, and roots; and in Burma

† A para of seed is being applied to the para of land. 1 bushel.

"where the peasantry have enough and to spare," 507 lb. per head.*

The cultivation of the coconut extends over the whole of Travancore, which has hence been facetiously called Coconut-core! Forty-four years ago the total number of coconut trees was 11,100,000, and the increase since has been so considerable, much waste land having been planted with this valuable palm, that the present number cannot be estimated at less than 15 millions. These are almost invariably too closely planted to obtain full advantage of sun and air; but supposing they stood at the moderate distance of 20 feet apart (which is 109 to the acre), the area covered would amount to 137,000 acres. The soils best suited for the coconut are the sea-shore, the banks and alluvium of rivers, and level lands exposed to the sea-breeze; these conditions abound in Travancore. Inland on the mountains the coconut will grow, but not bear fruit. The young plants generally require watering for the first two or three years, and must be protected from the inroads of cattle until they rise some feet above the ground. Ashes are applied as manure at the beginning of the wet season, and the ground opened about the roots of the trees, which come into bearing some eight or ten years after planting. A coconut plantation is one of the most easily managed and most remunerative products of the country. The natives have but to put down the nuts and guard the trees more or less while attending to their other employments, and in due course a permanent and profitable plantation is created. Europeans, however, seldom attempt such an investment, and few who have done so have succeeded in it. For new plantations, waste lands are usually taken up. Within the last twenty or thirty years much land otherwise worthless has been reclaimed along the sandy sea-coast, and many trees have been planted on either side of new roads opening up into the interior. The price of 100 ordinary trees in the southern parts may be stated at about 400 rupees. These would produce, at a low estimate, say 2,400 nuts, value 34 rupees annually. The produce of the tree is very much dependent on soil and climate. The average of good trees in full bearing has been stated at 120 nuts in the twelve months, while in low and sandy soils it will amount to 200, and in gravel or laterite under 60. Ripe coconuts are quoted in the Trevandrum market list at somewhat under two rupees per 100. The kernels are dried into "copra" for the manufacture of coconut oil. The copra is largely exported to other parts of India, as well as the "coir" or fibre surrounding the husk, which is sent to Europe and America.

The annual value of the products of this palm exported—nuts, dried kernel or copra, oil and fibre—amounts to 42 lacs of rupees, besides oil, nuts, timber, and leaves for home use. It has been estimated that 60,000,000 of nuts and 15,000 candies of oil are annually consumed in the country. The timber is not exported, but split up and used for rafters, and the leaves are in great demand for thatching.

The trees are sometimes tapped for a few months to procure the sweet juice, which, boiled while fresh, gives a palm sugar, and kept a day or two till it ferments becomes toddy, a slightly intoxicating drink, somewhat like beer. The toddy also is distilled into arrack or native spirits.

Other palm trees are also cultivated. Next to the coconut comes the palmyra, which is grown only in the drier districts towards Cape Comorin. The pal-

* The quantity required for an adult living wholly upon rice is usually reckoned at 3 nāri, about 1½ lb. per day, or rather more. The Famine Commission states that a male 1½ lb. of flour is required for a man from half to a year.

myra, with its sweet sap and sugar. leaves, timber, and fruit, furnishes a living to a great number of the Thanar caste in Travancore and in Tinnevely. The number of trees in 1880 was about 6,000,000. It is probable that no considerable increase has taken place since, as old trees are in demand for their timber, and the slow growth of this palm discourages planting. From 160,000 to 24,000 cwts. of the sugar (jaggery) of this palm are annually exported, worth something over 3½ rupees per cwt.

The beautiful areca palm is planted in damp, clayey soil on the banks of tanks and rivers. Unlike the coconut it will thrive at a distance from the sea and on the hills. It is grown very largely in North Travancore, whence the nuts are carried to the south by Syrian and other traders. The trees will grow two or three feet apart. The areca begins to bear in five years, and continues to produce for twenty-five years. The nuts are sold wholesale at six or eight chukrams per thousand, and retail in Trevandrum at from eight to thirty-two for a chukram, according to season and demand. 3,500 candies are annually exported to Bombay and other ports, the value of which is about 4½ lacs of rupees.

Roots, vegetables, and fruits form a considerable proportion of the food of the population in Travancore. The forest and hill people dig out wild stringy yam-roots from the jungle as food in the hot season. Every native grows something, if he can, around his own dwelling for home use. The principal cultivated root crops are yams (*Dioscorea*) of various sorts, the small tubers of which are planted out in the beginning of the rainy season and dug again within a year. Some of these roots grow, under favourable circumstances, to a large size, up to four feet in length and one in diameter. Sweet potatoes, the root of a convolvulus, give good returns within three months after planting, and quantities of esculent arums (*Amorphophallus* and *Colocasia*) are grown in fields furnishing a large supply of food.

Tapioca, introduced from South America, is now largely cultivated in Travancore, and admirably suited for still more extended use. As the price of rice has risen of late years, tapioca has become the more essential as an article of food. It will grow in any soil, and needs but little care except to preserve it from the depredations of cattle. After the roots are dug, the stem is cut into pieces about 4 inches long and planted some 3 feet apart with a little ash or other manure. The root requires occasional weeding and earthing, and arrives at maturity in nine or ten months. Well boiled it is eaten with fish curry. It is sometimes given to cattle. In a green state the root does not keep long, but it can be sliced and dried in the sun, or grated and made into farina. A field of this valuable and nutritious root is planted at but little cost; its yield is very large, and its cultivation highly profitable. The produce has been estimated in Ceylon at 10 tons of green roots per acre: this weighs one-fourth when dried, and, if the dried roots gave half their weight of flour, it would amount to 2,800 lb. per acre. With some care and attention any amount of the granulated flour might be prepared for home use and export; but, though this plant grows almost wild, the people do not take the trouble to prepare it.

Other culinary vegetables are amaranthus, cucumber, brinjal, peas, &c. Fruits commonly grown are the jack, of which there are two or three millions in the country, guava, papaw, anona, pine-apple, and plantains in great variety. The spices grown are pepper, ginger, turmeric, and chillies. The exports of ginger amount to about 4 lacs rupees; of tamarinds 2 lacs; of turmeric nearly 1 lac; of pepper 3 or 4 lacs; and of coffee, from 4 to 8 lacs. Good crops are often obtained from sesamum and horse grain,

and much might be done in the production of fibres for cordage and papermaking.

The size of farms is various; three or four hundred acres is an estate of considerable magnitude, which not two in a hundred will possess. The lesser farms do not exceed from seven to fourteen acres, and are often considerably smaller; indeed, taking the average as given in the Sirkar accounts, we should only have about two acres as the extent held by every farmer. As was well put in the report on the former survey, "A farmer with three hundred paras of paddy land, four hundred coconut trees, fifty areca, and twelve jack trees, with vines yielding five or six tulams of pepper, will be in very easy circumstances; but scarcely twenty husbandmen in a hundred will have such property; indeed, the lower classes rarely possess sufficient rice land on which to support their family; they trust, however, to the produce of their garden lands to make up the deficiency."

MATHEINE.

(*Brazil and River Plate Mail*, 1st Sept. 1881.)

What is Matheine? It will not be sufficient reply to this question to merely state that it is a new drink, which, in the future, must take equal, and in some respects, even higher rank than tea, coffee, chocolate, and the other well-known domestic beverages that "stimulate but not inebriate" the imbiber. It is, in fact, so important an addition to our social resources that we feel it to be a duty to make a more particular record of its characteristic merits. To some of our readers Matheine will present itself as an old friend in another guise; for it is the product of a process discovered by Mr. A. K. Mackinnon, (who, in connection with the Kopf Company, has introduced so many new and excellent food preparations) from the dried leaves of the *Ilex Paraguayensis*, with which South American communities are so familiar under the name of "yerba maté." In the *Revue Scientifique* and other journals of Europe, public attention has been directed to the special advantages of this South American drink. It has been represented, and truly represented, as possessing all the cheering and refreshing properties of tea and coffee, without producing any of the unpleasant effects upon the nerves too frequently attendant on an over liberal use of these popular beverages. But the mode in which it is used is so opposed to established custom in our own and other countries of Europe that journalistic advocacy must have failed to bring it into general consumption on this side of the Atlantic. The common practice in Brazil and the River Plate, where it is extensively used, is to pour boiling water on some of the powder (consisting of dried leaves and twigs of the yerba maté shrub), and then to suck the infusion through a tube, which is passed from mouth to mouth, as the "calumet of peace," under certain circumstances, is said to have passed round a circle of North American Indians. This difficulty has, however, been altogether removed by Mr. Mackinnon. Matheine, which is in a liquid form, can be utilized with the greatest facility while it may be fairly described as a boon to the weakly and infirm, and of the utmost service to hardworking people in every grade of society. Professor Wanklyn gives the following analysis of this substance: Moisture, 6.72; ash, 5.86; soluble organic matter, 25.10; insoluble organic matter 62.32. Another analytical chemist, Signor Parodi, now resident in Buenos Ayres, gives a qualitative analysis, viz.: Cafetannate of theine, Cafetannic acid (free), Chlorophyll and Wax, Resin, Gum and Vegetable Albumen, Lignine; and the ashes contain Salts of Potash and Lime, Oxide of Iron and Manganese and of Silica. Another analysis demonstrates the presence of Theobromine, which is the active principle

in cocoa. However, we are bound to say that, up to the present no satisfactory analysis has been made. We take the following, as to its properties, from an announcement of the Kopf Company:—

We know that the infusion of this interesting shrub possesses the properties of tea, coffee, and cocoa. It is sedative and stimulant; prevents the waste of tissues; increases the activity of the brain, and hence is invaluable to brain workers; causes the secretion of milk, and, therefore, of great value to nursing mothers; this which shows its nutritive power is amply exemplified in the fact that the gauchos (native horsemen) undertake long journeys on horseback, at times as much as 60 and 80 miles in a day, with no other ailment but three or four maté cups of their favourite infusion.

To military men this substance would be invaluable, as it would enable them to undertake fatiguing marches better than any other beverage known. Sportsman, angler, and traveller would alike benefit by its use in lieu of strong alcoholic beverages.

To South Americans, not less than Europeans, Matheine should prove exceedingly acceptable. The yerba maté infusion, as actually taken by the former, namely, by suction through a tube with a perforated bulb, is liable to serious objection, as the finer particles are swallowed, and in process of time accumulate and form irritating concretions in the stomach, to the serious injury of the health of the individual. In its liquid form this is altogether avoided. We should add that the proportion is one to two teaspoonfuls to an average sized teacup of boiling water, with milk and sugar to taste.

FLAX CULTURE.

(*Sydney Mail*, 27th August 1881)

A resident in the Camden district writes:—"I have been requested by several farmers (some your subscribers) to ask you for information regarding flax culture. They are inclined to experiment in new crops, for ever since the failure of wheat in the district they have had recourse to growing hay, which of late has been bringing hardly a price to pay. The questions I would like answered are:—1. Do you think flax could be grown in this district with success? 2. Is there any demand for it in Sydney? 3. What prices would linseed, flax, and flax straw or fibre command respectively? 4. And what would be an average yield per acre?" In reply, we may state that it affords us great pleasure to hear that the Camden farmers wish to move out of the old over-worked furrows to seek new ground. Nearly all the information sought appeared in these columns last July, when we strongly recommended flax culture as suited to this colony. With regard to question 1, any fair soil upon which wheat can be raised will produce good crops of flax. A retentive subsoil is necessary, for flax likes moisture; but it is not so liable to fail from drought as cereal crops are. The Camden district should prove a good home for the flax industry. It does well in Europe, especially in Flanders, and has done well in England and Ireland. It may be grown on any good deep loam, but this must be finely cultivated. The soil must be thoroughly open, perfectly clean, and reduced to a fine tilth to produce payable crops, and this is a matter which is recognized by the farmers of older countries, where linseed and flax production is an important industry. The flax farms are like gardens, and from the first part of the culture to the last the crop is one which requires close attention and plenty of labour. When flax was tried in Victoria, where 30 acres of bushland were offered to those who attempted its cultivation, only 17 acres were placed under the crop, and these returned an average of from 8 to 17 bushels of seed and from 7 to 9 cwt.

of flax per acre. But the cultivation was crude. Flax has been tried in South Australia and proved moderately successful. Its career was checked by the intervention of the Government, who closed the mills on sanitary grounds; but now, as explained in past issues in these columns, the failure of wheat in South Australia has caused a reaction in favour of linseed and flax. Linseed culture is also undergoing a fair trial in Victoria. In Australia, as in other countries, the production of fibre as well as seed must be the rule to render the crop profitable. This was well explained by an Ulster man, recently, in the columns of a Melbourne contemporary. We quoted his comments at the time, but as it seems they have escaped the notice of some of our readers we reproduce them. He says that in the North of Ireland the flax-scutchers give the farmer £12 per ton for the flax, harvested and dried in the usual way and delivered at the mill. He puts the average crop down as two tons per acre, and the cost of erecting buildings, plant, &c., for an establishment capable of manufacturing £250,000 worth of fibre per year, at only £3,000. When flax was cultivated in South Australia, the price paid for raw flax with seed attached was £5 to £5 10s. per ton. The loss of weight in scutching is fully 50 per cent. Apart from the utilization and production of the fibre, the profits from seed production depend greatly upon the quality of the soil, the care in harvesting, and, last but not least, the demand. On good soils well worked as much as 20 bushels of seed to the acre may be obtained, but we fear there are few inland localities in this colony will yield so much. On the coast, where the river flats are rich, good crops might be raised. The value of seed at present in this city is £16 per ton, about 8s. per bushel. An old colonist recently contributed to the July number of the *Victorian Review*, a paper well worthy of attention, on flax-growing. In this he says:—

“When cultivating the plant I have sown flax seed after grass, after wheat, upon new land, and upon land under fallow; or rather, instead of fallowing, strictly speaking, and allowing the land to lie idle the whole year, flax seed has been sown in the spring, and wheat the following autumn. When sown on new land or after grass, one ploughing only has been given, immediately preceding sowing; but after wheat or other grain crop the ground has been ploughed deeply as early as possible, and again in the spring, with repeated scarifying and harrowings, so as to get the soil into the finest possible tilth before sowing the seed. Having got the land in proper order, sow two bushels of clean linseed; that quantity per acre gives fine flax and good seed. The ordinary linseed of commerce is not the seed from which the finest flax is raised. Flax seed is imported yearly into Ireland from Riga (in Russia) and Holland, for seed purposes; from the former it comes in casks officially sealed as being true and good. The land should be sown (the reverse way to the last harrowing) broadcast and as evenly distributed as possible, then harrowed over (the same way as sown) with a very light grass seed or brush harrow, finishing off with a light rolling carefully, and if this can be got through while the land is dry and friable so much the better. The time of sowing, as early as possible in the spring of the year. No fixed dates can be given; the intelligent cultivator will be guided by his experience of the locality and nature of soil. As it is sown thickly, so it springs up, and the rapid nature of its growth, in this country, does not allow weeds to interfere, if the land is moderately clean. The proper time to commence pulling the crop is when the leaves begin to fall from the plant, and the stalks are nearly all yellow; experimentally, it has been pulled at various stages,—when quite green, partially so (as is the Irish plan, by which they lose the seed), fully ripe, and when

nearly so. The latter is found to be by far the best practice, having regard to fine fibre and good seed.”

There is a market in Victoria for the flax fibre. One manufacturer is prepared to take 100 tons annually, and give from £30 to £40 per ton for it.

HORSE-BREEDING IN WESTERN INDIA.

(Asian, 13th September 1881.)

A valued correspondent who has had some years' experience on the subject, has written to us regarding horse-breeding in Western India; and as the subject is an important one, we will let him speak for himself. He writes: “I propose to offer my opinion in reference to the breeding of stock in the western parts of India. You have made an impression on me and my mind of horse breeding in that part of the country from a paragraph in your columns lately. Erroneous conclusions have been drawn by other people that the quality of mares in these provinces have been overrated; and, as further change will probably take place by the opening up of the line of railway through some part of these provinces, especially that of the Rajputana State Railway from Ajmere to Palampur, I think those who may pass that way should take the opportunity to see some of the mares and stock in those parts. I have but little doubt that they will say that they have not been overrated, and it would afford me much satisfaction to discover that horses from this part of the country were distributed over a larger compass than they are, and if so, whether the Government of India would not then discover a new source from whence to get a supply suitable for the artillery and cavalry remounts without costing so much money and waste of time as the present system has led us to. The present mode of purchasing horses appears to me an hazardous undertaking, and often very disappointing to the Australian horse importers, inasmuch as from some batches of these horses I have seen lately, I say they have greatly improved. Yet I have seen some of these inspected and turned away, and sold to private individuals, who, in the course of six months, have profited considerably by their purchase. The quality of these imported horses, as I have seen from my personal examination, is much improved, and they are, to all appearance, better bred and more active than formerly. The best representatives come to Calcutta, yet there are often good mares rejected which would suit well for breeding purposes, as it is difficult to procure good mares for this purpose. These should be purchased and sent to the Government depôt for breeding purposes, and then I venture to suggest these Australian contractors would, in time, benefit the country. We should also furnish proper stallions to mate with them, and not some of the sort I have seen, which are likely to disappoint us, and I believe have done so. These are errors which should not be overlooked, for the business of breeding is expensive, so let us try and lay down the foundation for a new branch in this line. I will temporarily relieve myself from giving you further particulars of my opinion about a system which does not immediately concern me, as I might be told by some of the officers who conduct such matters that I know nothing at all about it. I am, however, a bit in the horsey line! To return to Ajmere, the terminus of the railway I have mentioned. I believe I am correct in saying some one has resolved to establish a breeding depôt near that station, and I am not surprised at it, and I hope they will succeed. For, be it known, in the western parts of India the climate is so well suited for the rearing of stock, as I have proved, that I believe the Government of India have, from experience, at last, found this out, for I notice there are two or three stallions located there, one of

them a fair specimen to breed from. It is possible, I suppose, to trace the breed of the horses and stock in Rajpootana, and its varieties from which they were formerly raised by the native Princes, and I have heard such names as Kuch Bhuj, and Thulla mentioned, and that they were considered the finest horses in India for military purposes years ago; but that great injury was done to these breeds which had not been repaired until this past eight or ten years. It is quite easily conceivable to those with any knowledge of horse flesh that these animals are particularly well framed, with good knee action, very powerful, and will stand any amount of hard work, as many have been convinced when traveling by dawk through part of the sandy country. I have seen a team of four walers actually give it up after a few miles when three country-breds, we will call them Marwarce ponies, in comparison to the walers being on such short legs, attached to the same carriage would go on twenty miles without hardly a halt. I believe something similar to this occurred when one of these native Princes had the honour of a visit from one of your late Viceroy's who was riding behind some of his own slashing looking walers, which had to be taken out to enable His Excellency to complete the journey, behind the horses reared and bred in Western Rajpootana. We see and hear of many gentlemen who yearly pay visits to the fairs of Pokhur and other places, and purchase cheap nags, which have found their way into some of your native cavalry regiments about the North-West Provinces, and which look more inviting and fit for hard work than those alongside of them on parade. It should, however, be known that these gentlemen visiting these fairs do not get the best breed horses, or of ages much beyond three, and in many cases younger horses which are sent to these fairs are not fair specimens of the Marwarce horse, and are sent often because considered of no practical value, and oftener, because religious duties or village disputes are urged as an excuse to get rid of them, and to settle matters. This is not, however, the case with the horses reared and bred solely by the native princes, who positively decline to sell any that have been reared from their own known breed and stock, however profitable it might be to them, and consequently a great number have accumulated. An accurate register of these I could never procure, but that they are the best and most uniformly shaped class of country-bred any one would wish to see, except, if one considers it a defect, that of the peculiar position of the ears, or I might say curve or twist at the point of the ear, and the carriage of their necks, which I think should be thought altogether unworthy of notice in selecting horses for cavalry purposes. We cannot obtain horses of certain shape and form to the perfection many would like to see them, so that I have come to the conclusion that you were perfectly right in your remarks in stating this subject of breeding was receiving a temporary check just at the very time when everything should be done to encourage, and nothing to disgust. Other wise these horses, however excellent, will not be made use of, when the time might come that we should require them. The native Princes are not so easily moulded into new habits; they have, however, transplanted, with their own Marwarce breed, horses and mares that will, I hope, again and again be bred from, and the breed be more improved, as they have spared no expense in procuring animals. I regret to say that a serious loss has happened to these States by the death of the valuable stallion "Crown Prince," whose shape and make we all well remember, with undeniable blood, when we saw him at Delhi during the assemblage. There are, however, a few others of the right stamp for breeding purposes, notably "Euro," of English parentage, but bred in the colonies, and "Cock-

a-Hoop," the former being by Lucifer out of Zenobia by Kingston, and the latter by Victorious by Newminster out of Mother Carey's Chicken by Declare. In fact, the Maharajah of Jodhpur has the most useful selection of horses and mares of all breeds collected together by any single person in India, some of which would greatly surprise your horsey men had they the opportunity to ride behind them in carriage, or on their backs out a pigsticking, or for a long tedious journey by road."

SUGAR GROWING AT PORT MACKAY, QUEENSLAND.

(*Sydney Mail*, 27th August 1881.)

Before entering upon a description of the sugar mills and the processes employed in the manufacture of sugar, it will be well to glance at the capacity of the Mackay district for the growth of the sugar-cane, and afterwards to offer some remarks on the climate. And in order the more effectually to do so, I shall have to present your readers with a few statistics, which I have gathered from official sources, as well as from gentlemen in Mackay whose experience and position render the facts given highly trustworthy. These will help to demonstrate how far Mackay is to be regarded at present as the greatest sugar-producing district in Queensland. No figures, however, will adequately convey the impression which only the face of nature is fit to produce; so much does the eye take in that defies calculation to give, and statistics, after all, are only approximately true. The prosperity of a district may be tolerably well-known from the high social condition of the town, and Mackay may be cited as a good example in proof. It is however necessary to place before the reader a few facts that will show this in other ways.

A ride across the country opens the observer's eyes to the richness of the land, which he sees spreading out in broad plains and gentle hills, backed by an uneven line of forest-crowned mountains in the distance. That the soil of the district is capable of profitably growing sugar-cane was proved as long ago as 1864, when Mr. J. Spiller began planting on the banks of the Pioneer. His example was soon followed by others, who were only waiting for signs of success. From that time to the present there has been a rapid increase in the manufacture of sugar, while elaborate machinery, capable of producing 14,930 tons, has been successively erected within a short distance from town, mostly on the banks of the river; and, now, attracted by the fame of the district, the Colonial Sugar Company, with a capital of £250,000, have commenced work at a place called Homebush, and will plant cane this year. This accession of strength will enormously add to the sugar-producing capacity of the district, and will doubtless induce other companies to do the same, for only a very small proportion of the country is under cultivation.

The extent of land under cane last year is set down at 6,678 acres, to which another thousand acres must be added up to March of this year; it is now probably much more. Of this, 5,486 tons of cane were crushed, yielding 9,470 tons of sugar, 287,250 gallons of molasses, and 8,617 gallons of rum. The probable yield of sugar during the present year, according to good judges, will be between 10,000 and 11,000 tons. But this inadequately represents the capacity of the Mackay district, for there is now within a distance of 25 miles from the town of Mackay, mostly in the hands of people able and anxious to grow cane, but debarred from doing so by the want of a market for it, over 160,000 acres beyond the acreage now under cultivation, equal to the production of at least 60,000 tons of sugar over and above the 23,310 tons which

the present cultivated land should yield. In addition to this, in the whole district, under exactly the same climatic influences, and with a soil similar to the land now being worked, there are at least 500,000 acres more, within easy reach of navigable waters, which would produce, after every reasonable deduction, at least 125,000 tons more sugar per annum, which added to the capacity of the alienated lands would bring the entire district up to 200,000 tons per annum, at what is regarded as a very moderate estimate of its capacity; and this in a district proved by 14 years' experience to be exceedingly well-adapted for the production of first-class sugars, at a cost, say, of £12 per ton on board ship.

The capacity, therefore, of this district for sugar production appears to be much greater than has hitherto been recognised. What hinders sugar progress at present is the want of one or more firms, who would meet the demand for milling power by erecting in the most suitable localities, mills which, commencing with a production of 200 or 250 tons per annum, might be increased by adding to their power, with the increase of crops, up to a production of 1,000 tons each per annum. One such mill, it is said, by the use of Mackenzie's ejector pan, could be started at a moderate cost, and it is confidently asserted that such a mill could, after the first season's operations, be worked on such a scale and at such a cost as would ensure a return of from 20 to 40 per cent to shareholders.

The sugar mills in the district gradually increased in number from the time (1868) when Mr. Davidson erected his first mill, to 17 at the present time, all of which are in full work, and just able to cope with the cane grown. A very large mill, capable when finished, of producing 2,000 of sugar in a season, is now being erected at The Palms, under the superintendence of Mr. Donaldson. It is owned by Messrs. Sloane, of Melbourne, who have other property in the neighbourhood, and will eventually be fitted with two vacuum pans, besides all the latest improvements in sugar making. Of the mills at work, the most complete and admirable in all respects that have as yet come under my notice are those at the River Estate and at Pleystowe, the former owned (along with the Pioneer) by Mr. Spiller, and the latter by Messrs. Hewitt and Co., over which I was courteously shown by their respective managers. At the River Estate mill, this month, an influential company of ladies and gentlemen assembled, at the invitation of Mr. H. Brandon, manager of the A. J. S. Bank, on behalf of Mr. J. Spiller, who is at present absent from ill-health, to witness the christening of a locomotive engine to be used on the railway constructed on the estate, as well as to see a trial made of Siemens' electro-dynamic machine, recently put up in the mill for illumination with the electric light. The christening ceremony was performed by Mrs. H. Brandon. The railway excursion among the cane fields up the hills was highly interesting and successful; and when the electric light was first put in action, the astonished kanakas excitedly exclaimed, "No more night—all now same as day!" At the close of the proceedings, the company were entertained at lunch at the house of the manager, Mr. Percy Crees.

With regard to the amount of sugar manufactured in the district from the commencement to 1878, I find 33,700 tons given as an aggregate yield. Since then we have 6,928 tons up to the end of March 1879, and 9,470 tons to the end of March 1880. This quantity, added to the 11,000 tons expected as the return for 1881, makes a total of 61,098 tons of sugar produced in the Mackay district from 1868 to the end of the present year. In three years it is anticipated that 20,000 tons will be the annual product of the district from existing mills, and in manufacture this

sugar will require 240,000 tons of cane. But with an estimated capacity of producing 200,000 tons, (some say 250,000 tons) it will be seen what an immense room still remains for further industry.

I am not yet in possession of estimates of value but those for 1878, during which year the export-value of sugar, molasses and treacle, golden syrup, and rum manufactured in the district of Mackay amounted to £168,036, of which £155,682 was for sugar. Other exports swell this sum to £193,491.

As all the mills are now furnished with centrifugals, and generally with vacuum pans, the sugar manufactured is of a very superior quality, and commands a price at the port of from £21 to £28 per ton; it varies in character from fine household crystallised white to different shades of rich yellow. Three qualities are generally made at each mill, but the varieties produced in the district are very numerous, it being found impracticable as yet to maintain perfect uniformity of character for any length of time. As far as my own experience goes, the white sugar, or that which is first turned out of the centrifugals, is as good a household article as could be wished; though for certain purposes, such as preserving fruit, the highly refined sugar of the Colonial Sugar Company is indispensable. It is, however, remarkable that in the very place where it is made, its retail price should be from a halfpenny to a penny per pound more than in the Sydney market.

With regard to the yield of sugar per acre, it is often very difficult to arrive at accurate results. Want of experience, the use of imperfect apparatus and a disastrous cane disease, have operated against ascertaining what are the capabilities of the soil, and the comparative productiveness of the various kinds of cane in cultivation. For Queensland generally, the yield, estimated for the ten years ending 31st March, 1879, was 25 cwt. 3 qrs.; and for Mackay 27 cwt. 0 qr. 23 lb. Considering the disadvantages above enumerated, this must be regarded as a prolific yield, being much higher than Jamaica and India, and but little below that of Java. But this estimate is much below the one I formed at the plantations, where 32 cwt. per acre appeared to be nearer the truth. In some instances 2 and 2½ tons have been taken off, but this must be looked upon as too exceptional a yield to be held up as a fair sample; yet, in so admirable a climate as this is made out to be, it is highly probable that with improved methods of culture the produce may be kept at near two tons. It must be remembered that at Mackay (and generally in Australia) no manures have yet been used to enrich the soil; while in other countries this is an expensive item, and tells heavily in the cost of production.

So fertile is the soil at Mackay that the planter may go on for years reaping crops which seem inexhaustible, but this fertility cannot last for ever; the soil, to be kept in vigour, must have that restored to it which has been taken away; and it would now be well for planters to store up manure for the evil day that is sure to come.

The amount of rum produced in the three distilleries of Mackay during 1880 was 88,604 gallons. The respective plantations distilled as follows:—Alexandra, 24,122 gallons; The Kowai, 24,428 gallons; Pleystowe, 24,054 gallons. The latter bears a high reputation in the market.

A comparison of Mackay with other sugar-producing districts of Queensland, gives it greatly the advantage. A few figures will show what I mean. In 1880, Cardwell yielded 525 tons of sugar; Maryborough, 4,157 tons; Bundaberg, 619 tons; Brisbane, 850 tons; Logan, 2,150 tons; while Mackay, probably owing to its superior climate, gave no less than 7,263 tons, its yield per acre being also higher.

The small planters, of whom there are a good many

in the district, and who have almost entirely abandoned growing maize in favour of sugar-cane, sell their produce to the mill-owners. The price paid is 11s. per ton for cane yielding juice having a density of 10. of Beaumé's saccharometer, the millowner cutting and carting the cane; or 10s. per 100 gallons of juice at 10° Beaumé. This is considered good payment, and the selectors are anxious now to grow cane to the exclusion of almost everything else; but there are many influences which cause the price to vary.

SHEEP.—In the year 1788 there were only 29 sheep in Australia; at the present time there are no fewer than 62,000,000.—*Indian Agriculturist.*

THE TOAD destroys from twenty to thirty insects in an hour, and the mole is continually destroying grubs, larvae, palmer worms, and insects injurious to agriculture; no trace of vegetation is ever found in its stomach.—*Ibid.*

GAS TAR.—An American farmer says that a gill of gas tar mixed in a pail of whitewash, and applied with a brush to the houses and roosts of poultry will destroy or drive away any lice that may infest them. This is easily tried and has the merit of doing good, whether in the direction intended or not.—*Ibid.*

BEES.—Indiana reports of the bee industry for 1879 (the latest given) show 145,327 colonies, yielding 1,107,627 pounds of honey, or 8.18 pounds per colony. The season was regarded as yielding only half the average annual produce. Lake stands at the head of all the counties, with 59,984 pounds of honey.—*Ibid.*

WATERING WITH SOLUTION OF IRON.—We learn from several agricultural journals that by watering plants with water in which sulphate of iron has been dissolved, most extraordinary results may be obtained; beans for instance will grow to double their size, and acquire a much better taste; the same is the case with pears and other fruit. Water kept in a tub with a quantity of old nails in it may also be used for watering with good effect.—*Ibid.*

MAIZE.—Paris, 13th Aug.—Messrs Porion and Mehay have discovered a means by which the residue of distilled maize can be employed either to fatten stock, or act as a manure, besides extracting an oil suited for the manufacture of soft soap. The plan rests on the well-known fact, that the oil contained in the grain, remains constantly fixed to the undissolved solid parts, and the azotised matters rest also for their greater portion similarly united. The composition of the cake prepared, exhibits but slight variation, and can be used in the end, either for food or a fertilizer; 2 cwt. of the refuse yield 6½ lb. of a colored oil, and 22 lb. of feeding cake. M. Ladureau of Lille has tested the products; in point of aliment, these products are equal to good linseed cake, and as a manure are on a par with groundnut refuse.—*Madras Mail.*

COTTON.—A single discovery has been made by accident in connection with some experiments upon cotton seed, which may have a widely extended influence upon agricultural operations. With a view to ascertain the situation of the oil-cells in the cotton seed, Professor Thomas Taylor, the microscopist, was requested to make an investigation, and he found that one row of these cells constitutes a protection to the germinating point. The Professor resolved further to ascertain how far these defences protected the embryo from agents usually destructive of all organic life. In using sulphuric acid, he found that one result was completely to remove the adherent cotton, so leaving the brown shell of the seed clean without being visibly affected. Some of the seed that had been thus treated was sown, and, to the surprise of every one, it came up at least five days earlier than the seed in its natural state. Several experiments were subsequently made, which confirmed the fact that the treatment with sulphuric acid stimulated the vitality of the seed. The gain of five or six

days' start in the avoidance of early frosts or in the raising of early cotton, for which premiums are offered in some of the Southern States, cannot be over-estimated. Another advantage is that owing to the cotton hitherto adherent to the seed, the sowing has had to be broadcast, which has been very wasteful. Now the clean seed can be sown by means of a drill, with the result of producing a regularity of growth which will tend greatly to facilitate the subsequent cultivation. The Americans are shrewd enough to apply this treatment with sulphuric acid to other seeds slow of germination. And we cannot but think that our English agriculturists will take advantage of this suggestion. If we have no seeds, like the palm, which take three years to sprout, at any rate there are frequently seasons when the power to hasten a natural operation will be an immense advantage.—*Indian Agriculturist.*

LOCUSTS.—Mr. Burrows, the purser of the steamer *Alvo*, tells a sad story of the plague of locusts now spreading starvation in the agricultural districts of the Columbia. He says that between Carthagena and Barranquilla the lands were as utterly barren of live vegetation as though some great fire had swept through them, burning and blasting everything in its track. "The once magnificent groves of coconut trees were to be compared to nothing but a forest of bare poles, without a single green twig or leaf. Millions upon millions of locusts filled the air like great clouds, and the atmosphere in some places was quite hazy in consequence. The ground presented a remarkable appearance; and as the train travelled along, the insects were so thick that they looked like small yellow waves as they jumped up and down. Not a stalk or a blade of grass was any where to be seen. The locusts alighted upon us until our clothes were covered with them. When we tried to remove them, they showed their ravenous condition by attempting to bite our fingers. The farmers are in a state of terror, as they are perfectly helpless before the plague."—*Madras Mail.*

TOBACCO.—The quantity of tobacco consumed in the world must be enormous. Some curious statistics relating to tobacco smoking in France appear in the Belgian *National*. It appears that there are 5,671,000 smokers, each person smokes an average of 9½ a year. For every fifteen smokers, eight smoke pipes, five cigars, and two cigarettes. The total consumption of cigarettes is estimated to be 294,000,000,000 per annum, that is, 800,000,000 a day, 33,000,000 an hour, 550,000 a minute, 9,166 a second; finally, if all these cigarettes were placed end to end they would reach 514 times round the globe. This is for France alone, and we imagine there are countries where more tobacco is used than in France, Germany for instance. France makes a considerable profit from the monopoly she enjoys in connection with tobacco, and there is no valid reason why tobacco should not be heavily taxed. It is clearly a luxury, and not a very good one at the best. The question of making this article a monopoly in India has often been discussed, and has invariably been laid aside on account of the difficulties attending the administration of such a monopoly, and because of its being looked on in India as a necessity of life. We do not see much difficulty, provided the several native Governments would likewise make its cultivation subject to such rules as control opium cultivation. Its universal consumption, which is urged against the proposal, is, in our opinion, the very reason why tobacco is a suitable article for monopoly. Excepting salt, it is the only article on which a tax would be of universal application, and it would enable the Government to lighten that on salt. This latter, although very light, is open to the objection of being a tax on a positive necessity of life.—*Friend of India.*

THE DEADLY LINDEN.—A St. Louis physician says the linden tree is dangerous to health, being like the deadly upas tree of the east. The St. Louis doctor has been making investigations, and he says: "Just in the spring, when the sap was about to rise, I wounded my trees in several places, and collected the exuding gum carefully. I found in it a new and singular alkaloid, to which we gave the name of 'lindoline,' and which fully justified my fears. It is a most deadly poison—somewhat akin to the curare or wooreli poison of South America. A very small inoculation upon the skin of a cat, made with a needle simply dipped in the lindoline, killed the animal in eighteen seconds. It acts as a nerve excitant of great power, and has a real value in the materia medica as an antidote to morphine poisoning and other cases of that kind; but it must be greatly diluted in order to do anything of this kind, as it is intensely virulent. I am quite sure that a pinscratch touched with lindoline would kill a man in a couple of minutes. Of course, like all poisons of this kind, it is not one-tenth as effective in the stomach as when inoculated, still even there it is deadly."—*Madras Mail.*

THE MORETON BAY CHESTNUT IN THE DARJEELING TERAI.—SIR,—The plants of the Moreton Bay Chestnut (*Castanospermum australe*) at Bamanpokri (Darjeeling Terai), three in number, have this year flowered for the first time. I send you a bunch of flowers herewith. They grow like the jack fruit on small special branchlets on the older parts of the stem and branches; but these special branchlets seem to produce no leaves. I would have sent you a better specimen, but that I want to procure seed in order to raise more seedlings of the tree. Two of the trees which are closest to the oak plantation, and are thus in the shade, seem to be dying slowly; whereas the other, which is about 60 feet distant, but well exposed to air and sunlight, is in a flourishing condition. At page 34 of your list of "Trees, Shrubs, &c.," you state that 1869 is probably the date on which these trees were planted. I should be glad to know if in its native habitat the *Castanospermum australe* flowers at so early an age as eleven or twelve years. I fear this early flowering is an indication that the tree is unable to adapt itself to the climate of the Terai.—F. B. M. NOTE.—It is a handsome orange yellow flower, resembling that of 'Cassia.' We cannot say whether flowering at an early age is the characteristic of the tree. Perhaps some of our readers can help us.—ED.—*Indian Forester.*

TOBACCO.—Since the commencement of tobacco growing by the Government, and more recently by the enterprising proprietors of the Poosa Farm, with a view to prepare the weed for European consumption, much has been done. We learn that 13,723,660 lb. of tobacco, worth only £126,322, were exported from India in 1878-79. In the following year a less quantity was exported, but the total value had slightly risen. This would seem to indicate an improvement in the quality of the exports. The fact that the value of non-Indian tobaccos has been falling during the interval, puts the prospects of the Indian trade in a still more favourable light. The few who have really studied the subject know that, in the estimation of London agents and merchants, the Indian leaf only requires the labour of skilled curers to compete successfully with the produce of America and the Manillas. The native agents here are the persons who are chiefly responsible for the abominably bad way in which the leaf is prepared. This shows clearly that the general quality of Indian tobacco is improving. The recent withdrawal of the Spanish Government from the Manilla monopoly should further advance this trade, and if only the native growers would procure good seed, and bestow more attention

on curing, there is no reason why Indian tobacco should not be equal to the very best in the world.—*Friend of India.*

TEA-BUG.—The following telegram from Mr. J. Wood-Mason to the Chief Commissioner of Assam, and dated June 8th, 1881, is extracted from the *Assam Gazette*:—Have discovered by observation of specimens of this formidable pest kept in confinement that the female deposits her eggs singly in the substance of the tenderest shoots of the plant in the *internodes* or portions of the stem between the pekoe and the two or three leaves succeeding from above downwards, and in the buds developed in the axils of plucked leaves and in the parts thereabout; that the presence and position of each egg is from the first indicated on the exterior by two unequally long glistening white bristle-like prolongations of its shell, and later by discolouration of the point pierced. Have discovered by dissection that she is provided with a serrated ovipositor of the shape and sharpness of a sabre, wherewith to pierce holes in the soft tissues of the plant for the reception of her eggs. These observations have been verified in the field upon numerous blighted bushes; but, though eggs have readily been found by the unaided eye on blighted portions of bushes, not a single one has yet been seen on any perfectly uninjured shoot. The vigorous and unremitting plucking of the blighted portions of bushes might mitigate the evil, and I would suggest that this message be sent to newspapers, and published in the *Gazette* for general information.

QUEENSLAND—At Oxley Point reserve plantations of red cedar (*Cedrela Toona*) have been successfully established; the young plants are now from 3ft. to 6ft. high. A large number of seedlings have been distributed gratis to intending planters; "applications varying from 20,000 to 2,000" have been received. The varieties of sugar-cane in the Oxley-reserve have thriven exceedingly well; many new varieties have been received during the past year, making in all 78 new varieties which are under successful cultivation. The director, has considered the sugar-cane an object worthy of his special attention on account of its great commercial importance. Rice from British Burma and from the Madras Presidency has succeeded. Surprise is expressed at the indifference shown by colonists to the special inducements offered by the Government to those wishing to go into coffee cultivation. The garden possesses a large stock of seed and plants ready and available for such cultivation. The Moresby Ranges are specially pointed out as adapted for the culture of coffee, cocoa, and several spices. Applications have been received for tea, but they are chiefly from abroad. Large numbers of seeds and plants have been distributed during the year, and no less than 104,000 cuttings and roots, chiefly of economically useful plants. The Mango, the Jack fruit (*Artocarpus integrifolia*), the China date plum (*Diospyrus kaki*), the Alligator pear, the Cherimoyer, the sweet sop, and the oval kumquat have all fruited abundantly, showing their perfect adaptability for culture in Queensland, but more especially in the northern portions. "The American and other varieties of grape vines from this establishment, distributed to Toowoomba, Warwick, and Stanthorpe, have yielded large quantities of superior-flavoured fruit, adapted for both wine manufacture and the table, proving to be a valuable addition to the many varieties already in cultivation here. During the late season I visited the majority of the principal vineyards, with the view of satisfying myself as to the existence or not of the *Phylloxera vastatrix*, and I am happy to be in a position to report that without exception I found every vineyard I inspected perfectly free from not only this pest, but from any disease whatever."—*R. B. Gardeners' Report.*

LIBERIAN COFFEE: WYNAAD NOTES.—It is worthy of note that, as far as can be at present judged, the Liberian coffee planted in Wynaad is entirely free from leaf-disease. The ordinary variety is beginning to show the usual golden tints to a disheartening extent, and some young West African plants, strong and healthy to all appearance, are, I regret to see, becoming affected. But the young Liberians raised in the same nursery are firm, green and healthy, without a speck. This is very encouraging, and will make the cultivation of Liberian coffee a matter of serious consideration to those who still believe in coffee. But King coffee is growing old in Wynaad. It is the opinion of many that his day is past, and that he must now give place to the more lucrative cinchona, or the speculative gold mine. It is certain that, in a few years' time, the appearance of the country is bound to become entirely altered. The hill sides will be thick jungles of cinchonas, and reefy patches will either be peopled by busy miners or (more probably, say the dubious) show ghastly holes and caverns, telling of failures, and proving that "all is not gold that glitters."—*Madras Times*.

TEA CULTIVATION.—As competition for labour in some of the tea districts, is becoming keen, from the difficulty of finding labourers, the *Indian Tea Gazette* asks why a Company should not be formed, aided if possible by Government, to buy up waste jungle land not yet cultivated, in the neighbourhood of the gardens, and help the people to emigrate to it from the more thickly populated districts of Bengal? Our contemporary thinks that the scheme might, and probably would pay, provided only that the people could be persuaded to emigrate, as the land in many cases would be suitable for rice crops, when it would in the course of a few years become very valuable; or, if it were unsuited for rice, it might grow sugar-cane, while the timber on the land should nearly if not quite pay for the cost of clearing. It would, of course, be an immense boon for planters to have a resident population around them, for one of the most tiresome, and in many cases expensive matters connected with the tea industry is the importing of laborers to work a garden. The people, however, seem loath to move, and appear to prefer abject poverty in their own district to comparative comfort in a land not far removed from their home, but still, to them, a strange one.

LINDULA, Sept. 14th.—Weather all that can be desired. Most estates busy planting out cinchonas. Crop beginning to ripen up. Coolies not plentiful; advances given out freely. Leaf disease has almost disappeared. If it comes as rarely every year, I do not think it will affect future crops, as the trees are getting fresh leaves in a most surprisingly short time. Trees with crop on look healthy and strong. Grub is not spreading. There is less of it in the district, as far as the appearance of estates goes, than we have had for the last four years. The beetles and grub do not travel from east to west, but west to east. When they have got to the end of the coffee due east, they attack south. Will anyone deny this? Grub will disappear as it did before. Old planters' tell me it was bad in one or two districts about 35 years ago, but afterwards disappeared. Again they came about 18 years ago and again died away. We have them again, and it is quite reasonable to expect that in another couple of years the words "white grub" will be in no one's mouth. Our roads want thoroughly doing up. If you travel from the Agras as far as Kotmale, you will not find more than four very small gangs of coolies. This is more like the years in which we used to get lots of rain in September. Coolies are, as a rule, very healthy. No thanks to the doctors, for we never see them. The Medical Ordinance must be revised. This will be one of the most important questions for the new plant-

ing member to bring forward. Mr. R. A. Bosanquet's name is talked of as the right man to be sent to Council. Just had a small washing of coffee. It turns out between 70 and 75 per cent. This I consider very good for the early pickings. Cinchona trees "shaved," and no covering used, feel the effects of continual rain. The side facing the south-west turns black, and, if the tree is not a large healthy one, it dies. Only in very exposed places they die. If there is a little shelter from the S. W. they do well.

THE VARIATIONS OF CLIMATE IN HAPUTALE, CEYLON: 11th Sept.—The weather reports for August, sent you from Haputale, have been so conflicting that the enclosed weather table, as registered by six estates, proves that the reports sent you from the various correspondents were strictly true, although by no means applicable to the whole of Haputale. Steady rain from late last night till now (2 p. m.), and appears pretty general over the whole of Haputale.

Aug. 1881.	Elevation about 2,200	Elevation about 1,400	Elevation about 2,200	Elevation about 3,400	Elevation about 6,100
2	...	Drizzle	Shower		Rain
5	Lt. shower				Hy. shower
6	do				
7	do	Lt. rain			Rain
8	do				
10					Lt. rain
11	do				
13	do			Shower	
14	do			Showers	Hy. shower
15	do			do	Showers
16	do				Rain
17	do			Shower	
18	do			do	Drizzle
19	do				do
20	Hy. shower	Drizzle	Shower	do	do
21	do	Rain	do	Gentle rain	Rain
22	Lt. showers			Showers	Rain
24	Showers				Hy. shower
25	do			Lt. showers	Shower
26				Drizzle	
27	Lt. shower				Rain
29				Lt. shower	Shower
30				A few drops	do

Under Govt. Road, Lemastota. Kanda-pola end. Under the Pass, Wiharagalla. Highest coffee estate in Haputale.

Aug. 1881.	Elevation about 3,100	Rainfall August.	July Rainfall	June Rainfall
5	Lt. rain	0.31		
7	Lt. shower	.15		
9	do	.01		
11	do			
12	do			
13	do	.27		
14	do	.06		
15	Lt. rain	.01		
16	Showers			
17	Rain	.45		
18	Showers	.03		
19	Rain	.09		
20	Shower			
21	do	.25		
22	do	.11		
23	Shower			
24	Lt. do			
25	do	.10		
26	do	.02		

1.68 0.59 0.59
Total...2.86

PLANTAIN FIBRE.—There appears now no doubt as to the suitability of plantain fibre for paper manufacture. The Bengal Government is encouraging the cultivation of the wild plantain for the purpose, and

Dr. King has recommended a trial shipment to the London market to make its value known to English manufacturers. The wild plantain, and for the matter of that the cultivated sort, the fruit of which, both ripe and unripe, is consumed by the masses in this country, grows luxuriantly on the hill slopes, and the fibre might be a source of additional profit, for the tree annually dies down, and the fibre is simply thrown away. The plantain, according to Laborie, is largely cultivated on coffee plantations in Domingo as a shade just in the manner that cinchona is now put among tea and coffee trees.—*South of India Observer*.

COLONIAL FISHERIES.—Your recent notice of Mr. Musgrave's work on the "Fishes of Jamaica" should induce circulars being sent to all the Colonies to contribute information on local fisheries, in readiness for the International Fisheries Exhibition, which is to be held in London in 1883. Dr. Day will, no doubt, take a lively interest in this matter. The author of the "Fishes of India" should be able to exercise great influence among our many Indian friends; and it is to be hoped that, through the exertion of Sir J. MacDonald and Sir W. V. Whiteway, our great fish-producing Colonies, Canada and Newfoundland, will make a better show than they did at Berlin two years ago. Australia, too, ought to be able to illustrate the wealth of her fisheries there. New South Wales sent a commissioner to Berlin to report upon any features in the fisheries exhibition there which might help her Government in passing regulations for the development of her fisheries, and an exhibition in London, ought to be the medium not only for affording similar instruction to all our Colonies, but for making the public better acquainted with the marine wealth of Britain beyond the seas.—*Colonies and India*.

CALCUTTA TO THE NILGHIRS.—The journey by road from Metapollim to Ootacamund is expensive by express tonga, much more expensive than that from Umballa to Simla; for while the fare for the latter journey is B40 (80 or 90 miles); the charge for the former is R30 or R36 for 32 miles; and this notwithstanding there is supposed to be opposition between two or three companies. The road for the first few miles to Kullar, the foot of the "Ghaut," is not very good; but the ascent is smooth, much smoother than the ascent to Simla; and the scenery is very pretty indeed as one mounts the face of the hills, and the varying foliage, tropical at first, but gradually displaying more and more of the European type. Here and there tea and coffee gardens are noticed, and further up cinchona is being planted in profusion. Indeed, planters here seem to look upon tea and coffee with a feeling expressed in the word *Ichabod*, and they are now going in for *gold* or cinchona. Practical men, these planters! They make diligent search over their estates, and they discover quartz, auriferous quartz, of course, at all events the specimen shown is generally valuable. Do they set to work at once and crush it? Oh, dear no! they sell or try to sell the estate or the right of working it, to a capitalist if they can find one, or a company if they cannot. By this means the planter saves a modest pittance, while he poses as a benefactor to the community. And we will wish them all well. May everybody who buys an interest in a mine, find that interest at least 50 per cent. As regards cinchona, it is a fair speculation. I am informed that digging "pits" costs about R17 per thousand. It will take five or six years before any return comes in, and there is the risk that the price of bark will have lessened owing to the quantity which will then be produced, but a glance at a share list, which shows that the dividend of a Cinchona Company was 100 per cent in 1880, engenders a natural expectation that there will still be a margin for profit.—*Pioneer*.

SULPHURIC ACID AS A CURE FOR COFFEE LEAF DISEASE.—We learned from Mr. Geo. Wall before his departure that some experiments he made on coffee leaf disease with very weak dilutions of sulphuric acid—watering the soil around affected trees—were eminently satisfactory. We believe Mr. Marshall Ward has been trying the same application, and no doubt the result will shortly be made known. Sulphuric acid diluted with water to the extent mentioned by Mr. Wall would be a very cheap application, if it proved efficacious in checking the leaf fungus.

THE RAIN-TREE.—At a meeting of the Committee of the Agri-Horticultural Society of Madras, held on the 3rd ultimo, it was stated that the Rain-tree (*Pithecolobium saman*) in the Gardens, which is believed to be under nine years, from the seed, continues, in spite of its having been necessary to amputate some of its largest limbs, to grow enormously. Measured on 30th July last, it gave in girth 9 feet 4 inches at the ground, 6 feet 3 inches at the height, 3 feet and 5 feet 9 inches at the height, 5 feet had spread about 85 feet from north to south; and a total height of about 46 feet. A reference to the former measurements shows that the girth at 3 feet from the ground has increased in the last three years 2 feet 2 inches. The age of the tree is, if anything, over-estimated; but search is being made for traces of the receipt of the seed, which it is believed came from Ceylon about 1872. A casuarina tree standing alongside, which was the specimen of its order when that part of the ground was laid out as the Botanical Garden, and is therefore known to be about ten years old, now measures at five feet from the ground only 2 feet 8½ inches, though it is about 82 feet high.—*Madras Mail*.

THE KALUTARA LIBERIAN COFFEE ESTATES.—The Liberian coffee enterprise in the district continues to flourish, and give every promise of assured success. A large clearing has been planted in Gikiyanakanda estate, and the plants are thriving beyond expectation. Cocoa is, I fear, not so successful: the soil is not rich enough for it, and the white ants attack the tree. Tea and India rubber both succeed admirably. The Rauwalagalakanda lots have not yet been put up for sale, as it was important to ascertain what line the proposed new road would take with regard to them. I have suggested that a road should be traced from the bridge at Tabuwana, the termination of the present road, to the foot of the estate Arapolakanda through Crurie and Torwood to Nebada, and thence to join the present minor road at Matugama, passing along the foot of the Ranwalagalakanda lands. A connecting road from Nebada to Warakagoda will afford an outlet to the river for those estates on the Ranwalagalakanda range, and relieve the District Road Committee of the extremely heavy upkeep of the hilly road through Gikiyanakanda. The great advantage to be secured by estate owners in the district is I conceive, the extreme facility of transport to Colombo by water. Coffee can be transported from the store on the river side to the store at Colombo without any further handling. The present estates are at some distance from the river, but there are large tracts of forest land adjoining the Kuda and Maguruganga which will, I doubt not some day, and I trust before very long, be taken for the cultivation of Liberian coffee and other low-country products. It is a great mistake to think that Sinhalese labour is unsuited for the purpose. I have found as many as 200 Sinhalese coolies at work cheerfully under Mr. Foulkes at Gikiyanakanda in the new Liberian coffee clearing, and he finds no difficulty in securing as much labour as he requires. The appearance of the estate is sufficient testimony to the quality of the labour.—*Mr. Wace's Administration Report on the Kalutara district for 1880*.

WEST INDIES, DOMINICA, 10th August.—The coffee crop is likely to a large one for the island, and the exports of cacao are expected to be above those of last year. The lime crop is late in consequence of the drought during the few fine months of the year, but the cultivation of the lime tree is constantly being extended, so the exports of juice, both raw and concentrated, become larger every year.—*Colonies and India*.

AUSTRALIAN GUMS.—If evidence were wanting of the suitability of the soils on these Hills to the successful cultivation of Australian gum trees, we need go no further than Dava Shola. On Mr. Money's Cinchona Estate in this locality, the blue gum has lately been planted both as a break-wind and as standards for a living fence probably to be rendered impervious with wire. The gums were planted not more than twelve months ago, and now are over six feet in height, and two inches in diameter. The rapidity with which they grow, makes them admirably adapted for shelter. The gum will probably be the great timber tree of the district, and take the place of the more valuable sorts of jungle wood now used by the natives for building purposes.—*South of India Observer*.

THE SUPPLY OF CINCHONA PLANTS.—This season has not been equal to the demand. Planters have enquired in all directions with only partially satisfactory results. In Ceylon stumps are in favor, and more than one correspondent of the *Observer* recommends them as preferable to plants, which sometime die down in patches wholesale in the most unaccountable way. The roots should be trimmed with a sharp knife, and the stumps cut off about 8 inches above the roots before planting. A planter in Wynaad has assured us that a device of his to supply a deficiency of plants has answered admirably. The plan was as follows:—He trimmed off the lateral shoots on the young planting of the previous year, and removing all but the two tenderest leaves at the tip, but in cuttings into the pits in some cases two to each and others three. The cuttings were put down before the monsoon, and the following year he found that most of them had struck root and were in excellent condition. In some cases both, and in many all three, cuttings had rooted. We commend the plan to those who have failed to secure a supply of plants.—*South of India Observer*.

TEA IN NATAL.—Tea cultivation in Ceylon is now attracting attention, and is making headway in the colony. We see no reason why it should not pay in Natal. It is already grown here, and succeeds on a small scale. We made a trial recently of the Natal product, and to our taste it is preferable to the Assam we are in the habit of using. It is strong, and like all Indian teas, does not do to be infused long. We today publish an article on the subject by a practical Indian planter, who is confident that under efficient management tea growing in Natal is a branch of industry that will yield a very good return on the capital that may be invested in it. Several parties are already growing a few plants, and they all agree that they are well suited for Natal, and that they would persevere if only they could get leaf manufactured. Heat and moisture, with soil that retains water are desirable. We commend our correspondent's remarks to the attention of our readers, and our columns are freely open for discussion on the subject. With sugar an established success, were tea proved equally so, there is no limit to coast industry, whilst abundance of suitable land is still procurable. The local, Cape, and South African markets would consume for some time to come all that is likely to be raised here at prices more remunerative than for export. Natal last year imported tea to the value of £6,264 and the year previous £9,793, whilst the returns from the Cape Colony aggregated in 1878 1,252,850 lb and in 1879 879,599.—*Natal Mercury*.

TEA CULTIVATION AT MESSINA.—We learn from the *Indische Mercur* that during last year an Italian landed proprietor, Count Amajo, opened on his estate near Messina a large tea plantation. It is growing excellently, and experts pronounce the leaves in no way inferior to the China variety.

JUTE, I think, would be a capital thing for the Ceylon natives, as it could take the place of their coffee in their defunct and non-yielding gardens. It is chiefly round their homesteads that the ryots and people of India grow it. How much is a Beegah?—*Cor.* [A third of an acre.—*Ed.*]

AGRICULTURE is a recognized part of the University curriculum of many American, Scotch and German Universities (Cornell, Kentucky, Massachusetts, Edinburgh, Halle, Göttingen, Munich, Leipzig, Berlin, Bonn, Vienna, Eldena, Giesen, Kiel) and distinct degrees in Agriculture are now granted in some of them.

TOBACCO CULTIVATION IN IRELAND.—Among the Irish business to be brought before Parliament next session will be a bill to repeal the Acts in force prohibiting the cultivation of tobacco in Ireland. During the recess arrangements have been made for the collection of information and statistics on the adaptability of the Irish soil for the growth of the plant. It is not proposed—should the cultivation of tobacco be resumed in Ireland—to exempt it from duty.—*Overla d Mail*.

CHICORY.—“What is one man's food is another man's poison” is an adage, it is to be feared, which will scarcely solace coffee-planters for the information given us by the *Sydney Mail*, that 50 lb. weight of chicory seed has been distributed among cultivators in the south-eastern district of South Australia, with the view of extending the growth of that plant. It is impossible to take up a journal published in our coffee-producing colonies without reading testimony to the general belief that their industry is seriously affected by the extensive adulteration of coffee by chicory, and consequent demands that efforts should be made to induce the Home Government to check it. There may be other uses to which chicory is applicable, but there is no doubt that the soft flavour imparted by it to coffee makes the adulteration of the latter more favourably regarded than it otherwise would be, and therefore this effort in the direction of “new products” in South Australia will be certain to call forth complaint in Ceylon, and other coffee-growing Colonies, which even now have difficulty enough to sustain the competition to which they are exposed with countries where labour is almost compulsory, such as the Brazils and Java.

NEW PRODUCTS IN THE WESTERN PROVINCE OF CEYLON. The cultivation of new products such as Liberian Coffee, Tea, Cocoa, and India-rubber, has been largely extended, and has been so successful that the enterprise has attracted the attention of even the villagers, to whom every encouragement in such cultivation is being given. There are still large extents of Crown land available for the cultivation of new products in the Western Province, and there is no doubt that, when better means of transport are secured to the Districts selected, these lands will be sold greatly to the advantage of Government as well as of the purchasers. In the development of these new resources new roads are especially required. In the Kalutara, Kegalla, and Ratnapura Districts there is already a large and steadily increasing area under cultivation of some new products, and the roads for which the planters have applied, if they can be opened in an inexpensive manner, will, I consider, be reproductive to both planters and the Government. A thorough reconsideration of the Road Ordinance of 1861, and a more liberal adherence to its provisions in favour of minor roads, is however necessary before much progress can be made in the matter of district thoroughfares.—*Hon. F. R. Saunders' Administration Report for 1880*.

THE AUSTRALIAN TEA MARKET.—The *Calcutta Englishman* gives a timely warning to the Indian tea planters, of the need of regular supplies of teas being sent to the Australian Colonies, if full advantage of the promising opening there is to be taken. The Indian tea planters complain very much of having only the London market to depend on, having seriously suffered from panics there, which, from time to time, has brought down the price of their staple to a ruinously low figure. The advice, therefore, which is given below, ought to commend itself to the Bengal tea-growers, as well as to the tea planters of Ceylon :

BRAN OR GROUND FEED is best fed to cows, upon moistened hay, it being mixed with the hay all will be eaten together and raised and masticated. But if it is not fed with cut hay, it should be fed dry and in a small quantity each time, for if fed alone it is not raised and re-masticated, but goes on to the third and fourth stomachs. If fed in slop it is swallowed without any mastication, and mixed with little or no saliva, but if fed dry it cannot be swallowed until it is mixed with saliva, and the saliva assists in digestion. When food is masticated the act of rumination causes the saliva to flow and mix with food. We have experimented, and find that when fed alone dry ground feed is better digested than when fed wet. —*National Live Stock Journal*.

THE BARK OF DEAD OR DYING CINCHONA TREES.—A planter writes :—"Can you, or any of your readers give me information as to whether the bark of a cinchona tree that dies, and is then pulled up and barked, still retains its valuable properties, or is the bark valueless? I have heard several expressions of opinions on the subjects but some said it was valuable, and others the exact opposite." The following is from the *Cinchona Planters' Manual* on this subject :—"The period of approaching decay has been indicated as the time for coppicing or up-rooting the clearing. Mr. Broughton's dictum on the subject was that diseased trees contained little, and dead trees no alkaloid. He also shewed that the larger and more vigorous the tree, the more valuable the bark. The result of some experiments in connection with this point, shewed bark from fine vigorous trees yielding 6.76 and 6.94 of total alkaloids; similar trees of the same age, and of mean growth, gave 4.34; and trees of stunted growth 2.40 only; the amount of quinine and the other alkaloids all diminishing in the same proportion. In spite of this, we find no difference in value between the bark of our dying and healthy trees. The reason probably is that the disease is a sudden one, and the tree shews signs of decay, putting on an unhealthy appearance, whilst only certain spots are affected; the bulk of the bark being as valuable as on the thoroughly healthy tree. There is indeed a very generally held opinion, that any thing which arrests the growth of a cinchona tree causes it to increase the secretion of alkaloid, and the change which takes place when the trees mossed is accounted for. Whether there is any truth in the idea or not, it is impossible to say, suffice it, that no proof has been brought forward in support of the theory, whilst the investigations of scientific men do not favour it. Dead bark, that is bark that has been deprived of its juices, and become inert on the living tree, is valueless. Instances have been given of dead bark having a value. This can probably be accounted for by the growth of the tree having been suddenly arrested, by up-rooting for instance, and the bark allowed to dry on it. In this case, there is no more reason for a loss of value in the bark than if it were stripped and dried in the usual way. This being the case, it is more important that diseased trees should be harvested at an early stage, before any portion entirely loses its vitality; and consequently, coolies should constantly go over the plantation to remove such trees, and to take the bark from fallen branches, &c."

OSTRICHES.—Two hundred ostriches from the Cape have been landed at Buenos Ayres, where ostrich-farming will be commenced.—*British Trade Journal*.

ADULTERATION IN PARIS.—The examination of samples of food at the municipal laboratory in Paris during July showed that of 412 samples of wine only 15 were good, 188 being tolerable, and 209 bad; of 13 samples of water only 1 was good, 1 being tolerable and 11 bad; of 164 samples of milk 31 were good, 21 tolerable, and 112 bad; and so with other articles of food, perfumery, &c. We read that "the examinations of bread, pastry, meat and coffee gave satisfactory results." But we suppose the analysts did not reckon chicory as an adulterant, or they would scarcely have been so satisfied with their samples, which must have contained more or less of that abomination.

CEYLON TEA IN GLASGOW.—A correspondent writes :—"If the enclosed cutting from the *Glasgow Herald* has any interest for you, or your readers, perhaps you will publish it. The figures are no doubt from *Ferguson's Directory*":—"Owing to short coffee crops planters in Ceylon have of late years turned their attention to the cultivation of other products, among which tea figures conspicuously, and the export from Ceylon of this article is yearly increasing. In 1877 only 2,105 lb. were exported, while in 1880 the export had increased to 140,000 lb. Last year the area of tea planted out amounted to 9,300 acres, which will produce about 3½ million pounds of tea when in full bearing; and as the planted area is yearly increasing we may expect before long to hear a good deal about Ceylon tea, which appears to be a successful rival of Indian tea as regards its qualities as a beverage. At the Melbourne Exhibition Ceylon teas were awarded 36 prizes, of which 11 were first-class, and the decision arrived at by the Victorian Government analyst was that in some important respects Ceylon tea was the best in the world, and that in Ceylon the best quality of tea could be produced with the minimum exhaustion of the fertilising matters in the soil. Regular supplies of this tea are now being received in Glasgow by the Strathellie Tea Estates Company of Ceylon, and judging from the demand it appears to be highly appreciated."

AGRICULTURE IN KEGALLA DISTRICT.—The cultivation of tea, Liberian coffee, cocoa, and other new products is becoming very popular in the district. In the neighbourhood of Kegalla, Liberian coffee has been grown successfully in native gardens, and I have no doubt that in the course of a few years the cultivation of this variety by the natives will be extensive. The climate and soil in Three-korales seem specially adapted for its growth. Mr. Molligoda has planted up about 50 acres of Liberian coffee in the neighbourhood of Kegalla, and judging from the appearance of the trees, now six months old, the estate promises well. European enterprize has converted the hitherto comparatively untried region about Ruwanwella and Yatiantota into thriving and industrious districts. Tea is chiefly cultivated, and is the most paying product. Next come Liberian coffee and cocoa, which thrive well, and will, I have no doubt, yield a handsome profit. The African palm also grows well. With the view of encouraging the cultivation of new products, I have requested each Ratemahatmaya to prepare a small nursery near his house for the planting of seed to be supplied to them from the Government Botanical Gardens. The seedlings will be given to the leading landowners in each village. In this way I hope that, under the fostering care of the chief headmen, the trial of new products will be within the reach of the poorer cultivators. Parcels of Liberian coffee, cocoa, and tea seed have been received from Dr. Trimen.—*Mr. C. A. Murray's Report for 1880*.

SCIENTIFIC AGRICULTURE AND AGRICULTURAL EDUCATION.

A home writer pleading for an agricultural education being provided at the public schools and universities, advances as one argument the responsibility of Englishmen for the well-being of India. Here we have a great Dependency in which Agriculture is pre-eminently the occupation of the people. On the one hand, ignorant intermeddling with, or neglect of, agricultural matters may bring on bankruptcy and ruin; while, on the other, due enterprise and encouragement guided by science, would increase the harvests of food and other produce far beyond any present conception. The successful administration of India (and we may add of Ceylon) must now every year depend more and more on the broad, intelligent and scientific handling of agricultural questions, and to secure this result, the laws and facts of geology, of botany, and of physiology, will have to be carefully studied and applied. It is particularly pointed out that it will become incumbent on the Government to have their subordinate officers—civil servants included—educated and trained to form reliable judgments on agricultural questions. Men of brains they should always be, and no doubt a classical, and especially a mathematical training, will still be required; but young Englishmen for the different branches of the Indian Service ought not to leave their native land without some knowledge of the ordinary rules of cultivation and, at least, of the elements of the sciences on which the success of agriculture, as well as horticulture in the long run depends. The latter branch, more particularly, deserves attention, for large districts in India, as in Ceylon, are now chiefly dependent on their planting industries, and one great duty of the servants of Government ought to be the promotion and encouragement by every means in their power, of the cultivation of new products, whether in garden or field, by the native villagers and land-holders themselves.

This brings us to consider more particularly what the Government of India are doing to promote these objects. We need not dwell on the Botanic and Economic Gardens or the Agricultural Exhibitions established at different points; on the great cinchona culture experiment with its brilliant success both on the Nilgiris and in Sikhim, and the important manufacture of the febrifuge which has followed; nor on the constant endeavour of the Indian authorities to encourage the development of their resources in new products, or to introduce other industries, such as jute, tobacco, india-rubber, silk-growing, &c., from abroad. Model Farms are being worked successfully in several divisions of the country, notably in Madras, where Mr Robertson has also a school of agriculture under his charge, which ought to be a model to the other Presidencies, and more especially to Ceylon. From a recent review of the work done under the auspices of this useful institution, in the *Madras Times* we quote as follows:—

To what a high degree of proficiency the Madras School of Agriculture has attained is shown by a pamphlet, which we have received, containing the "Question Papers of Class I. in the Madras School of Agriculture." Eminently practical in their character, and admirably suited to test the thinking-powers and the capacities of his students generally, no one can rise from even a cursory glance at them without feel-

ing convinced that a thorough knowledge of the various subjects mentioned in the papers cannot but constitute a scientific agriculturist in a very large sense of the term. Economically considered, the country has been too long a sufferer to the agricultural charlatanry which it has been a victim to, and Mr. Robertson has never ceased to point to means of escape from the dangers of a neglected agriculture. Field chemistry and geology are points which Mr. Robertson very justly lays much stress upon. They are subjects which the ordinary ryot treats with huge disdain, and the various papers set for examination show that the Superintendent of the Government Farms is anxious, beyond all things, to impress on the minds of his young pupils that Nature has no superfluities, either organic or inorganic, and that certain processes whose utility may not be apparent to us at first sight or thought either, are as necessary to the comfort of animal life as is the food that such life is supported by. Mr. Robertson leads with some very practical questions as to benefiting the soil by hoeing, deep tillage, and the conditions under which crops benefit by the latter. He has omitted no pains, apparently, in the analysis of waters, and expects his class to be able to determine the difference between Hydrostatic water, Capillary water and Hygroscopic water, Manures, and the several gases that go to form a fertile field, in short all the elements of plant food, are points on which he must have well grounded his class to expect it to be proficient. Flax and wheat, sugar, cotton, and maize, are crops whose scientific cultivation he urges the necessity of, while the growth of tobacco, hemp and fibre of all descriptions on principles better calculated to develop them to their fullest capabilities could not have been omitted in his lectures. Coffee loses none of its importance by the side of cereals and fodder-producing plants. Farm implements and gear generally are matters Mr. Robinson thinks his class ought to be adepts in; and, looked at from every point of view, the portion of questions set by him shews that there is no part of a farm, no concern of it, however petty it may be, that has not a recognised and highly important function to discharge. Doctor Western's papers on veterinary science follow those of Mr. Robertson. They are of a highly professional character, and extend to all matters connected with animal life on the farm either in health or disease. He is critical in the use of terms employed in the pharmacopœia of veterinary lore; and the general tenor of his paper denotes the inestimable value he sets upon cattle and the condition of perfect freedom from disturbing influences he would see them in. Mr. Hamilton's questions on chemistry are proof of the high standard of perfection to which the class must have attained to be expected to answer them. A discriminating intelligence alone could enable a student to pass through them successfully, and we feel certain that the questions demanding an explanation of the different kinds of acids known to the field chemist are meant to be something more than tentative. Mr. Wilkins follows with a string of every pretty questions on botany, and we would fain hope that the replies received were significant of the value the class attached to that branch of Nature's choicest gifts which the science of botany illustrates. Wiser than our ancestors in not a few respects, it is an unmistakable evidence of triumph of modern botany that we no longer labour with them in the ignorance which once existed with reference to a thousand discoveries that the science has made known in these latter days. Dr. Knes's questions on zoology are searching and interesting and at the same time the habits and characters of the animals he calls upon the students to classify cannot be contemplated with indifference. We have left ourselves but little space to notice the papers on Physical Geography,

Arithmetic and Book-keeping, Mensuration and Building set severally by Mr. Ganapati Iyer and Seetharam Moodelly Garco, and have only to add by way of concluding remarks that the little volume contains matter which we would give the students of class I of the Agricultural School the full credit of being thoroughly acquainted with.

Here we have a model Agricultural School established for some years, at our very doors, giving instruction and guidance to the Ceylon authorities if they only choose to profit by the same; and, seeing that the local Educational vote has been liberal beyond the ability of the Director to dispose of it, so far as the promotion of the all-needful elementary vernacular education is concerned, we would strongly advise Mr. Bruce to urge the commencement of an Agricultural School and the revival of the Model Farm. Inquiry has lately been made as to the position of the "Soyza Model Farm" enterprise, and during the present Session of Council we have no doubt the whole question will be opened up by one or other of the native members. Whatever may be the result, Government cannot plead impecuniosity in respect of this matter, for ground, buildings and even lecturers may be said to be available. But we need not pursue this subject further for the present. To return once more to India we have as the crowning evidence of the interest of the Government in Agricultural Improvement, the re-establishment of a special department, and from the official resolution on the subject, we repeat a portion for the information of our readers:—

Agriculture and Commerce Department. The new Department will, as a matter of course, control all operations for the relief of famine; but that part of its functions will be necessarily intermittent, and its main work will lie in the branches of the public administration which most closely affect agricultural development and the interests of the agricultural population. In making the following distribution of work, the Governor-General in Council has therefore, been influenced by the desire to free the new Department as much as possible from unnecessary calls upon its energies, in order to directed efforts, so far as present circumstances admit, to the fulfilment of its most really essential duties.

5. Having regard to these considerations, the Governor-General in Council is pleased to direct the all matters connected with the subjects noted below so far as they affect the provinces of British India shall come under the cognizance of the new Department, viz:—

1. Land Revenue, including Settlements and Takavi advances.
2. Surveys, including Geological Surveys, and excluding Archaeological and Marine Surveys.
3. Agriculture and Horticulture, including Fibre and Silk, Fisheries, Cattle-breeding, and Cattle-disease.
4. Minerals.
5. Meteorology.
6. Famine.

As a temporary arrangement, the Home Department will be charged with the superintendence of the Forest Department; and subject to reconsideration, the Agricultural Department will temporarily conduct the whole business of the Government of India connected with Emigration.

But it is not alone through a separate Department that the Government of India—thoroughly awakening to their true position as great land-lords—are prompting agricultural development and improvement. Every

Indian civil officer from the Lieut.-Governor down to the youngest Assistant Collector feels that no more important duty can be undertaken by him than the task of aiding and fostering the beginning of new industries among the people, or through the occupation of waste and unoccupied districts. In some instances a rich harvest has been already yielded; for as the *Pioneer* remarks:—

Our tea plantations and cinchona gardens furnish marked examples of what can, under judicious and energetic management, be effected in the direction indicated; and cinchona will for years to come be pointed to as a blessing which official European enterprise has extended to a country where for ages fever held sway, and was but little less paralysing in its effect than gaunt famine. Tobacco may be pointed to as another industry, which at the present time deserves especial attention; for although much has been already effected in the North-West Provinces towards establishing it in the market, there is still considerable room for further experiment, especially with regard to the long-vexed question whether the leaf, as grown and cured in this country, cannot be rendered a remunerative branch of our export trade. But even if this degree of perfection be not attained, there yet remains, judging from the large quantity of tobacco which the trade returns show as imported into India and Burmah yearly, an immense sphere for local consumption.

Then again, turning to the raw products and handicrafts of India, where the aid of Government might be beneficially invoked, notwithstanding the extent to which machinery has in some instances sapped a wide field for manual labour, it is beyond doubt that the manufacture of paper, sugar, candles, furniture, and leather, is yet capable of great expansion. It is satisfactory to learn that paper mills are likely to be started before long in British Burmah, where a well-known London firm has during the early part of the year been prosecuting inquiries on the spot, with a view to ascertaining the best adapted fibre of the widely scattered bamboo for the manufacture of paper. The enterprise, which we trust will succeed, will afford another extensive industry for the absorption of native labour.

Notwithstanding the vast and varied interests entrusted to their charge: the huge debt and the frequent political and military complications—from which our island is free—it must be admitted that the Government of India are far ahead of the Executive of Ceylon in their patronage of agriculture and their readiness to foster new industries. The time has now come when our local authorities should acknowledge the need for considerable changes in the attitude of the Civil Service towards this question. It may take some time to introduce marked improvements, but at least steps in advance should begin to be made; and some more of these we shall endeavour to indicate on another occasion.

DARJEELING TEA AND CINCHONA ASSOCIATION (LIMITED).

Messrs. Schoene, Kilburn & Co., the Managing Directors, have kindly sent us a copy of the report of the above Company for the half year ending 30th June last. We read:—

The outlay, as you will observe, has been very large, reaching the sum of R61,525-8-5; but the quantity of bark cut has also been much larger than it was for the corresponding period of 1880. This increased outturn has been further maintained up to the present time, and the returns shew 834,158 lb. of green bark

cut to the 21st August, against 483,868 lb. to the same date last year.

Prices, we regret to say, have been somewhat lower, and the sales are as follows:—

157 packages at an average of 1s 8½d per lb.	
91 " " " "	1s 6½d "
112 " " " "	1s 5½d "
160 " " " "	1s 6½d "
81 " " " "	1s 7d "
46 " " " "	1s "

The last lot was of inferior quality, and besides the above there are 557 packages in transit and partly arrived in London. The outturn of tea to the 21st instant was 5,030 lb. against 934 lb. for the corresponding period last year: 1,700 lb. have been sold at an average of R 1-4-3 per lb.

The property is stated by your manager, whose report we append hereto, to be in good order; and all the works, including the new extensions of both cinchona and tea, seem to be progressing favourably.

The approximate proceeds corresponding to the first half-year may be seen by the note at the foot of the accounts; and with this before us we would suggest that at your meeting the usual *ad-interim* dividend of 10 per cent should be declared.

We quote from the Report of the Manager (Mr. Hogarth) as follows:—

Buildings.—The buildings on the estate are in good order. The tea-house at Poomong has been completed, and a Portland Cement floor laid down: the *chulas* for drying the tea have also been made, and the verandah for accommodating the machinery at the east end of the house has been built. At Namring a wooden godown with an iron roof has been erected: the cook-house and stable are now completed, as is also the stable at Poomong. The pucca drying godown at Namring is hardly sufficient, but can easily be increased, if necessary, next cold weather, by adding to the length.

Chinchona Cultivation.—Up to the 30th June 113,414 lb. of bark were packed, and 108,014 lb. despatched, as against 51,051 lb. despatched to corresponding date last year, shewing an increase in despatch of 56,963 lb., which I think you will consider is very satisfactory. On the south and west portions of the Poomong spur all the Chinchona roots have been taken out, and barking is being carried on, on the east side of the spur. At Namring last year's extensions of Calisaya and hybrid plants have done very well, and I do not doubt, but that ultimately, they will turn out a success, and form a very valuable addition to the Company's property. This year's extension consists of 35 acres. At present it all looks healthy, and I have no doubt will turn out as well as last year's planting.

Tea Cultivation.—Up to the 30th June 2,796 lb. tea were made as against 411 lb. made up to same date last year, shewing an increase of 2,385 lb.: the whole tea garden has recently been hoed, and is at present in a very fair state of cultivation: last year's clearance is doing well, and the plants all look healthy. There are very few vacancies: the new extensions consists of 70 acres of good hybrid plants on the west side of the Poomong spur, and appear inclined to do well. I think there is every prospect of 100 maunds tea being made this year. No machinery is at present used, but when we require it, the supply of water will probably be found ample for working either a turbine or a water-wheel, whichever should be deemed advisable.

Labor.—I have been able to keep more coolies than I expected, the musters of the two factories of Poomong and Namring amounting daily to over 700 souls. This I consider, is satisfactory, as owing to the large extensions in both tea and cinchona a

considerable number of coolies is required to keep the young plants free from jungle, as well as to carry on the ordinary work of barking and tea manufacturing. I should, however, have been glad to have been able to obtain an even larger supply of labor, as it is excessively difficult to keep the jungle down: the health of the coolies on an average has been far better than it was last year.

General Remarks.—The two factories are in very fair order. Several improvements have been made in the roads: in the plantations sundry new roads have been made, thus facilitating access to the different works. In addition to the planting out of tea and cinchona, large nurseries of Toon Cryptomaria seed have been made, which at present have germinated well. The Toon will be planted out at the lower elevations on the Rungjo Flats: the Cryptomarias will be planted higher up. I have also just received some seed of the "Pinus longifolia." I trust these will all turn out well, as they will prove a very valuable addition to the timber on the estate; and, as timber is yearly growing more scarce in this district, it is very important that our wood should be preserved, and new timber grown as much as possible.

PUBLIC SALE OF CINCHONA IN COLOMBO.

COLOMBO, Sept. 22ND, 1881.

Messrs. Robinson & Dunlop put up for public sale at their offices this afternoon the undermentioned lots of cinchona bark, which sold at the rates per lb. quoted:—

	R.	c.
Stair—Lot 1 18 lb. Succirubra Quills ..	0	75
" 2 62 " " Stem Shavings	1	25
" 3 49 " " Root ..	0	87
" 4 670 " " Twigs ..	0	32
" 5 60 " " Officialis Stem		
Bark ..	1	40

The above bark was grown from trees 5 to 6 years old, at an average elevation of 5,000 feet.

	R.	c.
Mayfield—		
Lot 6 220 lb. Succirubra Stem		
Shavings ..	0	90
" 7 240 " " Branch Quills	0	33
" 8 150 " " Twigs ..	0	28½
" 9 60 " " Root ..	0	82
" 10 40 " " Renewed Stem	1	50
" 11 120 " " Officialis Stem		
Chips ..	0	90
" 12 26 " " Root ..	0	65
" 13 25 " " Twigs ..	0	33

	R.	c.
Abercainrey—		
Lot 14 450 lb. Succirubra Stem Quills		
analysis 1-96 ..	1	7
" 15 120 " " Bold Branch		
Quills ..	0	50
" 16 1320 " " Branch Quills	0	43
" 17 300 " " Twigs ..	0	27
" 18 120 " " Root ..	0	91
" 19 230 " " Stem Pieces		91
" 20 450 " " Shavings ..	1	22

From trees 4 to 7 years old. Elevation 4,200 feet. Analysis of stem bark by Mr. Symons, gives 1-96 yield of Sulphate of Quinine.

Portswood—Lot 21 210 lb. Officialis stem, c		
Lot 22 280 lb. Bold Twigs ..	0	28
" 23 40 lb. Small Twigs ..	0	15

From trees 3 years old, grown at an elevation of 6,500 feet.

Though prices were considerably below those of last public sales, this sale went very well considering the small quantities in some of the lots offered.

NETHERLANDS INDIAN NEWS: COFFEE.

(Straits Times.)

"BATAVIA, 2nd September.—All is quiet in Acheen to the satisfaction of the supporters of Civil Government there. The exodus of fleeing and disgusted Chinese from there to Penang seems to have ceased, at which, we heartily rejoice, from the services rendered to our forces and officials there by this indefatigable and industrious race of mankind."

The coffee crop in the Residency of Pasuruan appears, this year, to be likely to surpass the boldest anticipations. The local journal there surprised us this week with the tidings that the yield in that province will exceed the high estimate made, by about 50,000 to 80,000 piculs, and that, in any case, the crop may amount to 350,000 piculs. In spite of the rather lower prices realized by coffee of late in European markets, the revenue resulting from such crops will be very considerable. Let us hope that the Netherlands Government will employ a portion of the millions thus obtained in supplying what the Colony is so much in need of, namely, diminution of taxes, extension—speedy and great extension—of means of communication and thorough improvement in our defences."—*Java Bode.*

SALE OF JAVA CINCHONA BARK IN HOLLAND.

On the 21st July 1881 there were sold by auction at Amsterdam 26 chests and 824 bales of Java cinchona bark, as follows:—

			Per ½ kilo.
65 b.	succirubra	stem 1st qual.	... 151 to 201
11 "	do	do 2nd "	... 100 ,, 131
7 "	do	do br. quill	... 107 ,, 151
17 "	do	do dust	... 80 ,, 120
5 "	do	do root	... 166 ,, 206
6 "	cal. javan.	stem 1st qual.	... 149 ,, 162
10 "	do do do	2nd "	... 86 ,, 147
15 "	do do do	br. quill	... 81 ,, 90
26 "	do do do	dust	... 90 ,, 95
10 "	do	do root	... 151 ,, 152
129 "	do	schuh. stem 1st qual.	... 78 ,, 142
1 c.			
153 b.	do do do	2nd "	... 59 ,, 152
21 "	do do do	br. quill	... 51 ,, 91
137 "	do do do	dust	... 50 ,, 71
26 "	do do do	root	... 129 ,, 241
23 c.	do ledg.	stem 1st qual.	... 576 ,, 761
2 b.	do do do	2nd "	... 576 ,, 761
1 c.			
1 b.	do do do	br. quill	... 556 ,, 626
1 c.			
8 b.	do do do	dust	... 327 ,, 359
17 "	hasskarl.	stem 1st qual.	... 80 ,, 165
5 "	do	do 2nd "	... 81 ,, 101
3 "	do	do br. quill	... 90 ,, 91
19 "	do do do	dust	... 44 ,, 76
4 "	do	do root	... 103 ,, 129
12 "	officinalis	stem 1st qual.	... 220 ,, 337
2 "	do do do	2nd "	... 283 ,, —
3 "	do do do	br. quill	... 234 ,, —
17 "	do do do	dust	... 186 ,, 215
3 "	do	do root	... 358 ,, —
5 "	lancifolia	stem 1st qual.	... 165 ,, —
4 "	do do do	2nd "	... 130 ,, 147
3 "	do do do	br. quill	... 152 ,, —
7 "	do do do	dust	... 70 ,, —
1 "	do	do root	... 171 ,, —
1 "	pahudiana	stem	... 95 ,, —

The quotations being so many cents of a florin (equal to 1s 8d sterling) per 1- $\frac{1}{10}$ lb., we see that the highest price secured for red bark (stem and root) was

less than 3s 3d per lb.; for crown bark (stem and root) it rose to 5s 3d; and for the inferior yellow barks (*Calisaya Javanica*, and *Calisaya Schuhkraft*) as well as the hybrid *Hasskarliana* and the inferior crown species *lancifolia* the maximum was only 2s 6d per lb. On the other hand the first and second qualities stem *Ledgeriana* realized up to 761 cents per ½ kilo, or 11s 6d per lb. When we compare these prices with the London quotations at the same period we see that for fine quill of East India and Ceylon crown barks, as much as from 4s to 7s was obtainable, and even up to 5s for red bark quill. There is nothing very wonderful therefore in the 11s 6d per lb. for *Ledgeriana* bark; but without particulars as to the age of the trees from which it was stripped, it is impossible to institute comparisons of much practical value.

The purchasers of the *Ledgeriana* seed at the local sale on the 20th instant will however feel a special interest in the above prices obtained for the Java bark. The results of the sales of seed are reported to us as follows:—

			R
25 boxes	..	at R50	.. 1,250
5 "	..	" 55	.. 275
1 "	..	" 56	.. 56
1 "	..	" 57	.. 57
10 "	..	" 60	.. 600
1 "	..	" 61	.. 61
2 "	..	" 64	.. 128
		1 parcel	.. 11
45 boxes and 1 parcel			R2,438

Each tiny box contained about 31 grains in weight of seed, or say 4,000 seeds, of which 70 per cent are expected to germinate. We should say 50 per cent to be safe, and we then find more than 3 cents per seed paid; but if only 1,000 plants come to a marketable age in the nursery, we have no doubt that the purchasers can easily turn over their money. We have heard of a rupee per plant being offered and refused for *Ledgerianas* less than eighteen months old in the Central Province.

THE GOLD MINING COMPANIES OF SOUTHERN INDIA.

A handbook of the Indian Gold Mining Companies, posted up to July last, has been published by Messrs. Higginbotham & Co. It contains a list of the Companies; an alphabetical list of Directors; a list of the Mining Engineers; and the rules for Gold Mining leases in Madras, and in Mysore. The list of the Companies gives, in most instances the names of the Directors, the Secretaries, the Bankers, the Solicitors, the Consulting Engineers, the date of issue, the capital, the values of the shares, and the cost and area of the properties. We would have been glad if the compiler had gone a step farther, and favoured the public with a digest of the prospectuses of the Companies. It is likely to be interesting hereafter to compare promise with performance; for while on the one hand, the results of some of the Companies may exceed the sanguine expectation of the earliest pioneers of the industry, on the other it may be found that hope told a far too flattering tale to the promoters of several of the schemes. We have, however, been enabled to compile two useful tables from the information before us. In the first, we give

a list of the Companies connected with Wynaad, and some particulars about them:—

THE WYNAAD COMPANIES.

Name.	Capital.	Price of Property	Paid in Shares.	Area Acres.
Balcarres ...	£180,000	100,000	50,000	1,198
Carta Para ...	50,000	nett pro	...	300
Central Wynaad ...	100,000	62,000	33,000	1,560
Cherambadi ...	100,000	32,000	16,000	200
Cootacovil ...	100,000	60,000	32,000	300
Devalah Central ...	120,000	70,000	20,000	986
Devala Moyar ...	200,000	132,000	61,795	2,055
Devalah Provident ...	75,000	30,000	...	120
Dingley Dell ...	100,000	70,000	30,000	600
Ind. Consolidated ...	400,000	275,000	130,000	1,920
Indian Gold Mines ...	110,000	...	...	...
Do Glenrock ...	100,000	50,000	33,000	3,000
Do Grange ...	100,000	50,000	33,000	300
Do Kingston ...	130,000	91,500	43,333	270
Do Mammoth ...	150,000	70,000	...	1,500
Do Phoenix ...	150,000	85,000	33,000	800
Do Trevelyan ...	150,000	96,000	50,000	930
Needlerock ...	125,000	85,000	32,000	250
Nilgiri Gold ...	120,000	85,000	30,000	200
Parcherry ...	150,000	98,000	50,000	299
Rhodes Reef ...	190,000	130,000	50,000	50
Simon's Reef ...	170,000	55,000	...	...
S. East Wynaad ...	100,000	60,000	...	2,400
South Indian ...	100,000	47,000	...	1,200
South Wynaad ...	100,000	65,000	32,500	677
Tambracherry ...	160,000	120,000	52,000	6,000
Wala Wynaad ...	75,000	45,000	15,000	500
Wentworth ...	120,000	80,000	40,000	2,07
Wynaad ...	R650,000	...	...	1,000
Wynaad District ...	£100,000	40,000	25,000	270
Wynaad Glen ...	60,000	...	...	80
Wyn. Perseverance...	80,000	50,000	26,666	600

The nominal capital of these Company amounts to no less a sum than £4,030,000. To this we may add a list of the Companies working in the Kolar District:—

THE MYSORE COMPANIES.

Name.	Capital.	Price of Property.	Paid in Shares.	Area Acres.
Balaghat ...	R 3,60,000	1,20,000	60,000	150
Colar ...	£ 150,000	40,000	...	320
G South'n Mysore ...	75,000	45,000	...	150
Kaiser-i-Hind ...	R12,00,000	7,50,000	3,25,000	640
Madras ...	£ 135,000	85,000	25,000	320
Mysore ...	135,000	55,000	...	750
Mysore Reefs ...	120,000	75,000	30,000	320
Nine Reefs ...	100,000	60,000	33,000	300
N. Ooregum ...	120,000	75,000	40,000	320
Nundydroog ...	100,000	50,000	33,000	...
Ooregum ...	125,000	75,000	...	259

The nominal capitals of these Mysore Companies amount to £1,216,000. So the combined nominal capitals of the Indian Gold Mining Companies above named, plus the R6,00,000, of the Southern India Alpha Company (now practically absorbed in the Indian Gold Mines Company of Glasgow) may be set down at £5,306,000.

One characteristic of the majority of these Companies will forcibly strike most persons who look through the Handbook, namely, that their head-offices and Boards of Directors are in London, and they are almost entirely administered at a distance of five thousand miles from the mines. (One Wynaad Company, the Wynaad, has its head office in Bombay; as also has one of

the Mysore Companies, the Kaiser-i-Hind; and another Mysore Company, the Balaghat is administered from Madras.) The explanation of this is that as the promoters could not reasonably calculate upon getting the money they wanted in India, they had to resort to the place where the money was to be had for the asking. Doubtless, if the British public had looked askance at the schemes, few of the Companies would have been started. But while admitting that the promoters were wise in their generation in going far afield for the sinews of war, we consider that risk is run by attempting to direct the affairs of the Companies from London. The local management of mines has been found to work best in Australia and elsewhere; and we see nothing in the new industry in India to justify the supposition, that this plan, which commends itself to common sense, can be safely departed from in this country. Moreover, very few of the Directors can be regarded as men who possess a practical knowledge of gold, or any other mining. There are one hundred and fifty-two of them, and the majority are retired officials. The gentleman who seems to have been most in request, is Captain W. B. McTaggart, formerly of the 14th Hussars. This ex-warrior, is a director of six Companies, namely, the Nilgiri, the Nine Reefs, the Nundydroog, the Mysore, the Madras, and the Great Southern of Mysore; and in regard to five of these Companies he also occupies the position of one of the vendors of the land acquired. He is the son of a Madras merchant; but we are unacquainted with his other qualifications to direct the working of half-a-dozen companies, whose capitals total up to £665,000. Presumably, a director should be none other than a man who is competent to direct; and we do not readily understand how such competency can be obtained without a practical knowledge of the business that needs direction. One might imagine from the list of directors in the Handbook that "any fellow" is good enough to join the Board of an Indian Gold Mining Company whereas, if people who know a good deal about gold; mining in Australia and America are to be believed, the Directors of Gold Mining Companies ought not to be "guinea pigs," but men who have established a reputation for shrewdness and practice in the business of gold mining. The old proverb warns us that a "little knowledge is a dangerous thing" and not a few of the gentlemen whose names are before us might declare with truth, that since their minds are blanks with regard to mining they are not hampered with the dangerous modicum of knowledge referred to. But those Directors who are dummies are so many causes of weakness to the Companies under notice; for, as they become sooner or later conscious that they are at sea on the subject of mining, they are tempted to allow the entire management of the Companies to drift into the hands of individuals, whose ability to undertake the task may be open to question though there may be no indisposition on their part to learn the business that they have undertaken; but in the absence of suitable training, the requisite experience may cost a good deal to acquire, and the shareholders will have the honor of paying the piper.

This is already being discovered in India, for some of the above-mentioned Companies have appointed to the charge of their mines, men whose qualifications for the responsibilities imposed upon them are less obvious than their relationship to Directors or Secretaries. The title of Mining Engineer is readily assumed; but there is reason to believe that some of the men who are now called Captains of mines, would not pass muster for miners of the first class in Australia. In such cases the Directors have exercised the patronage which has fallen into their hands in a more good-natured than judicious manner; and there

may be in consequence a good deal of disappointment. But how are the Directors, who are not themselves to the manner born to mining, to know a first class miner, when they see him; or to detect the mediocre ability of a second or third class man? As time goes on, and their own false starts, and the blunders of the equally ignorant Directors of their Companies are brought home to them, they many learn a thing or two; but meanwhile the capital at their command will be dribbling away, and the public will become more clamorous for results. The shareholders will ask for dividends, and they will not be quieted by technical reports from the miners that are characterized by "much cry and little wool." There are, on the gold fields, some Mining Engineers, who may be safely trusted to go a-head economically, and conscientiously, without direction; but on the other hand, there are some engineers, so-called, who will need good deal of looking after, yet who may calculate with some safety upon the comparative freedom from direct control, which the five thousand miles between themselves and their Boards will give them. It is not necessary to assume that the latter class of men will not do their best, or will not act honestly by their employers; but their best may be far from satisfactory to those whose interests they are engaged to promote. This brings us round, then, to our former argument, that the Gold Mining Companies of India should be managed in India.

The Handbook contains the following list of Mining Engineers, and properties on which they reported favorably:—

Grove, W.	Central Wynaad.
Harris, Edwin	Grange.
Harris, John	Kingston Kaiser-i-Hind, Mysore
Reefs, Nine	Reefs, North Ooregum.
Harvey, C. J.	Cootacovil, Glenrock, Nilgiri, Tambracherry.
Lain, Thomas	Mammoth, Tambracherry.
London, E. V.	Cherambadi, Madras.
Massey, J. D.	Parcherry.
Pogler, Oliver	Devalah Central, Devala-Moyar,
Dingley Dell,	Consolidated, Kingston, Needle-
rock, Wentworth,	Wynaad Perseverance.
Rogers, John	Nundydroog.
Simons, W. Vazie	Carta Para, Devala Provident, Dingley Dell, Simons Reef, South Wynaad Wynaad District, Wynaad Glen, Ooregum, North Ooregum.
Smyth, R. Brough,	Devalah Central, Devalah-Moyar,
Trevelyan, Rhodes Reef,	South-East Wynaad.
Sowerby, W.	Central Wynaad.
Tapp, Henry	Cherambadi.

Of the above Companies one, the Indian Mammoth, is in liquidation. The Devalah Central, the Devala Moyar, the Devalah Provident, the Indian Glenrock, the Indian Phoenix, the Indian Trevelyan, the Rhodes Reef, South East Wynaad, the South Indian, the Tambracherry, the Wynaad Perseverance, the Colar, the Mysore, the Mysore Reefs, and the Ooregum Companies have obtained a settlement on the London Stock Exchange.—*Madras Mail*.

CALCUTTA TEA SYNDICATE.

We have received a number of documents relating to the operations past and prospective of the Calcutta Tea Syndicate. First is a circular dated 12th August, referring to a recent sales of tea in Melbourne, and giving an extract from a letter of Mr. Sibthorp's from Chicago on the prospects of Indian tea there. Then comes an extract from a letter of Messrs. Jas. Henty & Co.'s on the recent discussion on tea adulteration and stating what steps were being taken to make Indian tea known throughout the Australian

colonies. A memo is attached to this letter, on the irregularity of weight of the packages of tea from India, and consequent loss to importers. We then have the report of the Syndicate committee on the operations of the season 1880, and the revenue account and balance sheet of the Australian venture. The report summarizes the results of that venture and states what was being done in America. We see that the Indian Government have given a grant of Rs. 6,000 towards the expenses of the American experiment, as they had given Rs. 10,000 toward the Australian one. Lastly we have a report of a general meeting of the members of the Syndicate and others interested in the Indian tea industry, held on the 5th September in Calcutta. The chairman, Mr. J. J. J. Keswick, gave a short history of the movement which gave rise to the formation of the Syndicate, and the success which had attended its efforts in Australia. He also stated what was being done in America by Mr. Sibthorp, and urged on his hearers not to relax their hold on these new markets. He was followed by Mr. Inglis, who said:—

The indirect gain to all concerned in introducing Indian Tea to new consumers would be enormous. It must be remembered that America (including in that term the United States and Canada) consumes over 80 million pounds of tea, nearly the whole of which is at present supplied by China and Japan. If India could only get the supply of 10 per cent. of this quantity or say 8 millions, it would be an immense relief to this market, and would have the best effect on prices. Then again looking to Australian and New Zealand, we find they took over 22 million pounds last year from China, and I don't think we in India should rest content until we get the supply of at least one half of this quantity (Cheers). Of the two markets the American will, I think, be the most difficult to secure, and it will require a very persistent and well sustained effort to obtain the same reception for our teas there which they have already met with in Australia. But the effort is well worth making and cannot fail to succeed.

Mr. Lesslie Worke, who spoke next, said:—

I observed in a recent circular issued by the Syndicate that only 400,000 lb. had been promised by the agency houses for shipment to Australia. I can quite understand the attractions which the London market has thus far offered—fortunately for the tea industry it has yielded up to date very handsome averages, but I think when we remember that we have not been able to get through half the season without something very closely approaching a panic being seen in that market, we must feel that in it we are leaning upon a broken reed. So long as we have solely London for our teas, we have only one string to our fiddle, and it requires a very clever man to do well when he is reduced to a single strait. It is therefore clearly our duty and our interest to use all the influence we have as agency houses in supporting the Syndicate in its efforts to develop the Australian connexion, and we should certainly not rest satisfied with a smaller export this year than the 1½ million pounds spoken of by Mr. Inglis (Cheers).

The next speaker, Mr. Carritt, said:—

The tea industry may with advantage take a lesson from the Calcutta jute industry. Not very long ago our jute mills were in a more deplorable condition than was our tea industry last year, and but for the successful efforts made by the mills to open out fresh markets in the Colonies and America, many of the mills now running would be closed. Their efforts were not without difficulty and some discouragement, as we shall no doubt have, but if our efforts are rewarded with like success the prize will be well worth the labour. Not only are the Indian jute manufactures carried to the Colonies and foreign countries, but they are frequently even sent to Great Britain to the very fountain head from which their opposition came.

This seems to me almost like sending Indian tea to China.

Other speakers followed in the same strain, and Mr. Magor, the secretary, in tendering thanks for the confidence placed in himself and his colleagues, said:—

It is no idle boast to say that Indian tea is superior to that of China and Japan (cheers) and that consequently it only requires to become known to extend its consumption. To make it known is the end and aim of the Syndicate, and with this object in view, it must be obvious to all that the present opportunity should be availed of for keeping the market well supplied to meet all demands. Mr. Magor said you will have learnt from the Chairman that all tea which has been sent down has met with a ready sale and has gone into consumption, thus stimulating an inquiry which will give an impetus to the trade before leaving it to private enterprise to develop. With regard to America, it is a moot point whether we should endeavour to meet the public taste by an imitation of Japan teas, or make any alteration in our manufacture to suit their market. He was of opinion that our tea will have a better chance if it stands on its own merits (cheers.) They had no doubt about its quality—the only drawback is the prejudice that already exists in favour of a much inferior article. We must not forget, however, that Japan teas, which have now such a hold on the American taste are of comparatively recent introduction, and have had to make their way against the competition of the older China growth, in the same way as we shall have to compete with them. He did not under-rate the difficulties of overcoming these prejudices, and he did not anticipate that we shall command immediate success, but he was quite satisfied that, as the teas become known, they will make their way against all competition, and it may be our pleasing duty to elevate the taste (for tea) of a great nation like America (Loud cheers.)

NEW SUBSTITUTES FOR COFFEE.

(Translated from the "Indische Mercur.")

In a German paper it is remarked that the leaves of the coffee tree are really better adapted for use than the coffee leaves themselves. They are specially rich in caffeine and tannin. According to a chemical analysis of Professor Henhouse the leaves of the Sumatra coffee contain 1.26 p. c. of caffeine, besides tannin, but very little sugar and fat. The amount of soluble constituents is much greater in the coffee leaves than in the beans. As caffeine and tannin are by far the most important constituents of coffee, the use of coffee leaves as a substitute has much to recommend it. The leaves should be simply dried—as is the case with tea leaves, and could be brought into the market in this condition. The preparation of the dried leaves could be done in such a way that they could be roasted in the same manner as coffee, with the addition of about 10 p. c. of sugar, and coffee made from the ground powder by means of boiling water. A coffee substitute, consisting of a mixture of roasted coffee leaves and roasted corn, can in a certain sense entirely take the place of coffee, as this mixture, in consequence of its containing caffeine and aromatic products of roasting, which owe their origin to the tannin, approaches very closely to the composition of true coffee, whilst in the ordinary substitutes for coffee no trace is to be found of these substances. The history of coffee substitutes is more than ordinarily interesting: the first attempt at the manufacture dates from the second half of last century. In the year 1790 there were already in Magdeburg coffee substitute manufactories, which prepared the chicory root. This industry extended to such an extent that in 1840 there were already 41 coffee substitute manufactories with 2,500 workmen. What

success has attended the manufacture of coffee substitutes in other countries may be judged from the fact that in France alone six million kilograms of chicory root are consumed, not to mention all the other materials from which coffee substitutes are manufactured to an equal extent. The continental theory of Napoleon I. gave a specially strong impetus to the manufacture of artificial coffee, as it did also to the manufacture of beetroot sugar and soda. From the narrative of travellers we know that coffee substitutes are used by other nations also. In Arabia a kind of coffee is prepared from the roasted seeds the so-called Durrah plant and sold under the name of Sudan coffee. Several negro races prepare other seeds in like manner, and the Tunguses even the seeds of a poisonous plant, viz. the henbane. In our August number (*J. M.* 1880) we spoke of several new European coffee substitutes, and we shall not therefore refer to these, except to say that they have none of the effects on the nervous system which true coffee produces. It therefore seemed not uninteresting to notice the use of roasted coffee leaves, as in these are found the substances (especially caffeine) which exactly constitute the peculiarities and characteristics of coffee.

TEA AND SILK FARMING IN NEW ZEALAND.

Some six years ago we directed attention to the island of Ceylon as likely to become an important tea-producing country in the future, and to Australia as a vast field for sericulture. Since then the strides taken by the former country in tea-growing and manipulation have been simply extraordinary. This will be admitted when we mention that at the late Melbourne Exhibition the tea-planters of Ceylon carried off 11 first awards out of a total of 49 bestowed, and altogether, they secured 36 honours for the 78 samples they exhibited, out of a total number of 270 awards earned by 506 samples shown by the various tea-producing countries. It is with a feeling of pleasure, therefore, that we congratulate our *protege* of 1875 on having taken so distinguished a position in the great Colonial gathering of 1880 and 1881. It is not our purpose at present to re-direct observation to the progress of the sister occupation in Australia, although we understand that silk culture there has been fairly successful; but rather to allude to an important proposal, having for its objects the farming of tea and silk as a twin industry in New Zealand, which is at present being discussed in this country.

Practical persons have for some years been studying the scheme in all its bearings, and are assured that the North Island possesses many of the necessary advantages, and that the province of Auckland offers nearly all of them. There the temperature rises to between 90° and 100° Fahr. nearly every summer, with occasional leaps to 110°; the mean of the coldest month is 51°, and that of the warmest 68°. Snow is seldom seen, except upon the mountain summits, and even slight frosts are a curiosity on account of their rare appearance or their evanescence. Moderate showers spread over 186 days of the year, fall annually to the extent of 47 inches; the hot blighting winds and dust storms of Asia, so devastating to vegetation and so baleful to the silkworm, are unknown; and the mulberry, alanthus, castor-oil plant, and numerous semi-tropical shrubs and trees flourish profusely in the open air. For China and Japan tea these advantages promise the perfection of climate, and the rarity of frost favours the belief that the indigenous Assam shrub might also be successfully cultivated. We have used the guarded expression that Auckland offers nearly all the advantages desiderated for tea and silk farming, the exceptional circumstance being the want of cheap labour. Were it proposed to cultivate and prepare either product by itself, we should feel pretty well assured that in no sparsely

populated country, however suitable otherwise, could either tea-farming or sericulture, conducted separately, pay. But, pursued together on the same estate, under the same general management by much the same staff of employes, the scheme assumes rather an inviting complexion. Indeed, if the economy likely to be effected by the efforts of a highly-trained staff, using every scientific and mechanical aid to produce two or more important and valuable commercial articles instead of only one, be appreciated; if we bear in mind the moderate price of land generally in New Zealand, and Auckland's homogeneous and equable climate, so favourable to abundant and varied crops; if we recollect how trifling must be the expense of inland carriage to a shipping port in a country no part of which much exceeds 100 miles from the sea, as compared with the serious outlay incurred for transport by the tea and silk of China and India to the coast; if we give due weight to these advantages, and then reflect upon the enormous local demand for at least one of the products, the belief seems most reasonable that the higher outlay for wages will probably be far more than counterbalanced by reduced expenditure in other directions.

Several objects actuate the promoters of this enterprise, and their proposals may be thus epitomised:—"It is proposed to establish a syndicate with adequate capital, under the title, probably, of 'the New Zealand Tea and Silk Company (Limited),' for the judicious employment of capital and labour at the Antipodes by the acquisition of an area of say 30,000 acres in Auckland, or elsewhere in New Zealand, to be used partly for the land settlement of special classes of immigrants, and partly for the inauguration and prosecution of sundry important industries, particularly those of tea growing and preparation, and sericulture, and, with the subsidiary design of offering agreeable and remunerative work to deserving females of education, who have been deprived through misfortune or fraud of their incomes, and of trying to improve the habits of the aboriginal population by engaging them in congenial employment whenever practicable." In explanation, we may say it is expected that one of the first results of the successful introduction of tea and silk farming as a combined industry into New Zealand would probably be a copious influx of immigrants more or less connected with the industries in question or with allied trades. For the accommodation of such, and in order that some immediate advantage might accrue to the syndicate, the acquisition of a much larger surrounding or adjoining acreage than would otherwise be necessary is proposed. It is suggested that portions of this reserve land should be sold, let, or used in the most profitable manner as the state of trade at the time might dictate, and on other parts selected farmers of ability and some means, with labourers and others of good character, should be settled. Food would thus be provided for the infant colony, and at the same time there would be a battalion of reliable assistants upon which to draw during any sudden crisis. In short, it is suggested that in addition to the functions of tea and silk farmers, the syndicate should assume those of a land settlement company.

The purely industrial feature of the scheme consists in the gradual plantation of an area of 3,000 acres with tea and mulberry shrubs at the rate of 100 acres or more of each per annum. Simultaneously with this work, other products, such as olives, grapes, oranges, lemons, small fruit, honey, sugar, &c., are intended to be reared, all of which, being usually considered more remunerative than even the most lucrative crops of the ordinary farmer, would soon furnish a material item in the income of the syndicate. During the time occupied by the tea and mulberry bushes in

arriving at a yielding age—in the one case four years, if from seed, and in the other two years, if transplanted at five years old—the necessary buildings would be erected, the water services surveyed and arranged, water-wheels and other machinery constructed, and the general cultivation and improvement of the estate attended to and gradually increased. In the course of the second year the first silk harvest would probably be gathered, and the net returns, if all went well, might amount to £80 per acre for the yielding area of mulberries; a requital which, as far as the leaf crop alone is concerned, would probably be doubled after the bushes had been five years *in situ*. Until the fourth year there will be no appreciable income from the acreage under tea, and as this shrub has not yet been grown on a commercial scale in New Zealand, the promoters very properly think it better in the meantime not to hazard any opinion as to the probable return. But for the reasons already given, united to the circumstance that the present large local consumption of 1,500,000 lb. a year would render any export of the product for some years unnecessary, thereby effecting a saving if freight, commissions, and dock charges, they look not a very gratifying result from this source also.

To the philanthropic the intention of employing educated female labour in the more delicate manipulations is an appeal which has only to be known to meet with a hearty response. The successful employment of Maori workers, where practicable, would also be a philanthropic object well worthy a trial. But apart from this interesting, although subsidiary, feature of the proposed undertaking, we think it may be said to contain the elements of success, and it deserves the careful consideration of those who are anxious for the development of our Colonies. Further information may be had of Mr. William Cochran, of Overdale House, Dunblane, Perthshire, N. B., who is at present performing the duties of interim secretary.—*British Trade Journal*.

JAMAICA.

JAMAICA, one of the oldest of British Colonies, and next to Ceylon, the finest and most valuable of the tropical islands possessed by England, has for many years past suffered under much neglect and undeserved depreciation. Although the favourite seat and exercise-ground of British philanthropy, it has never attracted the attention it deserves as a field of colonisation and of British industry. Its manifold and unparalleled resources have remained almost unexplored, and its riches left to nature and the "irrepressible nigger." No Colony has paid so dearly for the luxury to which England treated herself some fifty years ago in the abolition of slavery, and none has been so slow to recover from the sacrifice which the nation then offered to humanity. For many years past Jamaica has been the Cinderella of the British family—the despised and abused sister, whose case has been given over as almost hopeless, and whom Government and the public alike have tacitly agreed to hand over to the emancipated Africans as their peculiar heritage.

From such a destiny, from lapsing into a second Hayti, there seems at length to be some small prospect of rescuing this beautiful and interesting island; a possession more valuable to England, if she knew it, than a dozen Cypruses. The wonder is that a Colony like this, with its many singular advantages, its wealth of natural products, and its commanding geographical position, should have been so long ignored by the restless spirit of British enterprise. As a field for such industries as are suitable to a tropical land, it may be safely affirmed that there is no portion of the earth which deserves so much attention as Jamaica.

Unlike any other of the West India Islands, it offers to European settlers a temperate climate of singular fineness and salubrity among the mountains, while its plains teem with all the treasures of the tropics. It thus combines the resources and the advantages of several distinct zones. There is nothing which is grown in any tropical country which may not be produced in the greatest luxuriance in Jamaica. There are many fruits and flowers peculiar to temperate climates which are produced in Jamaica alone of all tropical countries. While the sugar-cane, the pimento tree and the mango flourish in the low country, English flowers and fruits delight the dwellers in the Santa Cruz mountains. From Kingston to Newcastle is a pleasant ride of two hours, but in those two hours you pass from a temperature of 90° in the shade to one of 60°—from palms and bananas to furze and pine. The excellent "Hand-book" recently published under the auspices of the Jamaica Government will enable the public to form some idea of the extraordinary riches which nature has showered with bountiful hand on the island. Sugar, coffee, tobacco, rum, pimento, and fruits are at present the chief articles of export, but they are not produced in anything like the quantity which the island is capable of yielding under vigorous and enlightened cultivation. A great many articles, the growth of which is recently attempted, may be added to the number of the island's products. The cinchona plantations are found to be well suited to Jamaica and are beginning to give profitable returns. Cocoa or cacao, as well as the cocoa-nut, may be grown as easily as in Trinidad or in Honduras—the more sheltered valleys of the interior being admirably adapted for the former, while nothing can exceed in luxuriance and healthiness the cocoa-palms on the north coast. The breeding of cattle for export is already one of the most lucrative of occupations, while the climate has been found to be singularly favourable, for a tropical one, for horses. The mineral wealth of the island has scarcely yet been tested, but Jamaica is known to be rich in copper, cobalt and lead. The fish on the coasts, as well as in the numerous fresh-water streams in the interior—an uncommon feature in a tropical island—are most abundant and in great variety, though the creoles and the negroes have the bad taste to prefer, as elsewhere in the West Indies, the imported salt cod from Newfoundland to the produce of their own native shores.

Amidst such an abundance of good gifts, it may surprise us to discover a reason why Jamaica has not advanced more rapidly in the development of her resources. There is a reason, however, which those who have any knowledge of the island will be at no loss to name. The island has not prospered—is not prospering, by reason simply of the diminution of its labouring population. It never will prosper so long as its improvement depends upon indigenous industry. Its very fertility and salubrity are fatal to all progress, if that progress is subject to such influences as those which have hitherto retarded the prosperity of Jamaica.—*The Colonies and India.*

CEARA' AND PARA' RUBBER SEED.—Mr. A. Scott Blacklaw writes from Dollar, Scotland:—"You will see by my advertisement that I have made arrangements for getting seeds from Pará, and Ceará in any quantity. I fear, however, the Pará rubber cannot be raised in Ceylon, from seeds brought from Brazil. They say in Pará that, if the seeds are longer than a month in a *dry* place, they will not germinate. I have no doubt of the Ceará seeds growing, if sent to Ceylon, in tins, dried from Ceará. A few bags of Ceará rubber seeds came to Liverpool, in the same steamer in which I was a passenger. I fear they will be of little use, as they were loose in bags, and of last year's picking."

A LEDGERIANA CINCHONA tree four years old on Warwick estate, New Galway, is now in flower, and Dr. Trimen has seen the blossom and pronounced the tree a true 'Ledger.' There are a good many more trees and plants very much the same on this property, but of course they have yet to be verified.

A NEW FIELD FOR ARABIAN COFFEE.—A correspondent of the Calcutta *Englishman*, signing "Planter," writes, as follows, of the prospects of Arabian coffee in Bengal:—This plant (Arabian coffee) thrives well and fruits abundantly in Bengal. The Agricultural and Horticultural Society of India at Alipore have some specimen plants in full bearing, the branches are bending with their load, and from a calculation made by me, I am prepared to satisfy any enquirer that no more profitable industry than this can be undertaken in Bengal. The return in profit is said to be enormous to any person who will go into it.

GOLD, GEMMING AND PLUMRAGO IN THE WESTERN PROVINCE.—The discovery of precious stones in new districts has led to increased activity in their search, and has afforded employment, and a precarious means of living to a large number of natives both in the Ratnapura and Kalutara District. The law regarding the rights of the Crown and the proper means to be adopted to stop gemming on Crown lands has for a long time been in an unsettled state. I am happy, however, to be able to say that at last a partial remedy has been discovered by criminal prosecution under the 19th clause of the Ordinance 6 of 1846, relating to malicious injuries to property, and the wholesale deprecations which were committed, by persons, not stealthily but in gangs of several hundreds, have now been checked. There is, however, no doubt that a special Ordinance is necessary, embodying the provisions of the Proclamation by Sir Edward Barnes dated 9th December, 1826. Sir R. Morgan stated in Council in 1872 that this Proclamation had still the force of law and was a very useful measure, but it has been found impossible to give effect to it; and as I believe that almost the only printed copy extant is in my possession, I shall be glad if greater publicity can be given to it by printing it as an appendix to this report. (*Vide B.*) The discovery of gold in the neighbouring continent of India has re-opened discussion of the question whether gold in appreciable quantities exists in Ceylon. For my own part, I have little doubt that it does so exist in the Sabaragamuwa District of the Western Province. In 1869, when stationed at Ratnapura, I collected some gold from the stream which ran through the Government premises, and forwarded it through Sir Charles Layard to Mr. Brough Smyth. That gentleman, whose opinion is authoritative, stated that the small pieces of gold were real "nuggets," and had not travelled far and that he had no doubt a careful search or prospect in the neighbourhood would be repaid. When visiting Ratnapura in the early part of this year, I procured some more gold collected from the same spot, and sent it through Mr. W. Ferguson to Mr. MacDonald Cameron, and the report of that gentleman was equally favourable. The attention of Government, I believe, has been already called to the necessity for framing rules to regulate and define the rights of private persons to gold found on private or on Crown lands, and it is not necessary therefore to say more on this subject. The Government has been successful in a suit taken before the Privy Council in appeal from the Supreme Court of Ceylon for the recovery of a valuable tract of land containing plumbago at Pelpitigoda in the Kalutara district, and, as before stated, 37½ acres of this land have been sold for 35,351 rupees, an average rate of 968 rupees per acre. This would seem to show that the plumbago is of superior quality.—*Mr. Saunders' Report for 1880.*

TEA.—Nearly all the local tea Companies in Assam have declared, or are about to declare, an *ad interim* dividend. A Darjeeling correspondent remarks that "this is a satisfactory contrast to the state of tea in this district at the same period of last year. At that time it was almost morally certain that very few concerns would do more than pay their way until the manufacturing season came round again. This year, it must indeed be a badly managed concern, which, unless it is very handicapped by having to pay heavy interest on borrowed money, or by other exceptional circumstances, which ought not to give a very handsome return on the season's expenditure."—*Madras Mail*.

JOHORE.—A correspondent writes:—"As some of your readers may feel interested in Johore, the enclosed letter has a passage or two which you may care to publish for their benefit:—"I was pretty well disgusted with Johore at first. I got such fever, nearly finished me up twice. A newcomer from Ceylon says, he had Wellawaya fever and all other fevers in Ceylon, but he never felt anything to come near the severity of Johore. Liberian coffee does first-class in the lowcountry. Cocoa is being tried with apparent success. Tea is also promising. You may have seen about some samples sold in London, at a high figure. All that is nice enough, but what's the good of it when we have not a plentiful supply of labour over which we can have complete control? So you see, the burden of my letter is an indefinite supply of labour."

THE GOLDFIELDS OF INDIA.—Mr Samuel Jennings is the secretary to the South Indian and Glenrock Gold-Mining Companies, and naturally, in some respects, his book assumes the shape of a eulogy of those particular undertakings. After observing that the direction of a reef is ascertained by tracing the line of outcrops on the surface, and its dip only by driving levels to intersect it at depth, he adds, "In fact, no so-called reef can be properly said to have been proved until such levels have been driven, or shafts sunk upon it." Further on, he remarks upon the deceptive nature of quartz surface boulders, which, instead of leading to true reefs, prove on examination to be no other than mere boulder rocks "carried to their present position by some tremendous convulsion of nature; and subsequently and by degrees partly buried in the earth." Mr. Jennings leaves his readers to infer how many companies may be working upon barren soil. From first to last he bears out our expressed opinion that gold does exist in India in workable quantities, and that a few fortunate companies in the best selected districts will reap considerable profits, while the majority will fail. Several of those promoted in England, we are aware, had but one initial intention—to sell worthless land at a fabulous price. It may happen, however, that the victimised shareholders may compel the vultures to disgorge. "Free gold," about the existence and discovery of which every prospectus is full "is but seldom met with." This assertion will not encourage investors, more especially when his further observations upon the conditions under which it is occasionally found are also read. Again, investors will do well to remember that assays, "can never be relied upon to indicate with any certainty how much profit may be calculated upon." But perhaps the most important lines in the book are those which exhibit the superhuman difficulties to be overcome ere Indian gold-mining will be fairly upon its legs. Judging from the remarks about labour, roads, railways, communication, and other obstacles to be conquered, some years may elapse before twenty shillings' worth of gold may be brought to the coast at a less expenditure. Of course some plots will prove richer than others; but, for the time being, shareholders as a body must hope for no return.—*Overland Mail*.

THE FOOD OF THE blue-bird, for instance, according to the *Journal of Science*, consists of 90 per cent. of insects and only 10 per cent. vegetable matter; whereas that of the sparrow consists of only 6 per cent of insects, the rest being fruit or grain.—*South Australian Register*.

PLANTING IN BORNEO.—Mr. Loyalty Peake writing from Matang, Sarawak, on the 2nd instant, gives the following news of his pioneering work in the Far East:—"I am still working away at cinchona nurseries, and hope to get the clearing burnt off this week. We shall shortly be forming a Cinchona Company here, with 1,000 shares at 100 dollars each. It will pay well with land and felling so very cheap. The Borneo Company will shortly commence gold crushing on a large scale. The Chinese have been making it pay for years. I spent a very pleasant fortnight over at Johore last month and had a good look at everything. I have managed to get hold of a few Tamils here, but they are not a good sample: Chinese are much better workers, but you must give them contract work to make it pay."

TEA.—Dr. Aitkin observes:—"The introduction of tea, as the beverage of a man of letters, is a curious circumstance in dietetical history. I cannot but regard it as a very valuable discovery, and I think the literary tribe are much indebted to those who contribute to familiarise them with the 'cups that cheer but not inebriate.' I scarcely ever knew a person fond of study who was not also fond of tea, unless he had contracted a relish for less innocent refreshment. It is not my purpose here to enter into a medical discussion of the qualities of this herb; but, from experience, I can affirm that unless taken too strong, or of too high a quality, its effects are perfectly salutary, and particularly favourably to sedentary habits."—*Home paper*.

TAMBRACHERY ESTATES AND WYNAAD GOLD MINING COMPANY.—The directors of this company, in a circular just issued, state that after mature consideration they are resolved to consider the sum of £20,000 in the light of profit on the sale of the portion of land disposed of to the Cootacovil Gold Mining Company (Limited). Out of this sum they recommend the shareholders to declare a dividend of 10 per cent., which will absorb £16,000, and to appropriate the remainder to cover preliminary expenses in England and India. The directors, after taking the best legal advice, find they are precluded from carrying out their original intention of returning a portion of the proceeds of the above land in the shape of capital, and no other course appears to be open to them excepting that proposed, without bringing the company under the act as "limited and reduced," which is undesirable.—*Overland Mail*.

CEYLON BEES.—The bee is undoubtedly a wonderful insect; but Ceylon claims to possess, in the *Apis dorsata*, the "most wonderful bee in the world." This insect is known among the Sinhalese as the Bambara, a name which is curiously suggestive of the familiar title given to the wild bee of this country; and its nests are hunted for by the natives in the thick jungles of the island, where, however, no attempt is made to domesticate it. An enthusiastic American apiarist, Mr. F. Benton, has succeeded in taking captive two or three colonies of this bee, which he hopes to take to America. In his search in the forest, attended by a party of bee-hunters, he astonished the natives by the manner in which he handled whole swarms of the insect, before a single irritated specimen of which a Sinhalese honey-collector has been known to flee for miles: for the Bambara is so savage that a strategic movement to the rear is advisable when a swarm, or even a single individual, is ruffled by improper handling, though escape from its sting is hardly possible. If the bee deserves the encomiums which Mr. Benton bestows upon it, it will no doubt receive fuller recognition than has hitherto been accorded to it.—*Colonies and India*.

TRINIDAD.—The condition of the newly-opened line of railway to Couva was described as exceeding unpleasant, owing to the uneven subsidence of the earth-work, which has not as yet had time to settle down. The *Port of Spain Gazette* said that the sleepers of American cypress were already showing signs of decay, and even now wanted relaying.—*The Colonies and India*.

AN ENEMY OF LIBERIAN COFFEE?—A correspondent in Pussellawa writes:—"I am sending you, by this post, a poochie, which I shall thank you to tell me the name of. I found it about three weeks ago on the stem of a Liberian coffee tree in its cocoon, out of which it came this morning." The "poochie" is a moth, *Suana cervina*, belonging to the family Bombycidae. It is an enormous female with her wings not fully developed, and her body greatly distended with eggs. The silkworm is also a member of the same family.

EXTIRPATION OF THE PRICKLY-PEAR.—Government are anxious to extirpate the prickly pear; yet it is frequently planted as a hedge by the ryots. The Collector of the Chingleput District has notified that, if the ryots wish to avoid having to spend their time or money in removing this nuisance, they should endeavour to meet the wishes of Government. The village officers and leading ryots should themselves use for fences the plant called *Kilovay Mooloo* or *Korookapully* instead of the prickly pear, and advise others to do so. Both these plants grow quickly, and the latter answers the purpose of fuel.—*Madras Mail*.

HOW TO DETECT UNWHOLESOME TEA.—A correspondent writes:—"Teadrinkers now-a-days will do well to apply the following simple test to the tea purchased of their grocers. Turn out the infused leaves, and if any are found a good brown colour, with fair substance, the tea will be wholesome, but if the leaves are black and of a rotten texture, with an oily appearance, the tea will not be fit to drink. The purer the tea the more the distinctively brown colour of the leaf strikes the attention. I am sorry to say that the mixing that is frequently adopted by the trade to reduce prices results in the two kinds of leaves being supplied together. I need hardly add that it is important to see that the leaves have the serrated or saw like edges without which no tea is genuine."—*Trinidad Chronicle*.

CEYLON DIRECT SUPPLY AGENCY.—We have received a circular which informs us that this agency, whose office is at 10, Cullum Street, Fenchurch Street, London, has been established for the purpose of supplying the public with tea (and other Ceylon produce) direct from the plantation in Ceylon. The C. D. S. A. teas are packed in 1 lb. foil bags, and the superior qualities in $\frac{1}{2}$ lb. and $\frac{1}{4}$ lb. samples as well, each quality being distinguished by a coloured label. These teas are also packed in useful hinged lid tins of 5 lb. and upwards, or may be had in original half or quarter-chests of 38 and 20 lb. We wish all success to this agency, the manager of which is Mr. J. D. Van der Straaten.

CEYLON TEA IN SYDNEY.—Mr. A. M. Cameron writes from Sydney, under date 7th Sept., as follows:—"I hope something will be done in the way of trying Ceylon tea in those pound and half pound packets here; but it must be of the best quality. There has been so much inferior—very inferior—Indian teas sent to these parts, that, while it is surely depreciating all Indian tea in the market, there is a good chance of the success of Ceylon tea. But, as I have said, it must be of very good quality. In my opinion, it will be a mistake to get the people here to confound Ceylon with Indian teas in general. Ceylon tea, for its own sake, ought to be kept distinct. I am willing to do what I can to sell it here, by auction, or otherwise, if I am favored with any consignments; but, as I have said, it must be good stuff, such as I can recommend to the best houses and residents here."

WALLAHA, September 28th.—A revolution in cinchona: No such thing as hybrids!—at least, so says authority. Dr. Trimen and Col. Beddome paid a visit to this district, and have declared all supposed hybrids to be distinct species, by name Pata de Gallinary. They only visited one estate, Eildon Hall. Their visit seems to have been kept a profound secret (more's the pity, as other estates could have shown several different kinds).

SOUTH COORG, 23rd Sept.—South Coorg has a worthy representative of the same family as your "Kumbuk tree" viz., the "Terminalia Coriacea," the Mutti Mara of the Canaree, and Kara Maradoo of the Tamils. On the Tittymutty, it is the principal forest tree and grows to an immense size, planks 3 feet wide all hard wood being readily obtained. The koorambers use it when burnt in place of chunam along with their betel. It also in some cases affords them a supply of water, slightly bitter and astringent, but most acceptable when no other can be got. The timber is entered as first class by the engineers in our D. P. W. The wood is beautifully veined and when worked up is almost equal to walnut, and I believe some of it has been sold in London as Indian walnut. For doors or windows it is not much used, as it contracts very much in the dry weather. At present it is loaded with seed but they are not ripe. Divi Divi (*Cassalpinia coriaria*) grows splendidly at Hoonsoor, but unfortunately nothing will grow under it. I believe a shipment of the dried pods was sent home, but a second not having followed I fear the price was not satisfactory. I am glad to see that the merits of the Coorg coffee is being recognised by planters out of Coorg and Munzerabad, and I have no doubt that Ceylon planters would much benefit by the trial of a few bushels of guaranteed Nalkenaad tree seed, and that once tried there would be a regular demand for the same. To make sure of having seed that can be depended on as being true to the kind, it is requisite (in my opinion) to give an order a full year beforehand, so that the trees may be selected in December or January, and marked with pieces of tin attached by wire to the stem. When marked, the ground must be carefully manured and dug up for 2½ feet round the stems and then thatched with hill or swamp grass all over the dug space, and to a depth of from 4 to 6 inches. When the blossom buds are sufficiently forward, the trees should then be well watered so as to bring the blossom out, and the watering kept up as required till the spring showers. If any trees adjoining those marked show any symptoms of having benefited from the water their blossom buds must be rubbed off before bursting so that there can be no chance of hybridization from those inferior trees. When the crop is ripe, equal care must be taken that none but the cherry from the marked trees is picked, and to ensure this the superintendent must see every tree done and remain with the coolies the whole time they are at this work. When pulped the beans should be mixed with dry ashes or powdered charcoal and then spread a bean thick on coir or date mats in one cool airy store which can be locked, and there remain till it is required for the nursery, or till packed and sealed for transport. Plants raised from a December seed nursery will be from six to eight inches high by the end of June, and just what is required for ball planting. In proof of the superiority of Nalkenaad plants over all others, I have only to name the Watta cooly estate Samphaji, where the only trees of the 1858-59 planting now left are a few that were brought by a Coorg planter as a sample of what he had for sale. The Ghauts once the very centre of coffeeedom in Coorg are now on the wane, no one caring to open there, the bamboo having so many advantages, chief of which are climate and soil alike suited for coffee and cinchona.—AN OLD BAMBOO.

THE INDIARUBBER INDUSTRY in Mozambique seems to be developing rapidly. In 1873 only £443 worth of India-rubber passed through the Custom House. In 1876 it reached the value of £22,198, and last year, according to figures given by Mr. Consul O'Neill, it exceeded £50,000. It would seem, however, to have reached its climax until communications with the interior are properly opened up, the careless cutting of the trees by the natives having resulted in the destruction of enormous tracts of india-rubber forest.—*Echo*.

COOLIES IN JAMAICA.—Some 400 coolies, adults and children left by the ship "Syria," Captain Blaker, for Calcutta on Monday last. We learn that some £6,000 were taken away in Bills, and nearly as much in gold coins, and a considerable quantity of jewellery. From the Government Savings Bank three men withdrew the sum of £1,200, and several others took little fortunes in the shape of gold coins as well as Bills. Truly the West Indies are lands more propitious of blessings to the East Indian foreigner than to their own sons. Jamaica is a land dropping with milk and honey for the coolie labourer.—*Gall's News Letter*.

AN AGRICULTURAL DEPARTMENT IN JAPAN.—The institution of an Agricultural Department by the Japanese Government is announced. The matters submitted to it for consideration by the assembly of local officials charged with the development of agriculture in their respective provinces are reported to be—(1) revision of the methods employed in preparing agricultural statistics; (2) exchange of seeds between the different prefectures, and their transport; (3) supply of manure; (4) establishment of a society for investigating fishery affairs, and the protection of marine productions, fish, seaweeds, &c.; (5) subject of rewards granted for meritorious services calculated to improve agriculture.—*London Times*.

WYNAAD PLANTING AND MINING ASSOCIATION.—At a committee meeting held on the 14th September, a communication from the Government of Madras and Collector of Malabar was read, the order from the Madras Government being as follows:—"As recommended by the District Officers of Malabar, the Governor in Council resolves to sanction the extension of the Coffee Stealing Act to the low land tracts traversed by the coffee in transit to the coast. The Government, however, consider that it will be sufficient to apply the act in the main roads from Wynaad to the coast. The Collector will accordingly report, at an early date, if this is not enough; and what roads should be specified in the notification." This was recorded with great satisfaction, and it was resolved that the Honorary Secretary address the Collector of Malabar praying that the act may be extended throughout the whole of the district and that a recognised form of pass be made obligatory; the said form to bear a revenue stamp of one anna and to be procurable at all Cutcheries and Post Offices. The rest of the business related to telegraphic communication, repair of roads used by the gold-mining companies, and sale of arrack. It was resolved that the annual meeting should be held on 5th Oct.

DATE COFFEE.—We see the Ceylon planters are beginning to cry out against the so-called Date Coffee, and no wonder; but if people prefer ground Date stones to ground Coffee seeds, as they say they do, we do not see that Government can interfere further than to insist upon things being called by their right names. Date stones, as we believe, contain not an atom of the peculiar alkaloid on which the value of Coffee as food depends. One enthusiast—or is he a wag?—fired by the success of the Date Coffee, proposes to grind the Orange pips, which are as plentiful as Blackberries in Spain, into "Orange Pekoe"!—*Gardeners' Chronicle*.

PALM SUGAR.—It is not to be supposed that the price of coconut oil will always remain as low as it is at present, and we hope and believe that there will soon be an improvement, but as a similar depression in the oil trade may at any time happen again, it might be worth while to try if part of the produce of the coconut tree cannot be profitably converted into sugar. Perhaps it would not pay, but the same thing used to be said about beet root sugar, and yet the beet root is now largely cultivated in France for the purpose of sugar making. It is not, therefore, unlikely that if as much attention were given to the manufacture of palm sugar as has been given to that of beet sugar, similar success might be attained. Indeed it used to be said that sugar could never be profitably made in this country from the cane, and yet it has been done, and still continues to be done at Baddegama, near Galle. In the Kalutara district, coconut trees are grown more for toddy than for nuts. Most of this is used for making arrack, and some for conversion into vinegar, but a considerable quantity of it is made into jaggery, which is the only kind of sugar in common use among the poorer classes in this country. The farms in France are generally of small size, and the French farmers have not much capital, but they do manage to grow beet root and make sugar of it by having sugar factories conducted on the co-operative system. Considerable quantities of palmyra jaggery are sometimes exported from the Madras Presidency to England for making refined sugar, and we do not see why cannot jaggery—and kitool and palmyra jaggery too for that matter—should not be exported from Ceylon for the same purpose. Most of the sugar now consumed is made from the cane, but palm sugar is probably of more ancient use than any other kind.—*C. Messenger*.

GOLD ON THE NILGIRIS.—Assays of Nilgiri quartz quartz were made by Mr. F. Claudet, Assayer to the Bank of England.

	ozs.	dwt.	grs.	
The best result was.	2	12	12	gold.
and...	1	12	0	silver.
The worst result was...	10			gold.
...	9			silver.

} per ton of quartz

The other three assays were made by Messrs. Johnson Matthey & Co., Assayers to the Bank of England, and H. M. Mint:—

	ozs.	dwt.		
The best result was...	3	5		gold.
do.	1	10		silver.
The worst result was...	0.250			gold.
do.	0.100			silver.

} per ton of quartz

Mr. C. Harvey saw some of the quartz from these hills in England, and said that it was some of the best stone he had seen from India. I have been shewn the results of panning pounded quartz, and of sand in the rivers, near these reefs, and also in one case of the surface soil, on a very reefy looking bit, contiguous to a reef; and the results, judging from what I have seen in other places, were simply splendid in every instance. I have also been shewn several very fine specimens of gold that were taken from these hill reefs. With the immense natural advantages that there are on these hills, in point of climate, water, position, and local labor, it is a wonder that the investing public have not been induced to turn their attention to these parts, or that our wealthy Australian cousins have not paid us a visit. When once this new industry is started up here,—and surely some one will be enterprising enough to try it soon, however slow they may be in getting results in the Wynaad,—it will give a tremendous impetus to every branch of work up here, and it would not be long before we had the train running up to Coonoor, with or without the help of Government.—*Cor. Madras Mail*.

HORTICULTURE.

(Asian.)

CELERY (*Apium graveolens*).

Few vegetables are more benefited by good culture than the above. If it receives any check during its entire growth, the result is that it either becomes tasteless or stringy, or bolts, and not unfrequently both. The first sowing should be made in pans in July; the seed at this period will, however, frequently take from five to six weeks to germinate. As soon as the plants are large enough to handle, they should be transplanted to a nursery bed, where they may remain till large enough to be planted in the trenches. They must, however, be carefully protected with mats during the continuance of heavy rains; the main sowing should be made in the open ground by the first week of September. The seed at this time will germinate more quickly, and the plants will not be more than ten days or a fortnight behind the first sowing. When the plants are five to six inches in height, trenches must be prepared to finally plant them into. The trenches should be from nine to twelve inches deep, and about fifteen inches wide, the soil from which should be placed evenly on each side; then add four or five inches of thoroughly decomposed rich manure. This must be well dug in and thoroughly incorporated with the soil. The plants may then be planted at once. Care should be taken in taking up the young plants from the nursery beds not to injure the roots in any way; they should therefore be removed with as much soil adhering to them as possible. The principal attention they will require for the next two months will be to supply them with water and rich liquid manure as frequently as it is possible to do so. Earthing up should not be commenced until the plants have attained a height of at least 18 inches. A dry day should be selected for the operation. Before commencing, all the small lower leaves and any side shoots they may have formed should be carefully removed; then proceed by cutting down a portion of the soil on each side of the trench. Break this up finely and place the soil round the base of each plant with the right hand, which should be held in position by the other. Do not press the soil too firmly around the heart, and avoid letting pieces of the soil fall inside the plants, otherwise in all probability they will grow crooked. The market gardeners who supply the Calcutta bazars adopt another method for blanching the plants, which is to mould up the plants in the ordinary way to a height of about four inches only, and as soon as the plants have reached maturity, tie up the remainder of the stem in a plantain leaf. Another plan, and one which on account of its simplicity will certainly recommend itself to public favor, is to place ordinary drainage pipes, about 15 inches in length and four or five inches diameter, over each plant as soon as it has made its full growth. By either of these systems the heads will blanch more quickly than by the old plan of earthing up, but they invariably lack that sweet, nutty flavour which should be present in all good celery.

The best varieties in cultivation are:—

<i>White Varieties.</i>	<i>Red Varieties.</i>
Sandringham Dwarf White.	Wright's Grove Red.
Wright's Grove White.	Cole's Defiance Red.
Cole's Superb Crystal White.	Manchester Prize Pink.
Seymour's Superb.	Sulham Prize Pink.

CAPSICUM (*Capsicum*.)

The ordinary varieties of the capsicum are so well known and so extensively cultivated in this country that they hardly need be mentioned here; for, no matter how small a garden may be, and possibly without another vegetable in it, wherever a native *mallee* is employed two plants are certain to be found there—these are the common chili and toosle (*Ocimum sanctum*), a plant held in great reverence by the Hindus.

There are, however, several new varieties introduced

during the past few years which are deserving of a place in every garden—not for the value of their produce, but rather for the extremely ornamental character of the plant. The best of these are: "Monstreuse," "Prince of Wales," and "Princess of Wales;" the former has enormous fruits, frequently four inches long and six inches in diameter. Any of these are easily raised from seed sown in October in light, rich, sandy soil. As soon as large enough they should be planted singly in pots filled with a light rich soil well enriched with old manure or leaf mould. As soon as established they should be placed in a position where they are fully exposed to the sun throughout the day.

CARDOON (*Cynara cardunculus*).

A plant closely allied to the artichoke and much resembling it in its foliage. It is extensively cultivated on the Continent, but is but little known in England, and is but rarely, if ever, seen in India. Firminger thus describes the method of growing it:—"The seeds are sown at the same time and in the same manner as those of the artichoke. When the young plants are about nine inches high, they are put out at a distance of three feet apart in ground that has been well enriched with manure; they are then treated in the same way as celery. When the vegetable has become blanched by being earthed up, it is ready for use, and is taken up and stewed like "sea kale."

THE CARROT (*Daucus carota*).

This vegetable requires a deep, rich, light, sandy soil, and one that has been heavily manured; the season previously suits it best. In preparing the ground for them it should be trenched to a depth of two feet for long varieties, and about twelve inches for the short kinds. Care must be taken that the soil is carefully broken up and pulverised finely. If the soil has been liberally manured for the previous crop, and the soil moderately rich, no fresh dressing should be given, as fresh manure has a tendency to cause the roots to become forked. When, however, the soil is poor, a liberal supply of very old leaf mould or cow manure should be added. This must be placed about six inches below the surface, as it will then have the effect of drawing the young roots downwards. To promote a vigorous youthful growth, and enable the young plants to grow freely, some recommend that the drills be drawn deep enough to allow of a small quantity of well-rotted manure being placed at the bottom, and after covering this with a little fine soil the seed should be sown.

The first sowing of the horn varieties may be made on a raised bed early in September, and successional sowings every ten days thereafter. Sowings of the long kinds should be commenced in October, to induce the seed to germinate quickly. Before sowing it should be steeped in water for six or eight hours; it must then be thoroughly mixed with ashes or dry sand, and sown in drills nine inches apart for the small kinds, and twelve inches for the larger sorts. As soon as the plants are three or four inches high, they should be thinned out to a distance of six inches between them. The crop must be kept clear of weeds, and the soil frequently stirred around the roots; they must also be kept liberally supplied with water during the whole period of their growth.

As soon as they have attained maturity, they should be carefully taken up without damaging the roots, and after cutting off the tops to within an inch of the crown, and allowed to dry in the sun for two or three days, should then be stored in dry earth or sand for future use.

CRESS (*Lepidium sativum*).

In the open ground sowings cannot be made safely till the expiration of the rains in October. A small quantity of seed should be sown at short intervals to keep up a regular supply. By adopting, however, the process generally employed in England for forcing it,

we may have it in season all the year round. The seed should be sown in pans or boxes filled with a very rich soil; after being well watered the seed should be scattered thickly over its surface. It must be covered with a pane of glass till the seed germinates. If kept in a shady position it will grow quickly and be ready for use in from ten to twelve days from the time of sowing. Cultivated in this way it is much more delicate in flavour than that grown in the open ground.

AMERICAN CRESS (*Barbarea præcox*).

This is easily grown in any damp, shady situation in a good sandy soil, sown at the same time as the ordinary cress. In flavour it somewhat resembles the water cress, but is decidedly inferior to it, so that when conveniences exist for growing the latter, this may certainly be dispensed with in a garden.

WATER CRESS (*Nasturtium officinale*).

This, although naturally a perennial, can only be successfully cultivated as an annual in this country. The situation best adapted to it is a water-course or drain where there is a regular stream of clear running water. This is, however, next to impossible to obtain here during the cold season. The method therefore generally adopted is to sow the seed in gunlahs, the soil in which must be kept constantly moist. As soon as the plants are two inches high, they should be transplanted closely into other pans three-fourths filled with a compost made of equal parts of sand, coarsely broken brick and leaf mould. These should be placed at the edge of a tank, the top of the pans being kept on a level with the surface of the water. Of course as the water sinks in the tank it will be necessary to have the pans occasionally lowered. Another plan which I have seen successfully tried on several occasions, and which possesses many advantages in its favour, is to construct a small raft or frame of any common jungle wood. On this securely fasten a tray or box, about six inches in depth, of any size that may be required. This should be filled to within two inches of the top with the same compost as recommended for culture in pans, and the plants transplanted into it in the same way. The only precaution necessary is to see when the apparatus is complete, that it is so balanced as to keep the surface of the soil slightly below the water level. It may then be moored at the side of the tank or allowed to float about, when, if properly made, forms a pretty ornament. The great advantage of this is that after the plants are once established, they require no further attention. Where a tank is not available, they may also be grown in pans sunk in the open ground. Great care must, however, be taken to keep the soil in them constantly covered with water, and which, to produce a good crop, must be changed daily.

CUCUMBER (*Cucumis sativus*).

All attempts to cultivate the many splendid English frame varieties of this delicious vegetable in this country have, I believe, invariably proved fruitless. Whether it is owing to any peculiarity of the soil or atmosphere remains to be proved. Firminger seems of opinion that it is principally owing to the ravages of a kind of beetle with which they frequently become infested, but this certainly is not the only cause, for even if plants are grown under glass, and carefully protected from every insect, the result is the same. The seeds germinate freely enough, and the plants grow vigorously till they have formed five or six leaves; they then, from some unaccountable cause, obstinately refuse to proceed further, and gradually dwindle away. Strange to say all the varieties of English melons, vegetable marrows, and in fact nearly all the members of the *Cucumis* or *Cu urbita* family, when grown from imported seed fail in the same way.

There are, however, two varieties of cucumber indigenous to this country. These, although considerably

inferior in quality to the English varieties mentioned above, are still, when well grown, quite equal to those grown in the open air at home. They may be grown at almost all seasons of the year, and require but little attention, provided they are planted in good rich soil, and have a trellis or tree on which to climb fully exposed to the sun. They should be cut for use when very young, as, if allowed to reach their full size, they generally become tough and tasteless.

ENDIVE (*Cichorium endivia*).

This is not a very popular vegetable, although it is certainly deserving of more attention than has been bestowed on it in this country. The curled varieties especially are particularly useful, being greatly appreciated by many when cooked in the same way as other green crops, or when well blanched, it makes a salad almost equal to the best lettuce. The seed may be sown from August to December. For an early supply the first sowing should be made in pans, and as soon as the plants are two inches high, they must then be transplanted into beds of rich soil, to which a liberal dressing of very old manure has been added. They should be placed at a distance of twelve inches apart in the rows. As soon as they have made their full growth, they should be closely tied up to blanch in the same manner as lettuces. Some recommend that the plants after being tied up should be covered with a flower pot to induce them to blanch quickly, provided they are properly looked after. Undoubtedly this is the quickest and most certain method of blanching, but if they are at all neglected, and the pots not removed daily and carefully tried, the consequence is that the plants invariably decay.

INDIAN CORN (*Zea mays*).

This plant is so well known to every native gardener that it is hardly necessary to mention anything regarding its cultivation here. The sorts generally found in our gardens are the small seeded varieties so extensively grown as a field crop in almost every part of India. These are, however, very inferior both in point of size and quality to the many splendid varieties imported from America; these, whenever procurable, should be grown in preference to any other.

The best time for sowing is at the commencement of June, before the rains set in, but successional sowings may be made till September, although the produce will be inferior to that of the first sowing. Firminger recommends that the seed should be sown in rows twelve inches apart, and the grains eight inches in the rows. From my own experience I should say the crop would thereby be considerably too crowded; even a distance of eighteen inches each way will not be found too much. An American writer thus describes their method of cultivation: "Plant in hills about three feet apart; place a shovelful of manure or a handful of poudrrette in each—five or six grains to a hill is sufficient. When up thin them out, allowing three of the strongest plants to remain. Thorough cultivation is necessary to secure a good crop."

JERUSALEM ARTICHOKE (*Helianthus tuberosus*).

This is a very useful vegetable, and is much cultivated in some parts of India where potatoes are not procurable at the time it is in season. The tubers should be planted in April or May in the open ground, in rows two feet apart and eighteen inches between the tubers, and about four inches deep. If grown in a good rich soil no manure should be given them, as it often has the effect of causing them to form too much stem, instead of producing good tubers. They will be ready to take up by the end of October, and as soon as they are dry, should be carefully stored in sand or earth, as, if exposed long to the air, they invariably shrivel up and become useless.

KNOL KHOL OR KOHL RABI—TURNIP ROOTED CABBAGE
(*Brassica oleracea caulo rapa*).

A popular variety of the cabbage tribe principally valued in this country on account of its coming into season earlier than any other European vegetable. There are two distinct classes of this plant, namely, the green and the purple varieties, some of them growing to an enormous size. These, however, are not suitable for the garden, being very inferior in quality in comparison with the smaller kinds, the best of which are early white Vienna and early purple Vienna.

Its cultivation is the same in all respects as that of the cabbage, except that when planted out they should only be placed at a distance of eighteen inches between the rows, and about twelve inches from plant to plant. The soil in which they are grown can hardly be made too rich, and as soon as the plants commence growing freely, they should be supplied with frequent dressings of strong liquid manure, the great object being to induce the plants to make a rapid, vigorous growth, otherwise they invariably become tough and fibrous. They are best suited for the table when about the size of a cricket ball.

LEEK (*Allium porrum*).

The leek is but little cultivated in Bengal, and is rarely to be found in our markets. This is certainly not owing to any difficulty in its cultivation, for, providing good seed is procured, it can be grown most successfully with proper treatment.

Seed should be sown early in October or as soon as the rains are over, in a light, rich soil. When the plants are about six inches high, they should be transplanted into trenches prepared in the same way as for celery, but they need not be more than eight inches wide. The plant should be placed in the rows at a distance of not more than five or six inches apart. In planting, the seedlings should be placed at least three inches deep in the soil, and as they increase in growth, should have some light, rich soil drawn round the stems to insure their being properly blanched. They must be kept liberally supplied with water, and are also much benefited by frequent dressings of strong liquid manure.

THE LETTUCE (*Lactuca sativa*).

Lettuces are especially partial to an open, deeply worked, and well enriched soil, and to an abundant supply of moisture throughout their whole growth. Not only is this necessary to insure a free growth, but also to secure such an amount of crispness and natural succulency as alone constitute the highest merits of this important salad plant. The lettuce is divided into two distinct groups, namely, the cos and the cabbage varieties, both of which thrive equally well in this country, although probably the cabbage varieties are best adapted for very early crops being of a harder nature. Sowings may be made for an early crop in pans or boxes in August or September, and as soon as they have formed four leaves, should be transplanted into well raised beds. They must, however, be protected from heavy rains, otherwise they are liable to damp off. For main crops after the rains are over, sowings should be made in the open ground in drills twelve inches apart. As soon as the plants are sufficiently strong, they should be thinned out in the rows, leaving nine to twelve inches between the plants of the cos varieties, and fifteen inches for the larger kinds of cabbage. The plants that are removed from the drills should be transplanted into a bed of rich soil and carefully shaded for three or four days. These will form a good successional crop to those left in the original bed, although they will not be equal to them in size, as the finest lettuces are always produced from the plants that are allowed to remain in the place where the seed is sown. As soon as the plants are large enough a few should be tied up at intervals of three or four days to blanch them. This operation must only be performed when the plants

are quite dry; it is therefore best done in the afternoon of a bright sunny day. After being tied up care must be taken not to water the plants overhead, otherwise the water settling between the leaves frequently causes the hearts to rot.

The red ant is particularly partial to the seed of this plant, and in gardens much infested with this insect it is almost impossible to raise plants in the open ground. In such a case it is necessary to sow the seed in pans or boxes filled with coarse soorkee or gravel, to which may be added a small quantity of leaf mould. These must be placed in such a position that the ants cannot get to them; this is easily managed by procuring gum-lahs about the size of ordinary seed pans; fill these with water and then invert an ordinary six or eight-inch flower pot in each, on which must be placed the pans or boxes. If care is taken that the gum-lahs are kept constantly filled with water, this will form an effectual barrier to ants or any other insect.

THE MELON (*Cucumis melo*).

Innumerable attempts have been made in this country to cultivate the many varieties of melon now so much grown in England, but invariably, I believe, without success. There are various reasons adduced as to the cause of this:—some attributing it to the climate, others to the ravages of a particular kind of beetle, which, strange to say, has a happy knack of always turning up wherever a plant of the melon or cucumber family grown from imported seed is to be found, and yet they leave plants raised from indigenous seed entirely unmolested. Possibly, this insect acts on the same principle as the mosquito which is well known to have a peculiar penchant for new comers. I do not think either of these reasons sufficient to account for such an invariable failure—in the first place as regards climate. In England they are generally grown at an average day temperature of eighty-five and a night temperature of about seventy degrees. In most parts of Bengal at certain seasons of the year there would be but little difficulty in keeping a glass house or frame at the above temperature, and with reference to the insect theory, it is certainly, if not actually, a myth—at least considerably over-estimated, for, admitting the presence of the pest, still it is quite easy to protect the plants from its ravages.

Till such time as some better reason is brought forward to thoroughly convince the most sceptical of the impracticability of its culture, we ought certainly to persevere, as possibly by some happy chapter of accidents it may eventually fall to the lot of some fortunate amateur to discover a method by which we may be able to have a Hero of Bath or "Scarlet Gem" on our tables at a tenth of the cost it takes to produce them by our more fortunate friends at home.

There are one or two kinds of melon (*Kurboosa*) extensively grown in Bengal. These probably originally came from Cabool. They have, however, become quite domesticated here, and require but little care in their cultivation beyond being planted in a light, rich, sandy soil and liberally supplied with water. Closely allied to the melon we have the phootee (*Cucumis mormodica*). This is cultivated in the same manner as the preceding, but is very inferior to it in flavour.

THE MUSHROOM (*Agaricus esculentus*).

Although mushrooms are found growing wild in many parts of Bengal, it seems doubtful if any of these are the true *Agaricus campestris* so extensively cultivated all over Europe, although probably they are closely allied to it. Very few attempts have been made to cultivate the mushroom artificially amongst us, although we have every convenience at command, the only difficulty being to procure good spawn. This may be overcome by importing it from Europe at the commencement of the cold season, and probably even it might be artificially produced here by the same method as adopted in Europe.

The following taken from "Burbidge's Propagation and Improvement of Cultivated Plants," graphically describes the whole process of cultivation both in growing from spawn and also to produce the same artificially:—

"The great essentials to the development of the common Mushroom are a moderate heat of 60° to 80°, accompanied by a humid atmosphere, and a moderate amount of light. According to some authorities they absorb a large amount of nitrogen; but the direct application of nitrogenic manures to the soil does not appear to influence their growth in the open ground. The common or edible mushroom is readily propagated from spawn, that is cakes or bricks made of horse dung, cow dung, loam, and chopped hay well mixed together and made into flat bricks, and to these cakes the mycelium of the mushroom is added, either from a pasture where mushrooms are found in abundance or more often from previously made spawn. After the cobweb-like mycelium has spread through the compost in every direction, but before the more perfect threads have time to form, the whole is formed into bricks or cakes, and then dried; and curiously enough the mycelium thus treated retains its vitality for a long time, and soon develops itself when placed in a moist, firm compost or bed of horse droppings and soil, in a warm and humid atmosphere; the flat cakes are about ten inches long, and five wide, and vary from 1½ to 2 inches in thickness. By some spawn cakes are made of cow dung, horse dung (that from horses at grass being best), sheep dung, loam, and chopped hay, the latter being used to bind the whole firmly together. After these are made they are laid on laths to become partially dry before the spawn is added. They are then taken and placed in alternate rows of heated manure, and as each brick is added a hole or two is made in it with a pointed stick, and the cavity filled with previously made and tested spawn. The bricks should not touch each other; and when a stack has been made, cover the whole with a layer of the heated droppings, which, by gently heating the cakes, causes them to be completely pervaded with mycelium.

Spawn may be made in a covered and dry, but not too airy, situation. The corner of a barn or that of an out-house or even of a stable are favorable places for its development. The bed in which it is to be generated should be made early in May, and the following are the materials employed, which may be reduced to smaller proportions if necessary—fifty-six barrow loads of fresh horse dung, six barrow loads of good garden soil, and one barrow load of fresh wood ashes which have not been wet, with half a barrow load of pigeon's dung fresh from the pigeon house. The whole should be watered lightly with cow's urine or water from manure heap. When the mixture has been properly made, after various turnings it should be placed to the depth of a foot along a wall; the width may be left out of the question, but it requires a certain bulk in order that it may heat gently. The bed must be trodden firmly, and at the end of ten days the consolidating process must be repeated, and ought to be continued two or three times a week until early in September. The manure thus prepared is cut with a sharp spade into blocks of about a foot each. These are then left to dry in any airy place from which sunshine, and above all, damp, are excluded. These bricks are placed on their sides and turned from time to time. Spawn thus made will keep good from ten to twelve years if it is placed in a dry position free from frost. The spawn being thus prepared we pass on to the next stage, namely the production of mushrooms. To grow a crop quickly it is necessary to engender a moderately lasting artificial warmth in the materials employed. Get if possible to maintain them as free as possible from decay, and with a moderate latent moisture only. The place best adapted for their production is a rather damp godown or out-house; in this should be arranged a row of shelves

at a short distance from the ground, on which the material in which the Mushrooms are to be grown should be placed to the depth of eighteen inches and firmly beaten down. The compost best adapted for this purpose is prepared as follows:—Fresh horse droppings six parts, cow dung two parts, sheep dung two parts, garden soil four parts, and fresh wood-ashes one part. Before these are mixed they should be allowed to dry in the sun for two or three days to take off the excess moisture. After being mixed, and the beds made on the shelves as described above, they should be allowed to remain for five or six days, till fermentation commences. As soon as a moderate heat is perceptible, the spawn should be added; this is done by making holes in the surface about twelve inches apart and three inches deep; in each of these a small piece of spawn, about two inches square, is inserted. After having first been dipped in tepid water, these should be slightly covered with the compost and the whole beaten down firmly. After a month the beds should be covered with about two inches of light, rich soil, and the whole again beaten down, and then well watered; it will then require no further attention beyond occasionally watering the walls and floor of the house to promote a damp atmosphere. If properly managed the beds should commence bearing freely in about eight weeks from the time of spawning them.

THE ONION (*Allium cepa*).

The principal difficulty in the cultivation of the onion in this country is to procure seed that will germinate even in Europe. When it is more than a year old, it will but rarely grow satisfactorily. It is hardly surprising therefore that we should be frequently disappointed in our attempts to produce a crop from imported seed. Acclimatised seed, however, germinate freely, and when a crop is grown to be drawn, when young for salads, etc., it is preferable to use this, as there will then be no fear of a disappointment providing fresh seed is procured.

The onion is a very gross feeder, and requires deep cultivation; a light, rich sandy soil suits it best; the ground should be trenched to a depth of at least two feet, adding at the same time a heavy dressing of manure. Sowings may be made early in October in drills nine inches apart. After covering up the seed, the beds should be trodden or beaten down firmly. As soon as the plants are six inches high they may be thinned out to a distance of six inches apart in the rows. The crop must be kept plentifully supplied with water, and frequent dressings of liquid manure will materially conduce to the production of a good crop.

The young plants removed from the seed bed should be drawn carefully without injuring the roots, and transplanted into other beds. If carefully managed these will produce almost as good crop as those left in the seed bed. In planting out, however, it is necessary to notice that they are not put too deeply in the soil, otherwise this will prevent the proper formation of the bulb. As soon as they become ripe they should be pulled up and placed on mats to dry, fully exposed to the sun for a few days, taking care to remove them inside at night. When they have become thoroughly dry, they should be carefully cleaned and stored in sand in a cool dry place.

There are an immense number of varieties now grown in Europe; many of these however in consequence of their taking a long season to attain maturity are not adapted to this country. It is, therefore, advisable to select those sorts which are of a quick growth, such as "white Spanish" or the Tripoli varieties.

PARSLEY (*Apium petroselinum*).

This, although a perennial, can only be grown successfully as an annual in this country. Sowings may be made in pans under shelter in August; by the end of the rains these will have formed strong plants, and should then be planted out into beds of well manured

soil at a distance of six inches apart. A second sowing may be made in the open ground in October; this will not require to be transplanted, but the plants should be thinned out to the distance mentioned above. A slightly shaded situation suits it best; the seed will be found to germinate much more freely, if it is steeped in water for three or four hours and then well mixed with dry ashes or sand before sowing.

THE PARSNIP (*Pastinaca sativa*).

This vegetable is but very rarely grown in Bengal; the principal difficulty in its cultivation seems to be to induce the seed to germinate, as when once the plants are above ground they require no more care than the carrot. A mistake too frequently made by many is in sowing the seed too early before the soil is in a suitable state for it to germinate in. It is always advisable to delay sowing till the first week of November, when, if a light, rich, friable soil is available, a good crop may generally be grown without difficulty, for it is more frequently owing to the seed rotting in the soil from an excess of moisture than from any actual defect in the seed that produces so many failures in the attempt to grow this vegetable. The seed may be sown broadcast or in drills at a distance of nine inches apart, and as soon as the plants are four or five inches high, they should be thinned out to the same distance in the rows. They must be kept liberally supplied with water, and an occasional dressing of liquid manure will also be found beneficial.

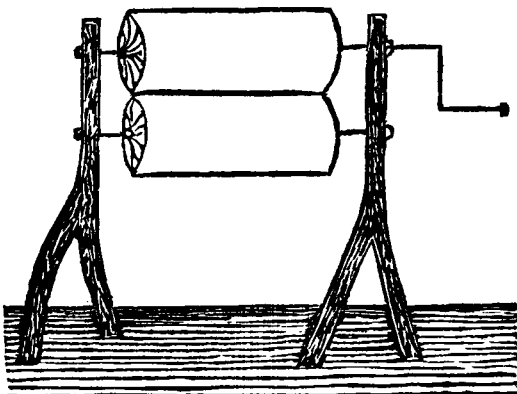
RUS IN URBE.

THE PLANTAIN TREE AND FIBRES.

The following paragraphs and illustrations of Mr. Liotard's memorandum were omitted by the *Journal of the Society of Arts* in its abstract, given by us on page 297 of the *Tropical Agriculturist*. We reproduce them here from a Madras Government paper. The first part as far as "rainy season" should come in after line 13, col. 1, page 298, and the second part, "In thoroughly conducting * * * each hand," should come in after line 43 of the same page and column.

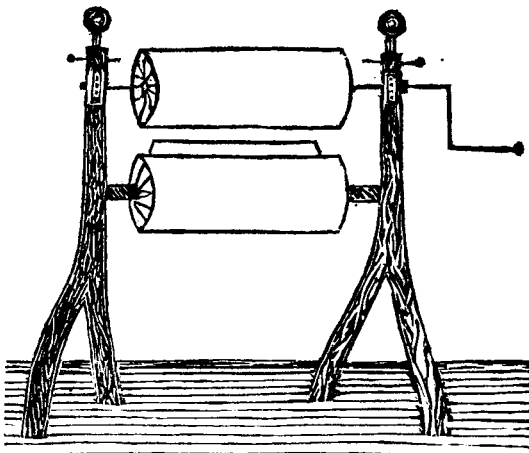
When cut and divided strip by strip, each class of the strips should be separately subjected to a process of crushing. For this and subsequent processes some simple, cheap, and efficient mode of treatment is requisite; and the machinery to be used must, moreover, be light and portable. As a beginning I would suggest the following processes which I have tested practically with good results.

In the first place the fresh cut strips (about two inches wide and on an average five feet long) should be simply passed through a pair of rollers, like those employed by Bengalis in expressing juice from the sugar-cane; or the contrivance sketched below might be adopted:



The rollers might be two feet in length and eight inches in diameter, and should be of any strong wood which can easily be procured. Stone rollers might not be easily procurable; iron ones would, if not very clean, discolor the fibre, and both will in any case have the disadvantage of being more costly and less portable. By using the rollers the strips will be crushed, but not so as to injure or tear the fibre. If necessary, the strips can be passed twice through.

The strips being crushed, the next thing to do is to entirely remove all the cellular tissues and coloring matter which, by the crushing, will have been loosened. A simple way of doing this would be to use a pair of wooden rollers of the same size as those just mentioned, but constructed thus:



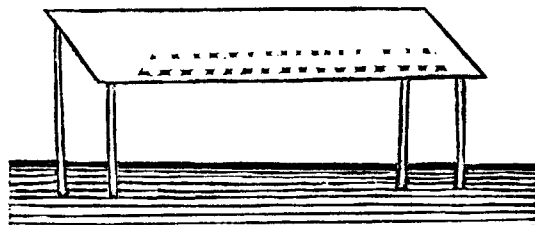
The lower roller would be a fixture, with a blunt wood or horn blade fixed into it, so as to stand against the space between the two rollers with a very slight slant on one side. The upper roller would be turned by the hand. The crushed strips should be placed between the rollers from the side on which the blade slants. Then the upper roller being turned will draw the strip through between itself and the blade, thus scraping away most of the pulpy matter which will have been loosened by the previous set of rollers.

After being passed a first time, the peg on both ends of the upper roller should be lowered into the posts in order to lower the upper roller so as to leave a minimum of space between it and the blade. The strip should then again be passed through, once or twice, when it will come out quite free from all pulpy matter. In every case the strip should be passed through with some care.

When cleaned in this way, the fibrous material resulting will be well suited for paper-making, and will only need drying to fit it for baling and despatch.

But for cordage and textile manufactures we should go a step further; we should comb the fibrous material, or (as it may more properly be called) the clean fibrous strip. This can be done by laying the strip flat on a board with pegs arranged close together thus:

The puller stands on this side.



The strip, on being pulled over the pegs, will be divided by the first and sub-divided by the second row of pegs. The result will be very fine strips of fibre which can be dried, baled, and despatched as marketable stuff. The cordage or textile manufacturers will then easily be able to extract single *individual* fibres out of the stuff for their industries.

I must explain that the pegs must *not* be of iron, as they would discolor the fibre; they should be of bamboo, the second row being finer than the first, and both rows being close in together so as conjointly to produce the effect of a fine comb. One single row does not answer so well as two rows.

The whole operation, from the cutting of the trees to the combing of the clean strips, should be done in one day. No water should be used at all, and the product of each class of layers should of course be treated separately.

The fibrous material, whether simply crushed and cleaned in strips for paper-making or also combed for cordage and textile manufactures, should be dried, not by being spread on the ground, but by being laid out in the sun, or in any airy place, on ropes, as the washermen lay out their clothes. The material will be dry in a very short time, but it should on no account be exposed to wet or to the night dew, and should be perfectly dry before being baled. And it follows from this, that the extraction of the fibre from the plantain tree had better be done during the day than during the rainy season.

In thoroughly conducting the trials on one, or two, or more species of the plants, the following particulars could no doubt be carefully noted:—

- the name and rank of experimenter,
- the species operated upon,
- the locality and district,
- the weight of the trees cut down,
- the weight of dry fibre obtained,
- the cost of the operation.

Samples of each class of fibre would be preserved for valuation. The object would be the production of a marketable fibre from indigenous plantain trees by some cheap and ready process of extraction such as is here indicated, in view to serving—

- (1) paper-makers, and
- (2) cordage and textile manufacturers.

That these suggestions will produce good fibre I have no doubt, as I have tested them practically on the Native variety of plantain known in Bengal as the *kanch-kella*, which does not produce such good or so much fibre as the varieties I have now referred to.

The working charges will not, I believe, be prohibitive, for the implements I have suggested are anything but costly, and they can easily be carried about the plantations, thus obviating the necessity of otherwise carrying the plantain trees themselves which are heavy to transport. The cost of manual labour can be reduced by making three men work two pairs of rollers and passing four strips at a time. This can be done by placing one man to turn one pair of rollers with each hand, and by having each of the two other men to pass a strip with each hand.

ENCLOSURE No. 2.

Letter from H. W. J. Wood, Esq., Secretary to the Bengal Chamber of Commerce, to the Officiating Under-Secretary to the Government of India, Simla, dated Calcutta, 2nd June 1881.

I am directed to acknowledge the receipt of your letter, No. 132, of the 21st of April, on the subject of fibre obtained from the plantain tree by the process described in the memorandum drawn up by Mr. Liotard of your department.

2. As the Committee of the Chamber of Commerce have no practical knowledge of the matter, the samples

of fibre, together with your letter and its enclosure, were referred to the Agri-Horticultural Society for report; and the Committee of the Chamber place before you the opinions of those whose practical experience will no doubt be accepted by the Government as a guide in any future experiments that may be conducted with the view of making a valuable addition to the industrial resources of the country:—

"I have submitted to our Committee your letter of the 19th instant, and the papers accompanying and the minute specimens of plantain fibre therein referred to. They are of opinion that they are very prettily got up, are much too good for paper making, but might be useful for cordage. It is, they add, impossible to quote values on such small specimens."

"If Mr. Liotard can prepare a *large* quantity of fibre similar to the specimens *at a moderate cost* it should pay well, probably as a substitute for Manila hemp."

ENCLOSURE No. 3.

Extract paragraph 1 from a letter from the North-Western Provinces and Oudh Government, No. 910, dated 9th June 1881, to the Secretary to the Government of India, Home, Revenue and Agricultural Department.

In reply to your letter, No. 6-125, dated 21st April 1881, regarding the cultivation of Manila hemp in these provinces, I am directed to say that inquiries concerning this plant had previously been made by the Department of Agriculture and Commerce, North-Western Provinces and Oudh, from Captain W. T. H. Cox, a planter in the South Wynaad, who has for some time past been cultivating it on a large scale. His report is not satisfactory, since he has found it impossible as yet to grow the plant at a profit, from the difficulty of cleaning the hemp for which no machine appears to have been invented. If the cleaning is done by hand, as in the Philippine Islands, the process is found to be too expensive to leave a margin of profit.

From C. L. Tupper, Esq., Officiating Secretary to the Government of India, Revenue and Agricultural Department (Agri and Horticultural), to the Secretary to the Government of Madras, dated Simla, 8th July 1881, No. 6.

In continuation of the letter from this Department, No. 122, of the 21st April last, I am directed to forward copies of the papers noted in the margin, on the subject of the extraction of fibre from the *Musa textilis*.

2. As it appears that Captain Cox has found difficulty in cleaning the hemp, I am to suggest that, with the permission of the Government of Madras, he should be furnished with a copy of the memorandum by Mr. Liotard. Should Captain Cox try the process therein described, the Government of India would be glad to be favored with some account of the results.

VEGETABLE PHYSIOLOGY.

(*Gardeners' Chronicle*, 10th September 1881.)

At the close of the last century Sprengel published a most suggestive work on flowers, in which he pointed out the curious relation existing between these and insects, and showed that the latter carried the pollen from flower to flower. His observations, however, attracted little notice until Darwin called attention to the subject in 1862. It had long been known that the Cowslip and Primrose exist under two forms, about equally numerous, and differing from one another in the arrangements of their stamens and pistils, the one form having the stamens on the summit of the flower and the stigma half way down; while in the other the relative positions are reversed, the stigma being at the summit of the tube and the stamens half way down. This

difference had, however, been regarded as a case of mere variability; but Darwin showed it to be a beautiful provision, the result of which is that insects fertilise each flower with pollen brought from a different plant; and he proved that flowers fertilised with pollen from the other form yield more seed than if fertilised with pollen of the same form even if taken from a different plant.

Attention having been thus directed to the question, an astonishing variety of the most beautiful contrivances have been observed and described by many botanists, especially Hooker, Axel, Delpino, Hildebrand, Bennett, Fritz Müller, and above all Hermann Müller and Darwin himself. The general result is that to insects, and especially to bees, we owe the beauty of our gardens, the sweetness of our fields. To their beneficent, though unconscious action, flowers owe their scent and colour, their honey—nay, in many cases, even their form. Their present shape and varied arrangements, their brilliant colours, their honey, and their sweet scent are all due to the selection exercised by insects.

In these cases the relation between plants and insects is one of mutual advantage. In many species, however, plants present us with complex arrangements adapted to protect them from insects; such, for instance, are in many cases the resinous glands which render leaves unpalatable; the thickets of hairs and other precautions which prevent flowers from being robbed of the honey by ants. Again, more than a century ago our countryman, Ellis, described an American plant, *Dionæa*, in which the leaves are somewhat concave, with long lateral spines and a joint in the middle, which close up with a jerk, like a rat-trap, the moment any unwary insect alights on them. The plant, in fact, actually captures and devours insects. This observation also remained as an isolated fact until within the last few years, when Darwin, Hooker, and others have shown that many other species have curious and very varied contrivances for supplying themselves with animal food.—*Sir J. Lubbock.*

A NEW ALKALOID.

(From the *Pharmaceutical Journal*, 27th August 1881.)

Under the name of cinchamidine, another alkaloid has been added by Dr. O. Hesse to the already long list of those derived from cinchona (*Berichte*, xiv., 1683). It has been obtained by precipitating the mother-liquor from the purification of homocinchonidine sulphate with ammonia, re-crystallizing the precipitate repeatedly from boiling alcohol, dissolving in excess of hydrochloric acid and fractionally precipitating the solution with neutral sodium tartrate. The last portions precipitated consist essentially of cinchamidine, mixed with another basic substance that is removed by treatment in sulphuric acid and solution with a few drops of solution of potassium permanganate; this does not attack cinchamidine, which is afterwards precipitated with ammonia and re-crystallized from alcohol. Cinchamidine crystallizes from boiling dilute alcohol in colourless lamellæ and flat needles, and from strong alcohol in short thick prisms, dissolving with great difficulty in ether, tolerably easily in cold alcohol, freely in chloroform, an insoluble in water. It has a composition represented by the formula $C_{20}H_{26}N_2O$, melts at $230^{\circ} C.$, forms salts with acids which are mostly beautifully crystalline, is levogyre, and dissolved in excess of dilute sulphuric acid neither shows fluorescence nor gives a green colour with chlorine and ammonia. Dr. Hesse states that cinchamidine crystallizes together with cinchonidine and homocinchonidine, raising their melting points, and he thinks that possibly its sulphate occurs sometimes in commercial homocinchonidine sulphate, and the base more frequently and in larger quantity in commercial "cinchonidin purum"; this would possibly explain some unexpected analytical

results obtained by Claus, which gave for supposed cinchonidine results corresponding more closely to $C_{20}H_{26}N_2O$ than $C_{20}H_{24}N_2O$.

On the other hand it should be mentioned that the existence of Hesse's "homocinchonidine" as a distinct substance has been more than once challenged, and Skraup states (*Monatsh. f. Chemie*, ii., 345), that having examined a specimen of cinchonidine" obtained from Hesse, he found that its difference in crystalline form from "homocinchonidine" was due to its containing 1 to 2 per cent of quinine, and that by an admixture of quinine with "homocinchonidine" it might be obtained crystallized in the form indicated by Hesse for his cinchonidine. He therefore contends that as Hesse's "cinchonidine" differs from "homocinchonidine" only by an impurity, the latter name must be abandoned.

According to Mr. Merck's last circular there is still some uncertainty as to the active principle of quebracho bark, and solid and liquid extracts appear to be preferred. What is known as Penzoldt's fluid extract (see vol. x., p. 50), or tincture, having the proportion 1:2 to the bark used, is evaporated to form a dry extract, of which 1 part represents 20 parts of the fluid extract. In the preparation of "Penzoldt's extract," a resinous body is obtained as a by-product, which is said to be a valuable remedy in diarrhoea. The bark, according to Hesse (*Pharm. Journ.*, [3], vol. xi., p. 589), contains a series of alkaloids, and of these, Mr. Merck prepares three: Fraude's "aspidospermine," in crystalline prisms; an alkaloid crystallizing in fine needles; and an amorphous alkaloid, forming non-crystallizable salts. This last mentioned is said to represent the "aspidospermine" of commerce.

A NEW BEVERAGE.

There seems to prevail a perfect mania at the present time for the manufacture of new beverages. We have already zoedone, vivone, vita novo; and other brain and nerve invigorators and non-alcoholic sparkling tonics; and as if these were not enough to satisfy the cravings of "drinking humanity," we now learn according to a French authority, one M. L. Couty, after a special visit to South America, has contributed to the *Revue Scientifique* an article giving the results of his examination of the food question in that continent, especially with respect to a nutritious beverage known as "Mocte," which he believes is destined to replace coffee and alcohol to a very great extent. The leaves are derived from the *Flex Paraguayensis* which grows to a height of from three to six metres, and covers acres of ground throughout Paraguay, Rio Grande, Parana, and the province of St. Catherine, which represent a zone larger than France and Germany united. The leaves, which are thick and oblong, are picked only every three or four years. They are dried by artificial means in the woods by the peasants themselves, who send them in a rough state to the factories. Here they undergo a separating process by means of sieves, and then they are packed ready for sale. The leaf is boiled for a minute or two and a liquid is produced less limpid than tea and not so dark as coffee. The aroma is less pronounced than that of good tea. Mocte is less bitter to the taste than coffee, and may be drunk without sugar. It may with advantage pass through seven or eight successive boilings, each time in fresh water, and the last infusions are better than the first; but in this case it must not be allowed to get cold. It is sold at the rate of 7 fr. and 8 fr. per 15 kilogrammes, delivered at Antonine, a shipping port in Parana; and as each kilogramme furnishes 40 litres of a strong infusion, the rate per litre is no more than 2 centimes. But the cost would be far less if there were proper means of traffic from the woods, carriage rates being three times as expensive as the article. Of course a great reduction might fairly be anticipated if railways

or even causeways were constructed; as at present the journeys are made by means of mules along steep and rugged paths. From a chemical analysis of the plant, it appears that it contains the same properties as coffee, an alkaloid with oleaginous essences and resinous gums, but as the quantity of the latter is much greater than in coffee, the nutritive element is superior. This analysis has been confirmed by experience. The inhabitants drink nothing else, and with moete and meat they live well, without feeling any anxiety for bread or vegetables, although it would be easy to cultivate maize and potatoes if necessary. The cattle tenders often remain shut-out for days from all human habitation with their herds, and are content to forego their usual meals, if only they have a good supply of moete which appears to be an active element of food and, unlike coffee, produces neither sleeplessness nor palpitation.—*Western Star*.

THE PAPER MULBERRY TREE.

(*Journal of the Society of Arts*, 2nd Sept. 1881.)

The United States Minister of Agriculture, in a recent report, calls attention to the largely increasing manufacture of cloth in China, Japan, and the Sandwich Islands, from the paper mulberry (*Broussonetia papyrifera*). In Tahiti and other South Pacific Islands, a species of cloth is manufactured from its bark, known as "Tappa" or "Kappa," and it is said that the finest and whitest cloth and mantles worn by the islanders and the principal people of Otaheite are made from the bark of this tree; it dyes readily, particularly in red, and takes a good colour. The following is the method employed by the native women of Otaheite in beating out the fibre. The cleansed fibres are spread out on plantain leaves to the length of about eleven or twelve yards, and these are placed on a regular and even surface of about a foot in breadth. Two or three layers are thus placed one upon another, great attention being paid to making the cloth of uniform thickness; if thinner in one place than another, a thicker piece is laid over this place when the next layer is laid down. The cloth is left to dry during the night, and a part of the moisture having evaporated, the several layers are found to adhere together, so that the whole mass may be lifted from the ground in one piece. It is then laid on a long smooth plank of wood prepared for the purpose, and beaten with a wooden instrument about a foot long and three inches square. Each of the four sides has longitudinal grooves of different degrees of fineness, the depth and width of those on one side being sufficient to receive a small pack-thread, the other sides being finer in a regular graduation, so that the grooves of the last would scarcely admit anything coarser than sewing silk. A long handle is attached, and the cloth is first beaten with its coarsest side, and spreads very fast under the strokes. It is then beaten with the other sides successively, and is then considered fit for use. Sometimes, however, it is made still thinner by beating it after it has been several times doubled with the finest side of the mallet, and it can thus be attenuated until it becomes as fine as muslin. Should the cloth break under this process, it is easily repaired by laying on a piece of bark, which is made to adhere by means of a glutinous substance made from the arrowroot, and this is done with such nicety, that the break can scarcely be detected. In other islands the bark is kept wet and scraped with sharp-edged shells. It is said that the King of the Friendly Islands had a piece made which was 120 feet wide and two miles long. In Japan a species of cloth is made from paper derived from this tree. It is cut into thin strips, which are twisted together and spooled, to be used in the wove of the fabric, while the warp is composed of silk or hemp. About 250 pieces only are manufactured at the principal manufacturing place. The paper mulberry grows everywhere in Japan, and is a valuable tree, as furnishing the bast from which a large portion of the Japanese

paper is made; the plants are reproduced in quantity by sub-dividing the roots, and in two or three years are ready to be cut. This work is done in November, and the branches, from seven to ten feet long, are made up into bundles, three or four feet in length, and steamed so that the bark is loosened and can be more readily stripped off; this is washed, dried, and again soaked in water, and scraped with a knife to remove the outer skin, which is used for inferior kinds of paper. The bast, when cleaned, is washed repeatedly in clean water and rinsed; it is then bleached in the sun till sufficiently white, after it is boiled in a lye, chiefly of buckwheat ashes, to remove all gummy matters. The fibres are now readily separated, and are transformed into pulp by beating with wooden mallets; the pulp is mixed in vats with the necessary quantity of water, to which is added a milky substance prepared from rice flour. The couches on which the paper sheets are produced are made of bamboo, split into very thin sticks, and in parallel lines by silk or hemp threads, so as to form a kind of mat. This is laid upon a wooden frame, and the apparatus dipped into the vat, raised and shaken, so as to spread the pulp evenly, after which the cover is first removed, then the bamboo couch, with the sheet of paper. When a number of sheets have been thus prepared, they are pressed to exclude the water, and afterwards spread out with a brush upon boards and allowed to dry. The sheets are only about two feet in length, but sometimes sheets ten feet long are produced.

AGRICULTURAL RETURNS FOR 1881.—The Statistical and Commercial Department of the Board of Trade have issued a summary of the returns collected on the 4th of June last, which shows the extent of land in Great Britain under wheat to be 2,806,057 acres, or 103,381 acres less than in 1880; barley, 2,442,405 acres, or 25,036 acres less than in 1880; oats, 2,901,135 acres, or an increase of 104,230 acres; potatoes, 579,431 acres, an increase of 28,499 acres over 1880; and hops, 64,128 acres, or a decrease of 1,577 acres. The total number of live stock in Great Britain on the same day is given as—Cattle, 5,911,524; sheep and lambs, 24,582,154; pigs, 2,048,034.—*Journal of the Society of Arts*.

SARRACENIA PURPUREA AND FLIES.—Joseph Jackson, Massachusetts, in Coulter's *Botanical Gazette*, states that when out herborising he was surprised on drawing aside the petals to look at the stamens, to see the whole cavity formed by the petals and the peltate expansion of the style filled with flies, as large as the common house-fly, all busy as could be, eating the pollen, of which scarcely a grain could be seen. Fourteen flies were counted in one flower. Nearly every plant examined was filled in the same way.—*Gardeners' Chronicle*.

TEA CULTIVATION IN AMERICA.—Successful experiments are reported on the cultivation of Tea in the United States. A tract of land has been selected in Georgia by the Commissioner of Agriculture as an experimental farm, on which the cultivation of Tea on an extended scale will be carefully and thoroughly tried. Samples of Teas already produced in America have been sent to London, and the report of a Mincing Lane firm is as follows:—"They represent Teas of a high type. The flavour, though not strong, is remarkably fragrant. In appearance they resemble Indian Teas, but the flavour is more like that of the finest Chinese black Tea, or of the hill Teas of India." The cultivation of the plant has been taken up with vigour by one enthusiastic planter, so satisfied is he of success in a commercial point of view, and this after fifteen years' experience of Tea cultivation in India. Fifty acres of land have been planted with Tea, which, if successful, will be at once extend to 100 acres. It is prophesied by this American Tea planter that in a comparatively short time America would be able to supply her own markets with this important article.—*Gardeners' Chronicle*.

LIBERIAN COFFEE IN SUMATRA.

Although published in Batavia in 1879, we had not previously met with a little pamphlet in Dutch by Mr. F. G. Steck, of Medan, Deli, Sumatra, entitled "De Kultuur der Liberia Koffij" (The Cultivation of Liberian Coffee). In his preface Mr. Steck acknowledges his obligations to the book published at this office, in 1878, containing the Liberian letters of the late Mr. Crüwell (whose name the Batavian printer has turned into *Grüwell*); and he adds such facts as had come under his own or his friends' observation in their experiments with this variety of coffee. On looking through the pamphlet, however, we cannot find any important addition to our knowledge of the subject. In fact, in closing his preface, Mr. Steck admits that the information given is meagre, as was to be expected in the case of a new culture, and he asks for corrections and further information with a view to an enlarged edition of his pamphlet. The little work consists of 31 pages, a page and a half being devoted to the situation, climate and soil of Liberia, and the remainder to the coffee tree to which it gives its name. In the division on the laying out of ground Mr. Steck describes at some length an invention of his own for taking levels on steep land. In quoting Dr. Bidie's opinion on the ubiquity of growth of this coffee, Mr. Steck refers to him as an authority on Liberian coffee in Ceylon! We do not remember to have seen stated what is mentioned here: that Liberian coffee contains 92 p. c. of caffeine, as compared with only 56 p. c. in Java coffee. At the end of the pamphlet the writer mentions what had been done in Sumatra up to the time when he wrote (Sept. 1879) in the way of cultivating Liberian coffee. The estates mentioned are Agnieta, 10 miles from the sea; Agatha, adjoining it; Mariendal, at Deli, about 180 feet above and 16 miles distant from the sea; and Boeroeng Merac, in Langkat, about 52 miles distant from but only 60 feet above the sea. The last two estates appeared to be doing specially well. We hope Mr. Steck will give us the benefit of his further observations soon.

SALE OF CINCHONA BARK IN COLOMBO.

Mr. E. John put up for public sale, at 19 Upper Chatham Street, Fort, at noon today, the following lots of bark which were sold at the prices mentioned:—

Lot.	lb.	R. c.
Katatoola—1	378 Succirubra quills	0 72½
2	446 " chips	0 73½
3	213 " root	75
4	478 " twigs	17

An analysis by Mr. Symons of lots 1, 2 and 3 mixed in their relative proportions shews 1.320 per cent Sulphate of Quinine. Root bark from 5 year old trees. Other trees 2 to 4 years old. Elevation 3,000 feet.

Lot.	lb.	R. c.
Dickapitiya—		
5	219 Succirubra quill	65
6	203 " paper quill	30
7	253 " twigs and chips.	27½
Agar's Land—		
8	211 " chips and pieces.	57½
9	78 " twigs	17
Claverton—		
10	433 " mixed shavings.	1 10
11	41 " silvery stem	1 05
12	304 " chips and pieces	97½
13	114 " papery quill	60
14	193 " twigs and chips.	27½
15	58 " dust	10

Analysis of lot 12 by Mr. Symons, shews 2.186 per cent sulphate of quinine.

Lot.	lb.	R. c.
Glenugie, B.—		
B 17	64 Succirubra stem quill	85
B 18	232 " chips and pieces.	77½
B 19	404 " paper quill	35
B 20	254 " twigs and chips.	24

Other remarks same as A parcel but without analysis. Glenugie—

Lot.	lb.	R. c.
17	150 Succirubra stem quill	82½
18	559 " chips and root...	80
19	406 " branch and twig.	25
20	630 " papery quill and pieces	55

Analysis by Mr. Symons of lot 18 chips and root shews 1.590 per cent. sulphate of quinine. Elevation 4,400 feet trees 4 and 5 years old.

Lot.	lb.	R. c.
Morar—21	24 Succirubra mixed quill	60
22	554 " shavings	1 20
23	667 " twigs	23

Analysis by Mr. Symons of the shavings lot 19 shews 2.316 per cent. sulphate of quinine. Elevation 4700 to 5,000 feet. From well grown 4 years old trees. Original plants from Portree.

Lot.	lb.	R. c.
24	196 Succirubra stem quill	77½
25	831 " stem chips and pieces	80
26	376 " root	55
27	37 " root dust	15

Lot.	lb.	R. c.
28	679 Succirubra twigs	22
29	27 Officinalis twigs and chips	23
30	37 " chips and piece.	70

Analysis by Mr. Symons of lots 25 and 26, in the proportion of 831 to 376 shews 1.567 per cent sulphate of quinine. Elevation of estate 4,400 feet. Trees 5 years old.

Lot.	lb.	R. c.
Troup—31	261 Officinalis stem quill	1 70
32	81 " root	1 00
33	120 " twigs and chips.	27½
34	11 Hybrid stem pieces	1 50
35	149 " quill	80
36	73 " root and stem pieces	1 10

Analysis by Mr. Symons of the hybrid stem pieces, lot 34 shews 2.767 per cent. of sulphate of quinine.

Lot.	lb.	R. c.
Waltriu—37	161 Succirubra young branch...	30
38	78 " old stem shavings	1 05
39	40 Officinalis twigs	0 27½

Lot.	lb.	R. c.
Templestowe—		
40	336 Succirubra stem chips	0 85
41	560 " shavings	1 15
42	196 " root	0 75
43	140 " dust	0 06
44	1,568 " twigs	0 22

Lot.	lb.	R. c.
Dotella—45	336 abt. Succirubra branch and twigs	0 32½

Lot.	lb.	R. c.
Hoolan kande—		
46	224 " chips and pieces	0 52½

Lot.	lb.	R. c.
Lindula—47	448 " stem quill and pieces	0 90

Lot.	lb.	R. c.
48	140 abt. Officinalis shavings	0 75
49	196 abt. Succirubra shavings	0 82½

Lot.	lb.	R. c.
Drayton—50	112 " mixed	0 47½

Lot.	lb.	R. c.
Glashaugh—		
51	3,360 " twigs and chips.	0 25

Lot.	lb.	R. c.
Hallowelle—		
52	336 " branch	0 30

Lot.	lb.	R. c.
St. Regulus—		
53	1,680 " twig	0 25
54	336 " bold twig	0 32½

Lot.	lb.		R. c.
Tientsin—	55	1,568 Succirubra twigs	... 0 25
Abbey Craig—	56	420 abt. Officialis chips and shavings...	1 05
	57	84 „ twigs	... 0 12
	58	20 „ root and dust...	0 37½
Eildon Hall—			
A	59	34 Officialis quill	... } 1 65
B	59	107 „ chips	... } 1 65
C	59	123 „ twigs	... 0 60
D	59	135 Succirubra and hybrid quill	0 72½
E	59	57 „ „ branch and chips	0 45
F	59	900 „ „ chips and twigs...	0 40

The attendance was good, and the bidding spirited, the whole 69 lots being knocked down within two hours.

CINCHONA CULTURE IN DIMBULA:

LEDGERIANAS 5½ YEARS OLD YIELDING 9·6 OF QUININE AND NOT A TRACE OF INFERIOR ALKALOIDS.

We draw attention to the good news conveyed to us by Mr. Wm. Smith in Messrs. Howard's analysis of bark from Ledgeriana trees on Matakelly, five and a half years old. The result is most satisfactory, the three richest specimens being, we suppose, worth at least 18s per lb. The Yarrow bark analysed gave up to 11·2 per cent sulphate of quinine, but the trees were said to be younger. It is possible that the source of the seed is the same in both cases, namely, the late Mr. McIvor of the Nilgiri Gardens. If not, Mr. Smith's pinch must be from some received by Mr. A. M. Ferguson direct from Mr. Moens. That is a point which can be definitely settled very soon now. The important news is that the most valuable Ceylon cinchona bark as yet analysed has been grown in the centre of Dimbula at an elevation of over 4,000 feet. The highest percentage of quinine shewn in the series of analyses we published the other day from Mr. Moens was 11·20 (of quinine, not the sulphate); but he does not here specify the age of the tree, merely referring to the plantation as a young one. In other cases we are enabled to institute a comparison. Thus bark from a five year old tree of the best type yielded 8·45 per cent of quinine, and another of the same type, seven years old, gave 7·20 per cent; but in these cases the inferior alkaloids made up from 2¼ to 3¾ per cent; while in the best Matakelly bark, the 9·6 of quinine was unassociated with even a trace of other alkaloids. This, of course, makes the bark all the more valuable to the manufacturer. If any one in Ceylon deserves success as a cinchona cultivator it is Mr. Wm. Smith, for if he had his way well-nigh twenty years ago he would have planted out in the Dimbula valley all the plants Dr. Thwaites had then to spare for him at Hakgala Gardens; but "partners" would not at that time listen to expenditure on anything but "coffee," at least not on a tree grown for pharmaceutical purposes! 'Whoever made a fortune by growing a drug?' was then the cry; but the few farseeing men of that early day have lived to see their prophecies more than fulfilled. It is also very satisfactory to find Messrs. Campbell and Fairlie so successful in their selection of the best types of the trees as proved by analysis this is a branch

of the cinchona planter's education which must be learned by all who wish to do justice to the richest species.

While on this subject let us once for all ask for uniformity among Ceylon planters and also merchants and brokers in their reports, quotations and speech about bark analyses. We hear 2, 3 and 5 per cent trees spoken of when all the time not quinine, but sulphate of quinine, is meant. In Java and India, on the contrary, the percentage is always based on the quinine. To give the proportion of sulphate is useful as a guide to the market value, but, in respect of yield of different barks, let it be the rule to associate "per cent" with quinine. In this way, we can compare the best tree in the latest Java report (11·2 per cent) with the best on Yarrow (8·4 per cent) and again on Matakelly 9·6 per cent. We have no doubt that Ceylon Ledgerianas will yet beat the richest produced even under Mr. Moens' special and scientific care.

PROGRESS OF CEYLON TEA CULTIVATION.

The following is an extract from the *Grocer* of Sept. 3rd respecting the prospects and progress of tea cultivation in Ceylon, and of the market opening for its disposal in the Australian Colonies:—

"CEYLON TEA.—Owing to short coffee crops, planters in Ceylon have of late years turned their attention to the cultivation of other products, among which tea figures conspicuously, and the export from Ceylon of this article is yearly increasing. In 1877 only 2,105 lb were exported, while in 1880 the export had increased to 140,000 lb. Last year the area of tea planted out amounted to 9,300 acres, which will produce about 3,500,000 lb of tea when in full bearing; and as the planted area is yearly increasing, we may expect before long to hear a good deal about Ceylon tea, which appears to be a successful rival of Indian tea as regards its qualities as a beverage. At the Melbourne Exhibition, Ceylon teas were awarded thirty-six prizes, of which eleven were first-class, and the decision arrived at by the Victorian Government Analyst was that in some important respects Ceylon tea was the best in the world, and that in Ceylon the best quality of tea could be produced with the minimum exhaustion of the fertilising matters in the soil."

In the same journal, I came across a letter addressed to its editor by some aggrieved tradesman, who evidently fears that arrangements something similar to those proposed in Ceylon for the disposal of island-grown tea will militate against the profits of the "middle-man." The following is its text:—

"IS IT FAIR?"

"SIR.—A short while since I had a circular placed in my hands issued by the 'Darjeeling Tea Company' to their shareholders, offering to supply them with boxes of their tea direct, and I was told that this offer was being accepted, not only for their own wants, but to supply the needs of their circle of acquaintances as far as practicable. I would ask you, sir, if you consider this fair to the trade? Unless I am mistaken, the Assam Tea Company attempted to do this some years since, but withdrew the privilege upon remonstrances being made to them by their broker. Perhaps the Darjeeling Tea Company may also see the 'error of their ways,' when they know that such procedure is strongly resented by the dealers.

I am &c.,

"Exeter, August 29. W. S. SAUNDERS."

Now, without wishing to disparage the usefulness to the community of the shop-keeping classes, it cannot

be thought that in these days of co-operative trading the growers of tea should stand particular in considering their interest to the detriment of their own, and I don't suppose this protest will deter or delay the steps contemplated in Ceylon for the profitable disposal of its products.—*London Cor.*

AGRICULTURE IN MADAGASCAR AND MAURITIUS.

MAURITIUS, 6th Sept. 1881.

That Madagascar, in the hands of a civilized and strong Government, would become a wealthy possession, the experience Mauritians have of that island permits of their entertaining very little doubt. Its climate, it is true, is not very healthy; but it is the *ne plus ultra* of a sugar and coffee growing country: while it could export coals, timber, and cattle in immense quantities, and gold has been found there, but owing to the jealousy of the natives the working of the mines has been forbidden; so that it is impossible to give an opinion as to their riches. I may notice, as a sign of the times, that one of our firms (Messrs. Antelme, Patterson & Co.) has lately put a small steamer about 300 tons, the "Imantina," permanently in the trade between this and Madagascar and Réunion. Our connection with the former fine island is daily making headway; and I may say *en passant* that Madagascar is quite worth any trouble that can be taken to obtain a footing there. As a sugar-growing country, it will, before many years, be likely to leave Mauritius in the background, and many of our rising generation are daily leaving this for it.

The Chemical Manure Company is one of our most prosperous public investments. It was founded here some years ago by a French gentleman passionately fond of scientific agriculture; and, unlike many things undertaken *en amateur*, it has proved a great success, and gives its shareholders about 20 per cent per annum. It possesses a capital of R200,000, and its net profits since January last, for the half-year ending 30th June, were R87,008! Of this magnificent result, the directors have, however, only given the shareholders their usual 10 per cent for the half-year; and the remainder has been carried to the reserve fund for future dividends.

SCHOOLS OF AGRICULTURE IN THE UNITED STATES AND BRAZIL.

We are glad to see from *O Agricultor Progressista*, a new agricultural journal published in the interests of the *Companhia Zootecnica e Agricola*, that the director of that society, Sr. Domingos Maria Gonçalves, proposes to require manual labor from all the students attending his new agricultural schools. We were misled by the statement in the statutes of the society that "the laborers, watchmen, shepherds, field servants, &c., will be by preference admitted and chosen from among the freemen," which, in the absence of any clause specifying obligatory field labor for the students, led us to infer that the work would all be done by hired laborers. In this inference the director informs us that we are mistaken, as manual labor will be required from every matriculated student in proportion to his strength. This is just as it should be. One of the most successful agricultural schools in the United States—the State Agricultural College of Michigan—was founded literally in the forest, and all the work of clearing and breaking up the land, fencing, draining, road-making, planting orchards, as well as the after work of crop, fruit and stock-raising, has been done by students. The land which was once covered with a dense forest of oak, beech and maple, is now one of the finest and most productive farms that can be found

anywhere—and all the work is done by students, who are required to work a specified number of hours every day. Many of the most successful farmers in the state are graduates of this school and some of its graduates occupy high scientific positions. It is not claimed that the labor of the students has any great pecuniary advantages, but it gives them a practical knowledge of scientific agriculture, and contributes largely to their good health and physical development. In relation to the profession in whose interests the school is established, it not only makes its graduate practically familiar with all the details of every day work, but it makes them acquainted with the latest and most scientific methods of agriculture, and teaches them to investigate and experiment for themselves. Such a result as this is greatly needed in Brazil. Instead of calling upon the government for an investigating commission when his coffee trees, or his sugar cane fields are attacked by disease, the Brazilian planter should be competent to take the matter into his own hands. He should know how best to cultivate his lands and to obtain the best results. Instead of tilling a piece of land for a time and then abandoning it as worn out, as is now the practice, he should know how to keep up the fertility and productiveness of his fields, and to add to their value year by year. The profession of agriculture should be elevated to the rank of a science, and this can only be done through just such schools as we have indicated.

FALLING-OFF IN COPRA EXPORTS.

The Chairman of the Levuka Chamber of Commerce referred as follows in his annual address to an article of produce which has recently been the subject of discussion in Ceylon:—

"The article, however, which shewed the most serious decrease is the principal export, viz., copra. The official returns clearly give the following as the quantities raised in the colony:—

	1877	1878	1879	1880
Tons ...	4372	5513	2714	5168

"That is to say that Fiji produced 2,000 tons more copra in the two years, 1877-8, than in 1879-80. This is serious and difficult to explain; on a former occasion I assigned two principal reasons—the Government system of collecting native taxes in produce instead of money and the consequent restrictions crippling the enterprise of the individual native, and a drought in the early part of 1879; but exception has been taken to my arguments by a few. Within the last twelve months copra has fallen over 20 per cent in value in Europe, and unless it rises as rapidly again, which we hardly warranted in hoping, or the quantity exported this year shews a considerable increase, a large section of our producing community will suffer severely. The causes of this serious depreciation are difficult to assign, it is true that the present low value of the article at home may discourage some of those in Africa and the East Indies who were tempted to enter European market by the high prices of 1878-9; should such prove to be the case we may than perhaps look for an improvement."

In respect of trade generally he stated:—

"That the value of the total export trade for 1880 exceeded £229,000, of which £51,000 was produce imported and exported again, which was an indication that with care and enterprize the trade of many other islands in the South Seas might be concentrated in Fiji. The value of the produce raised in the colony was nearly £178,000, but the whole of this apparent increase of nearly 35 per cent on the yield of the previous year cannot fairly be claimed owing to certain exceptional circumstances. There is a decrease in the

exports of beche-de-mere, candlenuts, maize, and copra. We (*Australasian*) share the surprise expressed by the chairman that the export of sugar was less in 1880 than in 1879, but we are glad to learn that it is not likely to be permanent, but that, on the contrary, Fiji seems destined very early to take a high position as a sugar-producing colony. The Colonial Sugar Company of Sydney are establishing works on the Rewa River, which, it is believed, will very shortly increase the export of sugar by one-half, and other extensive mills are projected. It is highly satisfactory to learn that in 1880 nearly 15 times as much coffee was exported as in the three previous years combined. On the whole, the chairman of the principal commercial body in the colony speaks most hopefully of the present and future prospects of the export trade. The imports for 1880 exceeded £185,000, an increase of over 30 per cent on the previous year. These satisfactory statistics indicate very clearly that the Fiji settlers are not deficient in energy or enterprise; and if they accept the advice of their late Governor; and display equal moderation and good sense politically, a bright and prosperous future may be predicted for the Pearl of the Pacific."

SOUTH COORG.

20th September 1881.

I have now to thank you for the correction made with regard to Coorg trees, as also for the specimen numbers of the *Tropical Agriculturist*, which, to use a stereotyped phrase, "does supply a long felt want," and which ought to make the teeth of this Presidency editors water with sheer envy. Their hobbies seem to be Service and Gold, both of which they seem to ride well.

The monsoon has been most favourable for planting operations during the whole of August, and till the present date. During 27 days on which rain fell in August, I registered 10.54 inches, which is 2.806 above the average of the past five years, and with the exception of 1878 heavier than we have had since 1873, from which my record dates. For September, we have had rain on 15 days, giving a total of 3.19 inches and but very little sun—just the very weather we want for making up nurseries &c.

Plants in old coffee and clearings are now looking well, excepting where choked with weeds; and but very few places are in that deplorable state just now, labour being very plentiful on almost every estate, and still coolies come trooping in. Fortunately for them crop will soon be on, when every one of them can be well accounted for.

Leaf disease is showing up here and there on "chicks," but nothing to speak of, and I think our Nalkenaads will remain untouched. I think our mamoty diggings have a little to do with our freedom from disease, as well as our good caste trees. The whole of the Bamboo estates are now dug regularly and to a depth of from six to nine inches. It is found to be far more beneficial to the trees, and only a little more than our old weeding and burying used to cost. A clean estate can be dug by Canarese coolies at R4 per acre, and a dirty one about R4.12. If done by coast contractors the prices will be slightly higher, probably R5 and R7 respectively. Our dread enemy, the borer, has not been so bad this year as we expected, and now that we have become familiar with him, we take his little freaks as a sheer matter of course, and keep on supplying, and with the grand soil and forcing climate we have here, the raising of supplies is comparatively an easy work. In the Ghauts it is almost impossible to get a supply up, but the soil there is poor and the monsoon well worthy of its name.

Cinchonas are doing well both in Ghaut and Bamboo land, the Ghaut having the advantage. With few ex-

ceptions succirubras have been the only sort tried. The only exception I know is a nice little field of Ledgerianas which were brought from the hills and planted out this season. They have been most successful so far. We find the succirubras do splendidly under our shade trees and bid fair to outgrow the figs and jacks. I could point out many over six feet high and only 20 months from seed. How does this compare with Ceylon? With regard to cinchona under shade, the hill planters gave as their opinion the reverse of what we have by experience proved to be a fact; and, if I am not misinformed, Coorg planters having Ceylon experience gave the same dictum with regard to coffee, and now shade is considered by all to be a *sine qua non* for the latter, and any one holding the reverse would be considered a fit subject for a lunatic asylum in the Bamboo.

SALES OF CEYLON AND INDIAN TEA IN MELBOURNE.

Indian tea, season 1881-82. Ex "Rollo," from Calcutta.
 10 half-chests (each 40 1-lb packets) Kangra Valley pekoe blackish even curled leaf, strong rich pungent, ripe delicate pekoe. 1s 2½d.
 31 boxes Assam broken pekoe very handsome small wiry black leaf, full of golden tips very strong pungent, rich dark red liquor 2s 1d
 44 cases (each 2 22-lb tins) Darjeeling Pekoe small even wiry black leaf choicest full rich mellow, Darjeeling pekoe flavour 1s 7¾d.
 50 half-chests Darjeeling pekoe handsome black small even wiry leaf extremely choice rich ripe liquor 2s 0d.
 36 cases (each 2 22-lb tins) Darjeeling pekoe souchong greyish-black even wiry leaf very rich full ripe mellow, Darjeeling flavour 1s 5½d.
 50 half-chests Darjeeling Pekoe Souchong black even wiry twisted leaf very choice full pungent mellow pekoe souchong 1s 3d.
 48 half-chests Dehra Doon pekoe souchong handsome even wiry curled leaf extremely rich, with most delicious fragrant fruity flavour 1s 1¾d.
 25 half-chests Kangra Valley pekoe souchong even curled black leaf full fresh brisk malty flavour 0s 10½d
 9 half-chests Kangra Valley souchong black curled leaf full brisk malty souchong flavour 0s 11½d.
 43 half-chests Darjeeling Pekoe handsome black small even wiry leaf extremely rich full ripe mellow Pekoe flavour 1s 5d.
 50 half-chests Darjeeling pekoe souchong greyish black even wiry twisted leaf choicest full rich delicate, Darjeeling flavour 1s 3d.
 41 half-chests Assam pekoe souchong black small wiry even leaf, pekoe tips very strong fine red hick liquor 1s 1¼d.
 34 half-chests Darjeeling pekoe souchong Greyish black even twisted leaf very rich, very strong, full ripe mellow liquor 1s 3d.
 35 half-chests Dehra Doon pekoe souchong black even wiry curled leaf choicest, very rich ripe, delicious mellow fragrant flavour 1s 1¾d.
 40 half-chests Darjeeling pekoe souchong black even wiry twisted leaf very choice, rich mellow, delicate, Darjeeling flavour 1s 1¾d.
 50 half-chests Darjeeling pekoe souchong greyish-blackish even twisted leaf very strong full rich ripe mellow, Darjeeling flavour 1s 3¾d.
 50 half-chests Indian pekoe small even wiry black leaf, full tips very strong rich pungent dark-red liquor 1s ¾d.
 50 half-chests Indian pekoe black small wiry handsome leaf, pekoe tips very strong powerful rich ripe malty pekoe 1s 2½d.
 50 half-chests Indian pekoe souchong even twisted wiry black leaf strong full rich ripe, fresh flavour 0s 11d.
 50 half-chests Indian pekoe souchong black even wiry twisted leaf very strong rich full pekoe flavour 0s 11½d.

50 half-chests Indian pekoe souchong even wiry twisted black leaf, pekoe tips very full strong rich fresh Pekoe Souchong 1s 2d.

CEYLON TEA.

Ceylon tea, season 1881-82. Ex R. M. S. "Bokbara," from Ceylon.

100 half-chests Ceylon Pekoe Souchong black even wiry leaf, pekoe tips very strong full rich ripe, dark-red infusion Passed.

33 half-chests Ceylon Broken Pekoe small even black broken leaf, Pekoe tips very powerful rich ripe Pekoe flavour 0s 11d.

67 half-chests Ceylon broken Pekoe small even black broken leaf, Pekoe tips very powerful rich Pekoe flavour Passed.

Grown on the celebrated Dunedin Estate.

COFFEE EXHIBITIONS.

The projected coffee expositions abroad, however good they may be in theory, can only be effective in practice, if they are placed under the management, not of the Brazilian consuls, as proposed, but of special agents who possess a thorough practical knowledge of the coffee trade, which the consuls seldom possess.

One of the great embarrassments with which the Brazilian coffee is struggling at present is the discredit into which it has fallen in the consuming markets, and this is attributed to two causes. Firstly, to the speculation of some dealers in Europe who, in order to obtain a better price, unscrupulously pass off the best Brazilian coffee as Java or Mocca, and declare only the lower qualities as coming from Brazil. Secondly, to the bad faith of certain coffee producing countries which try to disparage the Brazilian product in order to exalt their own.

In proof of this latter fact a correspondent of the *Jornal do Commercio* cites a circular lately sent by the Minister of Commerce of Haiti to the consuls that of country in Europe, in which he says the following:—

"When there is a considerable fall in the prices of coffee, our principal production, of which we export more than 60 millions of lb., it is our duty to point out to the nations to whom we send that precious product, how much superior the Haitian coffee, is in taste and aroma, to that of other countries, with the exception of Mocca. The qualities of Guadeloupe, Porto Rico, Cuba and Jamaica, which can compete with ours in aroma, reach the various markets only in insignificant quantities. It is for this reason that in order to improve the bad taste of Brazilian coffee, which is produced to the huge extent of a million of bags, the Brazilians employ the coffees of Haiti and Java."

That circular is being reproduced in most of the commercial papers of Europe, and it does not appear that any Brazilian consul did think of protesting against its assertions.

Few of them probably either know or care much about the subject, and equally few of them would have the capacity, energy, or commercial experience necessary to manage the projected coffee expositions, or to take other steps to improve the position of the Brazilian products and commercial interests a broad.

Canada has set a good example to Brazil in this respect. Desirous of extending her commercial relations with Brazil, and having decided on the measures to be adopted, she did not put them in practice through her diplomatic or consular representatives in Brazil, but named a special agent for the purpose, selecting a Rio merchant of great commercial experience and a thorough practical knowledge of the subject. It being decided that the establishment of direct and subventioned steam communications was the first step necessary towards the development of

the commerce between the two countries, the agent of the Canadian Government placed before the Imperial Government and the representatives of the nation such convincing proofs of the utility of the enterprise that the former promptly granted and the latter promptly confirmed the subvention.

The Canadian Government then made it generally known in the dominion that they had a special agent in Rio always ready and capable of giving to the Canadian manufacturers and merchants any information and explanations they might desire, and thus the contemplated development of her commercial relations with Brazil is steadily progressing on a sound and practical basis.

Let Brazil follow a similar plan in the execution of her project to hold coffee expositions abroad, and then this project may prove as effective in practice as it is good in theory.—*Anglo-Brazilian Times*.

We are not amongst those who think that the proposed Coffee Exhibitions to be held in England and America will prove of advantage to Brazil. There can be no doubt that the Brazilian coffee trade is just now suffering very severely from a variety of causes, chief amongst which are the various mixtures now sold on this and the other side of the Atlantic to the detriment of the sale of the pure article, and the action of a few unscrupulous buyers who are selling the finest Rio coffee as prime Java or Mocca, and are declaring that only the lower qualities come from Brazil. It would be difficult, we know, to put a stop to this practice, but it would be far more difficult to compel the British or American consumer to pay 1s 8d per lb. for pure coffee when he can get a very palatable substitute for 10d. Almost every English grocer now has a mixture of his own, which is put up in 1-lb. tins and sold for 10d, and we are informed that where a pound of pure coffee is sold twenty of these tins are disposed of. If the planters and merchants of Brazil think that by establishing Coffee Exhibitions here and in the United States they would be successful in changing the tastes of the consumer, we venture to say that they will find themselves woefully mistaken. And, besides, where could such an Exhibition be held here to prove attractive and at the same time remunerative, for we presume that it is not meant that they should be carried on at a loss? We have now a Wool Exhibition at the Crystal Palace, but it has proved nothing like the success that was anticipated, and we are afraid that if a Coffee Exhibition were got up it would prove less attractive still, for it must necessarily be of much smaller dimensions, and there would be nothing like the same variety as at the Crystal Palace Wool Exhibition. Most astonishing of all, we note that "it is proposed to have such exhibitions every year." One year's experience, we have not the slightest doubt, would prove quite sufficient to show the inutility of the scheme; and if we wanted any evidence on this point we should only have to turn to the special trade exhibitions which have been held in London during the past twelve months. We have made these remarks solely in the interests of the planters and merchants of Brazil, feeling assured that, so far as this country is concerned, at least the establishment of a Coffee Exhibition would prove a great loss to all concerned, and we would counsel them to keep their money in their pockets.—*Brazil and River Plate Mail*.

CEYLON TEA IN AUSTRALIA.

(From Our Correspondent.)

Melbourne, 12th Sept. 1881.

On the 2nd September, another successful sale of Indian teas ex "Rollo" took place at auction. The trade run on the Darjeeling Pekoe and Pekoe Souchongs paying

for the same from 1s 1½d for large rough leaf with little liquor to 2s per lb. in bond for even, wiry, leaf with strength. For some rather good broken Assam Pekoe with tip 2s 1d per lb. B was paid. The Kaugra Valley teas were too high fired, and Dehra Doon too herby to sell well.

At the same sale, some Ceylon teas were tried, a small line of broken flaky realizing 11d per lb. The other two lines were withdrawn, higher prices than previous sale being evidently wanted and not obtainable at the time.

I send you the *Age* of 6th September containing a full report of the opening of the Calcutta Tea Association (no connection with the Calcutta Tea Syndicate) new premises in King Street, Melbourne. This Association is formed for the wholesale and retail sale of Indian teas only, and have opened large premises in Charlotte Place, Sydney, for the same purpose. Their advertisement offers the public pure Indian teas in ½ lb and 1 lb packets, 5 lb, 10 lb, and 25 lb. tin cannisters, and chests, half-chests and quarter chests. The planters of Ceylon and India should wish this Company every success in their endeavours to sell Indian tea straight. We have blenders here of India and China teas, but this means adding the superior Indian tea to bring up the *very inferior* China tea.

"The Calcutta Tea Association, 26 King-street, Melbourne, and Charlotte-place, Sydney, are now booking orders from grocers and storekeepers for their pure Indian teas, in ½ lb and 1 lb packages, 5 lb, 10 lb, and 25 lb. tin cannisters, also, chests, half-chests, and quarter-chests, to be sold at 2s 6d., 3s, and 3s 6d per lb.

"Until the grocers are supplied the public can obtain sample packages from our wholesale warehouses.

"The above teas are the produce of upwards of 50 tea estates, blended so as to make the most perfect tea the world can produce."

THE CALCUTTA TEA ASSOCIATION.

(From the *Age*.)

Under the auspices of this Association the Indian tea interests are now making a vigorous attempt to introduce Indian teas to Australia. To this end large premises have been taken in Kingstreet in this city, and also in Sydney, where the operations of the Association are carried on on a large scale. Yesterday a large number of gentlemen, including the leading business men of the city, visited by invitation of Mr Inglis, a gentleman largely interested in fostering Indo-Australian trade, and recently representative of India at the Melbourne International Exhibition, the stores of the Association in King-street. The building is a large one of three stories, the ground floor being used as an office and store. In the upper story the blending of the teas is carried on by skilled workmen, under the supervision of Mr. Fraser and a gentleman who has been thirty-four years in the trade. The floor is divided into bins and the products of the various districts, principally Assam, Cachar, S. Ilet, Darjeeling, Dooras, Kangra Valley, Nilgiris and Ceylon are united, so that the good qualities of each tea may be apparent in the whole. After being properly blended the tea is sent down to the second story by means of shoots where it is packed for sale, and in this room a number of the youth of both sexes are employed. The tea is made up principally in ½ lb. to 1 lb. packages, but a considerable quantity is packed in from 10 to 40 lb. cases. The aroma of the tea was spoken of by experts yesterday in the highest terms, and the purity of the leaf was the subject of remark. In the blending room is the necessary machinery for reducing the leaf if it is too large, and the whole arrangements have evidently been made by those who thoroughly understand their business. About twenty-five hands are at present employed in Melbourne, but forty at least would be required when the Association is in full work. As showing the excellence of the teas offered to the public by the Association, the following analysis has been made by Messrs. J. Cosmo Newbery and Dunn:—

THE CALCUTTA TEA ASSOCIATION, PER MR. J. A. MOODY.

Marks.	Percentage of mineral ash.	Percentage of extract.	Percentage of Soluble salts.
No. 1	5.36	41.42	3.38
No. 2	5.26	42.41	3.35
No. 3	5.32	40.41	3.26

The above samples have been carefully examined by us. They are absolutely pure, and we may add that even the lowest quality of your tea has a higher extract than any packet teas we have examined.

J. COSMO NEWBERY,
FREDERICK DUNN.

The packet teas examined by Messrs. Newbery and Dunn up to the above date comprised the following:—Royal Mixture, Challenge Mixture, Universal Mixture, Governor's Mixture, Exhibition Congou, Taping Mixture, Oriental Mixture, Family Mixture, International Mixture, Nonpareil Mixture, Celestial Mixture, Steamer Brand Empress Breakfast, The People's Choice, Phasant Brand, Cock Brand, Pagoda Brand, and Mikado Mixture. After the party had been shown through the building they were entertained at luncheon; Mr. INGLIS occupying the chair. After the usual loyal toasts had been duly honored, the Chairman said he had a toast to propose which he thought would be drunk with enthusiasm, but before doing so he should like to say a few words to those present. He stated he had been asked as the representative of the Indian Government at the late Exhibition to invite those present to assist in the promotion of the Indo-Australian tea trade. For years past a great trade was being carried on between Australia and India with horses and now India was trying to start woolen mills, in order to utilise Australian wool. What he asked them to do now was to assist the Calcutta Tea Association in pushing the sale of pure Indian teas in the Australian market. Of course there was a prejudice to combat. People were accustomed to Chinese teas, and might think the Indian tea unpalatable the first time they tasted it, but after taking it he would guarantee they would appreciate its purity and flavor. That there was a prejudice against the tea in the public mind was really not an insurmountable obstacle, as those present knew what an unnatural prejudice had been exhibited at first in England to the Austrian wines sent home, which all here knew were pure and wholesome. Another point in favor of the Association teas which would soon make itself felt was the fact of the operations of the Company being carried on by experts. The teas passed through no intermediate hands, but were in the possession of the Association from the time they left the gardens in India till they were offered for sale to the Australian public. That was a sure guarantee that no adulteration would be permitted. Another point in favor of the teas was that those offered to the public by this Association were products of ten or fourteen gardens blended nicely together, so as to produce the most pleasant flavor possible. The Association intended to go into the trade with spirit, and did not doubt to conquer in the end. As instancing the manner in which Indian tea had increased in popularity in England, he might mention that in London last May 4,500,000 lb. more Indian tea were sold than in May of the previous year, and the total export from Calcutta to London for the month had been 44,500,000 lb. He would now call upon them to drink success to the Calcutta Tea Association.

Mr. E. S. HARLEY begged leave, as one of the oldest tea brokers in the colonies, to say a few words before the toast was honored. He could assure them that the teas were bound to become popular although a prejudice might exist against them at first. Anyone who had taken Indian teas for a few days would never go back to Chinese. The starting of this Association was of more interest to the colonies than the generality of the public were aware of, and he sincerely hoped the operations of the Association would be successful.

The toast was then drunk with great enthusiasm.

The CHAIRMAN proposed the health of the manager, Mr. Fraser, and spoke in eulogistic terms of that gentleman's qualifications for the post.

Mr. FRASER responded in a few appropriate words, stating at the same time his firm opinion that the Indian teas would soon hold the foremost position in the Australasian trade.

The CHAIRMAN proposed the health of the Press, by whose advocacy alone they could hope for a successful development of the industry just started; and after the toast had been suitably responded to the company separated.

SILK-GROWING IN CEYLON.

With reference to Dr. Vanderstraaten's paper on this subject, we may call attention to the following extract from our "Review of Agriculture and Planting Enterprise in Ceylon" published in our Handbook for 1876-78:—

"There is a spot on the banks of the Kelani river 3 or 4 miles above the Bridge of Boats *en route* to Hanwela 'Orte Saide' or Sikk Garden where the Portuguese are believed to have fed silkworms. The Dutch unsuccessfully attempted to propagate the Silkworm and produce Silk at Jaffna. In the British period silk has been tried more than once, more particularly by a coffee planter (Mr. H. C. Bury,) in Haputale, on whose produce a favourable report was received by us a few years ago, from a Coventry firm, but the difficulty of securing careful skilled labour and the injurious effects of thunderstorms on the silkworms prevented the continuance of the experiment. Sir Wm. Gregory took a great interest in Silk-growing, as in all other experiments with new products. In 1872 he reported that the 'mulberry tree grows quickly and vigorously in Ceylon, and the worms are reported to be hardy and to thrive well, but the difficulty was to find patient and skilled hands to wind the silk.' Accordingly he recommended the dried cocoon to be sent to Europe to be spun, but the cost of female labour in England is another difficulty. Sir Wm. Gregory introduced and distributed Japanese silk-worm eggs in Ceylon."

Dr. Vanderstraaten writes to us in reference to his paper:—"I was indebted to Mr. Alex. Geddes of Moratuwa for the floss silk exhibited. The white is from the Bombyx mori, a Chinese silkworm; the brown is from the Tussur silk moth (*Antheraea Mylitta*, or *A. Paphia*). Mr. Geddes finds that the Tussur moth cannot be domesticated. Mulberries are plentiful all over the island, and can be freely cultivated from cuttings; in two to three years each tree will supply 5 lb. weight of leaves. As a new industry mulberries can be cultivated with tea. It is a profitable and interesting amusement for women and children. Every year about £1,500,000 is sent from Europe to China and Japan for eggs; principally from Italy, where mulberries are plentiful. It is introduced into orphan schools, reformatories, prisons, leper and lunatic asylums: supplies of eggs can be sold to the general public. The early history of Ceylon from Valentyn in 1663 to Tennant has been consulted. In 1663 the Dutch cultivated it in Colombo and Jaffna. When the English came to Ceylon a garden of mulberries and buildings for the rearing of silk worms were found at Orté Sedé (Portuguese for silk-garden) near the Bridge of Boats at Kelani. The silkworms exhibited at the Polytechnic Exhibition were from Father allPas' supply. It ought to be tried more largely now that the experiment has been successful as shown yesterday."

We are glad to learn that an experiment is being conducted so far with success in "silk-growing" in lower Dimbula, and we learn from another gentleman, who has taken considerable interest in the matter, that, though his experiment in Colombo was a failure, he is trying again with more chances of success, and is inclined to experiment with the very

abundant "lettuce" (*Pisonia alba*) tree leaves instead of those of mulberry. If the silkworms thrive on the leaves of this plant, the industry ought to prosper in and around Colombo.

CINCHONA CULTIVATION IN JAVA.

LETTER FROM MR. MOENS:—SIKKHIM LEDGERIANAS THE SAME AS THOSE IN JAVA.—PROSPECT OF A GOOD COFFEE CROP IN JAVA.

By all cinchona planters in Ceylon, the following letter addressed to us by the able Director of the "Government Kinakultuur, Java" will be read with much interest: it is of great importance to know that Mr. Moens consider the Ledgerianas in British Sikkhim to be the same as his own, seed having already come from Northern India freely to Ceylon:—

Bandong, 22nd Sept. 1881.

DEAR MR. FERGUSON,—I have to thank you very heartily for your kindness in sending me your Directory, which contains so much valuable information about Ceylon and its Planting Interest. And, by the last mail I also received from you Owen's Cinchona Planters' Manual, which appears to me to be a good book, giving a great deal of concise and useful information about cinchona.

On some chapters we would not have the same opinion. I am quite opposed to uprooting or coppicing, as long as there is any chance of stripping or shaving the trees with success. Of course, I understand that with trees, living only five or six years, all attempts at stripping would be vain; and then nothing is left, but uprooting with an experiment to replant.

I found coppicing not a great success, neither in the Nilgiris nor in British Sikkim: many of the stumps failed to make shoots or died afterwards. With us, as a rule, coppicing has answered much better, but, as I said above, I prefer stripping. The gardens at Neddivuttum which had been stripped seven times, looked quite healthy, and I think Dr. Bidie has seen them formerly in a bad time, and that they recovered afterwards.

From my last report you will have seen the analysis of the so-called "pubescens." It does not contain much quinine, but will be improved a great deal by stripping or shaving. *C. Pitayensis*, which ought to be called *C. Trianae*, is a valuable kind, as it contains, besides a good percentage of quinine, as great a quantity of quinidine. Cross has told already that they have only about 50 old plants of this kind in Doda-betta; none in Neddivuttum nor in Sikkim. But private planters, Mr. Liddell and others, have *C. Pitayensis* in rather large quantities.

The Ledgerianas in British Sikkim I found quite the same as ours, and as drought can be more relied upon there than here, a regular supply of seed will be easier to get from Mr. Gammie, than from our plantations. We have had a normally dry season, with about 3 months with very little rain, and I expect to have a good crop of seed in 1882. There will also be a large crop of coffee, for the same reason. The small crop of last year was *not* caused by leaf disease, but by the continuous wet weather.

I brought some "hard Carthagenas" plants from Gammie, but they have died. I do not think it a great loss, and fear that it will be found a very poor bark.

With great pleasure I see that Ledgeriana is found to grow so well in Ceylon, and that there are many more trees of this kind than people knew. The more I see of it, the more I find that we generally planted

it too high, and that it flourishes better from 3,200 to 4,500 feet than above this height. They begin to plant it largely now in Java at 3,200 feet, with great success.

Our *Lageriana* grafts go on to grow better than anything else, and I will take a first crop from them by cutting the lower branches in November next, when they will be two years old, since planting. Till now there are no signs whatever of the gloomy predictions of Mr. Cross going to be realized. Some people will condemn things they never saw or tried: I am a great friend of the principle of trying. So Cross with the stripping: what does it matter, whether the trees are placed on crutches for the rest of their life after the first stripping, if they produce more and better bark lamed and on crutches, than healthy on their own feet. It may appear cruel to ill-treat a tree in this manner, but we do not keep them for our pleasure, but to get as much and good bark from them as possible. Mr. Cross has very great merits indeed for cinchona cultivation, more than anybody else, by his successful gathering of different valuable species; but he is not at all an authority on the cultivation of cinchona, and has taken great pains to show this in his report.

I think the publishing of your *Tropical Agriculturist* a happy idea; and most people in Java, who do not, of course, take so much interest in the local affairs of Ceylon, will like to have the planting information in a concise form.

Some days ago, I got a letter from Australia telling that old Mr. Ferguson will pay us a visit, and can be expected at Batavia on the 30th of this month about. I hope he will soon come to the hills, and I shall be glad to go with him over the plantations and to introduce him to planters of coffee, tea, or other products which will be of interest to him.—Yours very truly,
J. C. MOENS.

FIBRES.

A Dikoya planter sends us a sample of fibre accompanied by the remark:—

“Knowing you take great interest in new products, I send you a specimen of fibre I have grown here. Could you ascertain name of same as the plant grows very freely in the present soil.” The fibre is not unlike that of the tree-mallow, sent us lately by Mr. Hay from Dolosbage, being soft and white and probably more fitted for papermaking than cordage.

Mr. Schrottky, who saw the sample today, condemned it as too weak, putting its value at £15 a ton (against £400 for rhea grass which is the fibre to be experimented with here) and his opinion is fairly borne out by a merchant with Calcutta experience, to whom we submitted the specimen. He writes:—

“The sample of fibre, which appears to be jute or one of its congeners, is of fair staple, fairly cleaned, but short, containing no No. 1 of the ordinary Calcutta classification, but little No. 2 and to be composed of No. 3, 4, 5, with pieces, worth on the average, about £15 to £16 in London, or about £10 per ton here. You should tell your friends that it is well to avoid cutting off pieces of quality like those in the sample, the cutting diminishing the value of the staple which should be as long as nature produces it. It is only rough ends, coarser in texture than the run of the filament that are cut off, and the pieces I see in the sample do not appear to partake of such roughness. A longer staple would command about £18 to £20 per ton in London, and its equivalent here, and this will help to guide your friends re the remunerativeness of the cultivation.

GENERAL PLANTING REPORT FOR CEYLON.

WEATHER.—North of Kandy, the planting season cannot be said, so far as it has gone, to have been a good one, and there are still a number of cinchona and other clearings to plant. In Dimbula, Dikoya, Maskeliya and Ambegamuwa, the rainfall has been up to the average, but it has been very irregular, coming down generally in heavy pours succeeded by a week or so of drought, which is not desirable planting weather. There is every prospect of a wet north-east monsoon, which is likely, on the whole, to do good to coffee and other products, although it may interfere with curing operations.

BLOSSOM—CROP PROSPECTS AND CROP GATHERINGS.—Crop prospects are not as good as they were in the early part of the season. A great deal of the blossom did not set, and some of what came on is dropping off half ripe, or drying up at the points of the branches. Leaf disease is blamed for the whole of this, and no doubt correctly. The lower districts, and favoured estates in the higher districts are doing well, and it is nothing unusual to see fields, or portions of fields, with from five to ten cwt. an acre. It is quite true that a smaller proportion will ripen than did formerly, but it is encouraging to see coffee trees in these days with such good crops on them. If some districts and estates are doing well, this cannot be said of others, such as many at high elevations, and with a westerly aspect. Many such estates are not giving a cwt. an acre. And Uva, which has been the means of keeping up the total crop for several years, is likely to be short. It is to be feared that next year's crop will not exceed 600,000 cwt., if it reaches that figure.

LEAF DISEASE.—Lately we have heard less about leaf disease becoming modified, or passing away. There are few, but hope that it will pass away of its own accord, although thus far there is no appearance of it. People have almost lost hope in a remedy of a practical nature being found to eradicate or even modify it to any considerable extent. Manure seems to be the best remedy for it, but with short crops few can afford to apply it. Meanwhile coffee, the greater part of the year, looks as well as could be desired, and no doubt it would again bear as formerly, were leaf disease removed.

NEW CLEARINGS.—There is hardly such a thing out of Uva as a new clearing for Arabian coffee. Cinchona clearings are being planted and supplied, the latter being a work that never seems to have an end, so many are the failures from sun, wash, canker, insects, &c. In the low-country the areas of tea, Liberian coffee, cacao and cardamoms are increasing, but not so rapidly as they would if money were more plentiful. Those engaged in planting new products have not the slightest fear of failure where soil and climate are suitable. Liberian coffee in particular gives great promise, and before long will astonish those who, knowing very little about it, have taken it upon them to warn others from planting it. There is now Liberian coffee in partial bearing on many estates, and the yield where planted with the proper number of trees per acre is almost incredible. With regard to pulping it, this can be done without any very great difficulty. A Liberian pulper has not yet been perfected, but no doubt one of our engineering firms will soon turn out a satisfactory machine.

LABOUR PROSPECTS.—At the end of last crop there was a good deal of labour in the country, but the strictest economy being the order of the day, all surplus coolies were paid off. Many got work from sub-contractors on the railway, but after a short time a number of contracts were stopped and the coolies thrown out of employment, without being paid in some cases. It is said, after this many left the Island and went to

their villages, and at present there is no surplus of coolies, but scarcity, in many districts where coolies are required for planting, or to assist in taking in a larger crop than usual.

ROADS—RAILWAY AND TRANSPORT.—Roads at present are generally in good order, probably owing to the traffic being little than in former years. On the Dikoya road there has been a great increase of traffic, on account of the railway works, and it is a very common thing for carts going to Dimbula taking this route, which, though longer, is easier than the Kotmale road. There is no valid reason why Government should any longer refuse to undertake the entire upkeep of this road, seeing so much extra traffic is thrown upon it.

The coaches now running on the Dimbula and Dikoya roads are a great convenience, and are well patronized.

MANURING, &c.—Very few estates are now able to afford artificial manure, and many long ago broke up their cattle establishments. However not a few old estates still retain their cattle, it being well understood that to give up manuring where it has been continued for years is almost equivalent to throwing up the estate, and this is especially the case with old coffee. Where it can be done, manuring still pays; the trees are kept in good heart, and a larger proportion of the blossom sets.

MEDICAL ORDINANCE AND HEALTH OF COOLIES.—Medical Committees have been doing their utmost to keep down expenditure, and reduce the assessment to rates that estates can pay. It is the manifest duty of Government in the present depressed state of the coffee industry to remove this burden from the shoulders of the planters, and let it be borne by the general revenue. It will probably come to this in the end, and the sooner the better. On low-country estates there has been a good deal of sickness during the past six months, but not so much as there has been among the Sinhalese in the villages. Kurunegala has been unusually unhealthy for many months, but is now improving.

NEW PRODUCTS:—CINCHONA, TEA, CACAO, CARDAMOMS.

CINCHONA.—The planting up of cinchona in coffee has been more general than ever this year, and where it is not being done, or done on a small scale, the reason is that sufficient forethought was not given to the preparation of nurseries, and the purchase of plants cannot be afforded. Planters have at last come to realize that Arabian coffee alone cannot now be depended on, and something else must be planted along with it. Cinchona answers this purpose best, where the elevation is suitable, but succirubra cannot be planted with more than 200 trees to the acre without injuring the coffee, and the branches must be kept well lopped. When succirubra is over 5 years old, 100 trees per acre are as many as can be had, without serious injury to the coffee. In the case of officinalis, much closer planting is practicable without harm to the coffee, and as many as 1,200 to 1,500 per acre may be planted, if they are thinned out when they reach 4 years old.

TEA.—No cultivated plant seems to grow so well and readily as tea, and there cannot be the slightest doubt that when Ceylon tea planters have attained the requisite skill in the manufacture of it they will be able to compete successfully with Indian teas. We have great advantages over the Indian tea districts in climate, labour, and means of transport, and we shall be able to put our tea on board ship at a lower cost than it is possible for them to do it. What we require is to give increased attention to "manufacture," and be able to turn out really good teas, and then without doubt tea cultivation will be one of the best investments in the Island.

COCOA.—Nothing is likely to pay better than cocoa,

but it will not grow everywhere. Good, deep soil is required, and perfect shelter from wind. Under these conditions it will pay handsomely. It grows well up to 2,000 feet, and even higher. It does not object to a rainfall of 150 inches, and finer trees or pods cannot be seen everywhere than those Mr. Drummond can show on Gang-warily, where there is a considerable rainfall.

CARDAMOMS.—The area under cardamoms is rapidly increasing. They can be grown from a few hundreds up to 4,000 feet, although they bear best at from 2,000 to 3,000 feet. The cultivation is very simple, and a very moderate capital is required. Should a large quantity be produced, many fear there will be a fall in the price. Those who are fortunate enough at present to have an acreage of cardamoms in bearing are reaping a rich harvest.

TROPICAL AGRICULTURE IN THE SEYCHELLES ISLANDS.

The *Ceylon Government Gazette* gives as a Supplement a report by the acting Civil Commissioner of the Seychelles, Mr. Cockburn Stewart, (formerly Private Secretary to Sir Hercules Robinson in Ceylon) on the agricultural resources of those dependencies of Mauritius, and observations on the same by Mr. J. Horne, Director of Forests and Gardens at Mauritius. These are published at the request of the Mauritius Government in the hope that capital will be attracted to the islands. Unfortunately Ceylon has at present no capital to spare, but some of our planters may wish to try their fortunes in the Seychelles, and skew the Seychellois "how to do it" with regard to coffee, &c. But it will be seen that they will have to undergo fumigation on arrival there, lest some of the insidious spores of hemileia should be concealed about their persons! Mr. Stewart's letter is dated 20th June, and is addressed to the acting Colonial Secretary at Mauritius. He begins by stating that the present is a turning-point with regard to the future prosperity of the islands, on account of the coconut disease having assumed such alarming proportions as to threaten the extinction of that product. It is, therefore, all the more necessary for other products old or new to be extended or introduced. Hitherto the area of Mahé, the principal island, has been unascertained, the report of Mr. Salmon for 1878 putting it down at 110 square miles, or 70,400 acres, of which 40,000 were estimated to be forest. Mr. Stewart has had careful measurements taken, however, which show that the total acreage is only 34,749 acres. He says:—

"Of these 34,749 acres, about 12,000 acres are planted in coconuts, and 9,500, as according to a return which I caused to be prepared, are divided into estates not planted with coconuts, and of which about 500 acres are planted with vanilla, cocoa, coffee, cloves, maize, manioc, &c., and 1,500 is forest. The addition of these figures, viz:—12,000, 9,500, 1,500, gives 23,000 acres. We find that there remain 11,749 acres of non-cultivated and waste land. Of these 11,749 acres, 8,000 are well suited for vanilla, cocoa and coffee planting, which, with the 9,000 acres referred to above as divided into estates not planted with coconuts, gives a total of 17,000 acres of land admirably suited to the production of every known spice, vanilla, cocoa, and coffee."

The three principal products of Seychelles in the future he says will be vanilla, cocoa, and Liberian coffee. Of vanilla there were 150 acres planted, one-half being in bearing. At the last Paris exhibition

Seychelles vanilla obtained the first prize, and the present market value in Paris is 80f. per lb. That the culture is a profitable one may be judged from the following :—

"An ordinary vanilla plantation, or "vanillerie" as it is called here, is about 5 acres in extent, and at a moderate computation represents a production of 250 lb. of vanilla per acre. A clear profit of 10 rupees a pound after deducting all expenses of production, shipping and freight to Europe may be accepted as a fair calculation, thus giving a profit of 2,500 rupees an acre. To refer to actual facts, I may mention that Mr. Serret, a member of the Board of Commissioners, who possesses a vanillerie here, informed me that last year he was offered 100 francs a kilo or about £2 per pound for his first crop of vanilla, which represented 270 lb., and that this year his second crop is estimated at 600 lb., of which 400 lb., are actually gathered. Mr. Serret's estate is 7 acres in extent, with 5½ planted, and is worked entirely by twelve African boys."

As to cocoa we read :—

"There are about 100 acres of cocoa in cultivation, and the quality is pronounced by judges in Europe to be unsurpassed. The cocoa from here took the first prize at the International Exhibition of Paris. The cocoa tree bears in the fifth year after it is planted, though, in some instances, it has been known to bear after three years. It thrives magnificently, and the trees everywhere are healthy and vigorous, and seem admirably adapted to the soil in all parts of the Island. It will grow well at Praslin, Silhouette, Félicité and La Digue."

But Liberian coffee is *the culture par excellence* for Seychelles, Mr. Stewart thinks, and he describes 42 trees obtained by a Mr. Cauvin from Mauritius in December 1878, and which at 30 months old were from 8 to over 10 feet high, and were covered with berries. Mr. Cauvin states that they had blossomed in November 1879, May and November 1880, and May 1881. The ordinary coffee also grows well on these islands, 70 acres being in cultivation, the quality being good, and the flavour excellent. Regarding other products Mr. Stewart says :—

"The attention of the Seychellois has again been attracted to the cultivation of cloves, and there are 150 acres under cultivation. I say "again" attracted, for I regret to say that the lazy habits of the people have led to the wanton destruction of acres of this spice. Mr. Horne, the Director of the Mauritius Botanical Gardens, in his admirable Report on these Islands, dated the 20th May, 1875, writes as follows :— "The manner in which the Islanders gather the cloves is both reckless and wasteful; they cut off all the branches of the tree, although they are well aware that several years must elapse before the trees again reach the bearing stage, and in fact that many of them will die altogether. The cloves could easily be gathered from the highest trees by means of a bamboo ladder, and Mr. MacLeod, H. B. M. Consul at Mozambique, writing of Seychelles in 1859, twenty-two years ago, says, "This year two-thirds of the cloves that are produced by the remains of the spice gardens established by Mahé Labourdonnais were left on the ground for want of labour to save them." Since that date they have been cut down for firewood. The value of the Seychelles cloves is about £4 the 100 lb. The last lot sent home realized £6 the 100 lb., but this was exceptional. Pepper grows wild in these Islands, but although attention was called to the desirability of cultivating it by Mr. Horne in 1875, no attempt has as yet been made to make it a productive industry. I am glad to say, however, that I have induced several of the inhabitants to commence to cultivate it, and have promised to endeavour to import two or three Malays from the

Straits Settlements who understand its culture and manufacture to show them what should be done to render this plant, which is indigenous to the Island, a source of probable cultivation. Cinnamon is allowed to grow waste, and no attention is paid to nutmegs, allspice, arrowroot, ginger, saffron, and cardamoms, all of which could be extensively cultivated. I am taking every step in my power to impress upon the people of Seychelles the importance of this place as a spice producing country, and using every endeavour to give an impulse to the nascent desire of the more advanced of the population to adopt such ideas. It is impossible to imagine a country more favoured by nature than Seychelles. Though near the equator, the great heat common to the tropical countries is not experienced, and hurricanes so destructive to agriculture in Mauritius and Bourbon never visit these Islands. The country is notoriously healthy and exempt from all epidemic diseases and endemic fever, and well watered streams and rivers, and, as I have endeavoured to point out, peculiarly adapted to the cultivation of every known product of the East or West Indies. Cotton used to grow here, but has for years past been uncultivated. Mr. MacLeod, referring to Seychelles cotton in 1859 says "From 1817 to 1827 a flourishing and lucrative cotton trade was carried on at the Seychelles, and it requires only labour to compete with America in this article which it produces of the very finest silky Sea Island quality." It grows wild on some of the outlying islands, but its cultivation has never been attempted. There is no better tobacco grown in the East than Seychelles tobacco, yet but little is exported, and the preparation is still crude and unskilful, a fault easily remedied by the introduction of two or three Malabars from the Coast of India skilled in the preparation of Coringhy tobacco."

It is difficult, as Mr. Stewart says, to understand how, with all these advantages, the agriculture of the islands should have so long remained undeveloped. The reasons he gives are that the islands were almost unknown, and the land is mostly the property of private individuals unable from want of capital and from natural apathy and indolence to cultivate the lands. The teak tree will grow admirably, and it is proposed to replant the forests with it. At present there is only one specimen, 2½ years old, and 20 feet high. Mr. Stewart then refers to the labour question, the supply having been hitherto obtained from the liberated slaves brought to the islands in 1878 by H. M. S. "Ruby." In conclusion, Mr. Stewart touches on the coconut disease, regarding which a separate communication has been sent to our Government, but is not published here. He says :—

"The cultivation of the coconut tree is one which is peculiarly suited to the indolent habits of the people. A tree is planted and reaches the bearing stage after twelve or fourteen years without any further care. The fruit falls to the ground, and the only trouble required is to gather it. Although I cannot help feeling that the appearance of this disease will lead to the increased prosperity of the Seychelles Group, inasmuch as it has turned the attention of the inhabitants to the fact that their present easily cultivated staple produce will not continue to last for ever without some care and attention, and has awakened them to the consciousness that the cultivation of other products for which their country is so suitable is an assured success, and within the reach of the most of them, still it bides Government to take energetic steps to endeavour to combat the progress of the disease. I have addressed you separately on this subject by this mail, going into full particulars for the information of His Excellency the Lieutenant-Governor. I will only add, therefore, that the disease is caused by a species of borer which, introducing

itself into the trunk of the tree, gradually works up to the top, when the tree dies, and that I believe the appearance of this insect is due in a great measure to the utter want of care bestowed upon the trees by its cultivators. I cannot but hope that some easy remedy may be found to combat successfully the damage which is caused by this insect to the coconut cultivation of these Islands."

Mr. Horne's letter is a running comment on Mr. Stewart's. We extract the following paragraphs:—

"All purely tropical agricultural products thrive in Seychelles in a most admirable manner. Cloves, pepper, and cocoa grow without any attention or care from the inhabitants all over the country, as if they were indigenous, especially in Mahé. The common coffee, and cinnamon, escaped from former plantations, may be seen growing like native plants in many parts of the forests and in nearly all the islands of the Archipelago. A species of vanilla (*Vanilla Phalaenopsis*) "Liane sans feuille," is wild, and everywhere, in sunshine or shade, this plant may be seen scrambling over the rocks. The semi-spontaneous growth of these kinds of plants not only shows how well the climate and soil of Seychelles are adopted to them, but it clearly indicates the success which will attend their cultivation whenever seriously entered upon. Experiments in their cultivation are not needed. The planters have simply to plant, cultivate, gather, and prepare the produce for the market. The suggestion of introducing Malays who understand the cultivation of the pepper and preparation of the produce for the market is an excellent one. Liberian coffee is likely to take the lead, and it will grow well on every part of these Islands, whether the land has been planted with coconut trees or not—sandy beaches of a saline nature, perhaps, excepted; cocoa will thrive best in the sheltered fertile valleys in the interior of Mahé, Silhouette, Praslin, La Digue, &c. Care must be taken not to introduce plants nor seeds, &c., of the Liberian coffee, nor of any other thing from Ceylon, for fear of introducing the coffee leaf fungus, which has been so disastrous to the coffee plants in that country, Southern India, Singapore, Java, &c. This fungus was introduced to Fiji with coffee sent from Ceylon. The Government of that colony put itself to great expense in endeavouring to extirpate it, and, according to latest information, success was very doubtful. The introduction of this pest would either ruin Seychelles as a coffee growing country or greatly detract from its value as such. A good precaution against its introduction would be to disinfect seeds, &c., coming from any of these countries into Seychelles, with sulphur and lime, &c., and even people's clothes, whether in portmanteaus or on their owner's back. It may safely be concluded from a mass of evidence that no variety of the coffee plant is exempted from the attacks of this fungus, and that of Liberia suffers severely in Ceylon.

"The teak tree appears to thrive in Seychelles; so also will Sal, Sissoo and Toon, which are among the principal useful forest trees of tropical India. These should be freely introduced to the forests of Seychelles. So also the South American Rubber trees, viz: *Manihot glazovii* (the Ceara Rubber tree) Heveas and Castilleos. Plants of the two former will be sent to the Chief Commissioner as soon as the young plants will be fit for transportation. Three Wardian cases of Nutmeg plants will also be sent at an early date. No opportunity should be lost in making the Crown reserves useful to the community, and making them self-supporting if not remunerative beyond their up-keep and watching. While not unmindful of exotic species, which will flourish in Seychelles, I would draw attention to some of the most useful of the native forest produce, the growth of which ought to be

encouraged. These are in order of merit. Bois de Natte (*Imbricaria* sps.) This tree yields a timber which rivals the mahogany—Bois de fer (*Wateria Seychellarum*.) This large forest tree yields a most excellent and enduring timber. Capucin, (not yet botanically known) also grows to a large size and yields an almost indestructible timber of great value. Gayac or Faux Gayac (*Afzelia bijuga*.) This tree attains large dimensions and grows in rocky land by the sea shore. Its timber is of great value and reputed for a variety of domestic uses. Bois rouge and Moiré are of smaller import, but still worthy of preservation and increase. The same may also be said of the Filoa, which thrives on the poorest of soil, and sometimes attains a height of 150 feet with trunk whose diameter is nearly 7 feet. The Lette (*Verschaffelia splendida*) is a large growing palm whose trunk is split and the outside slabs are used as palisades in house building. Palmiste Haut Baum (*Stevensonia grandifolia*); the large entire leaves of this palm are used for thatch. Palmiste Choru (*Dickenia nobilis*); the heart of this tree is a most useful and excellent vegetable. Owing to the numbers of it which are annually felled, and as there are none planted to replace those cut, the tree is becoming more and more scarce. The extension of this tree in Government forests is most desirable. Coco de Mer (*Lodoicea Sechellarum*) is, not only on account of its uniqueness and rareness, but also on account of its utility, a subject worthy of attention and care. It should be planted in all the reserves. Cocoa marron (*Curculigo Seychellensis*.) yields leaves useful for cordage, and also for enveloping tobacco, &c. This list might be added to, but I hope it is sufficient to show what is meant. In fact the growth of every wild plant that is of utility, even in remote degree, to the community should be encouraged in the Government forests; and the little raspberry (*Robus rosaeifolius*) which yields a fine fruit, and also fine apples, which grow wild and by the acre where nothing else would thrive. Another plant, Bois dur, (*Plectronia bibractiata*.) is the source of the beautiful walking sticks for which Seychelles is famous. On this account it will soon become extinct. It thrives on soil of the poorest description, and it is worthy of preservation in Government reserves suitable to its growth."

NEW PRODUCTS IN THE LOW-COUNTRY OF CEYLON.

GENERAL REPORT:

CACAO AND CRICKETS; LIBERIAN COFFEE; LEAF DISEASE; WHITEANTS; THE RAILWAY AND LOWCOUNTRY TRAFFIC.

WESTERN PROVINCE, Oct. 3rd, 1881.

The weather of September was showery up to the 20th, after which we had eight days dry and hot, when it again became showery.

I was rather hasty in assuming, in my last report, that the crickets had moderated their ravages. It was only a lull of a few days, after which they set to work with fresh vigor, and are still going on; cutting leaves even on last year's plants, cutting daily fresh plants, and destroying the buds by which those cut formerly were endeavouring to re-establish themselves. Already twenty-five per cent of the last planting have been cut, and, as they continue to operate up to the middle of November, they have time to do a great deal more injury before they die. For two years I have been trying to observe their habits, with a view of counteracting their operations, but my progress has not been encouraging. I know that they begin to appear about the beginning of March and that they disappear about the middle of May; that they reappear in the latter end of August, and again dis-

appear in the middle of November. I know that placing the young plants in baskets is not an absolute protection, but it is the only means of saving them I have discovered. When the plants are put out in the field, they continue cutting the stems, till they are eight or nine inches high, after which they begin to cut the leaves. A circle of green leaves stuck in round the plants is a partial protection, but only so long as they remain green, and they are quite as bad in new as in old land. Plants once cut, they return to again and again, season after season, and they follow no rule as to where they attack. All parts suffer alike in the course of the season, and the plants are not fairly out of danger till they are over one foot in height. As some lands are entirely free from this pest, I believe it is a speciality of soil that suits them. They burrow deep down (sometimes as much as eighteen inches) and they can only do so in a light sandy loam. It is the same soil that suits the batali, and the earthworm. Our jungle is an impenetrable thicket of the one, and several inches of our surface soil consists of the castings of the other. So far as I can judge, these insects have no enemies. They only leave their burrows at night, and we have no terrestrial insectivore of nocturnal habits. The hedgehog would be an exceedingly useful creature among them; but we have neither that nor any other creature of like habits.

The soil, however, that suits batali, earthworms, and crickets, seems equally suited to Liberian coffee, so that we must, as the old proverb has it, "lay the head of the girse to the tail of the sow," and thus we may work out a tolerable result from the given factors. Besides, a close observation of the facts and constant reflection on them may, by-and-bye, result in the discovery of some mitigating appliances that will, in some degree, stay the waste of plants that has so seriously affected our progress here. The coffee still continues to grow rapidly, making two branches a month: the older trees seem, however, to have called a halt, in their vertical extension, at from five to six feet, and are now giving themselves chiefly to lateral growth.

Leaf disease is not extending. I still stump any plant that I find it on, prior to branching, but my eye spares one in full growth with several pairs of branches, and leaves more extensive than a lady's bonnet; as I find it is the small-leaved varieties on which it permanently fixes.

The whiteants have, in a great measure, moderated their attacks on the young cacao, but the crickets are now cutting a good many of them, and, as the nursery plants are safe and thriving where they are, I am not anxious to expose them in the field till the cricket season is over, and I am in hopes that the liming I propose to give them in planting will deter the ants till the ground settles about them. The white ants always make a minute examination of any newly moved soil, in search of anything that may suit them, and to establish their runs against dry weather.

We have had such frequent, if not very heavy, rains during the last five months, that weeding has been a rather serious matter. We have got pretty well clear of the special jungle weeds, but have in their place the goat weed, and several other troublesome annuals. The worst enemy however and the most persistent is pasture grass, of many species, that if left to nature, would in a few months turn the property into excellent feeding ground for cows and oxen.

I sowed ten thousand coffee seeds about ten days ago in the sheds, and as I treated them with a good dose of quicklime I will be able to report its effects in due time.

I have $3\frac{1}{2}$ acres of new clearing ready for planting, with twelve chains of cart road, a bambu fence of ten chains, all the ant-hills levelled down, with some draining and embanking; all at the moderate cost in coolie labour of R63. If I had got a good fire, I would have saved five rupees of this outlay. The 27×24 inch holes have still to be filled up, and the batali roots to be extracted, which will bring the whole cost of the $3\frac{1}{2}$ acres up to R100, or say R30 per acre. I have made this a test piece, to ascertain the lowest figure for which an acre of Liberian coffee could be put down by Tamil labour; but it has cost a good deal of personal exertion, and the consumption of a good deal of extra beer. To enjoy beer a fellow wants to be out in the field all day in this climate, keeping his eye on all that is going on, bullying, coaxing, scowling, warning, instructing and in desperate cases cuffing. Then wending his weary way home, he immediately, on arrival, has a vessel ready that will hold a whole bottle, and empties it at a draught. Jove never so much enjoyed the nectar handed by Hebe, as the old planter enjoys that draught of beer. Far be it from me to advise young planters to forswear tea, coffee, cocoa, and other such innocent beverages, and addict themselves to beer, but I state a fact as it concerns myself; though from necessary economy I am obliged to do without it, for the most part.

It seems as if the various departments of Government do not work together for the general benefit. This estate is beginning to have some traffic with Colombo, and it became necessary for me to consider how it was to be conducted most economically. We have a railway station within $7\frac{1}{2}$ miles, and I have no complaint against the charges made by that institution; in fact, so far as the railway is concerned, there can be no competition, but it has pleased the Provincial Road Committee to establish two tolls within three miles of each other, and if I send an empty cart to bring a load from the station I have to pay at both tolls, first going and then returning R1.38 for a single load, using $7\frac{1}{2}$ miles of minor road. The toll ordinance provides, that a cart passing a toll with a load shall be free when returning empty the same day, but it makes no provision in favour of a cart that passes empty and returns the same day with a load, though I fail to discover any reason for making a difference. The two tolls in question belong to two different minor roads, the junction of which is well within half a mile of the railway station, and the grievance of this neighbourhood could be easily remedied, by moving the one beyond the junction on its own line or franking the one by payment at the other. Till one or other of these courses be adopted by the P. R. C., I will, in common with my native neighbours, conduct the traffic of this estate by cart altogether, and save something over a rupee on each load. It is not the only instance in this province in which the Road Committees wink at toll-renters, establishing themselves at points where they can intercept the traffic, on roads already amply supplied with those institutions, but in this case a not inconsiderable amount of traffic is forced away from the railway by the multiplying of tolls on the roads leading to it. If the Provincial Committee would make a regulation, that, where any two tolls are within five or six miles of each other, payment at one shall frank the other, the public would be satisfied; but if that or some other equally just arrangement be not made, and that soon, there will be agitation on the matter that may not be successful, but will certainly be troublesome. I can, in some cases, travel nearly twenty miles, and come across only one toll, but here are two to pay within three miles.

Correspondence.

To the Editor of the Ceylon Observer.

THE CEYLON TEA-PLANTING INDUSTRY
AND COLOMBO EXPORT TRADE: A GOOD
SUGGESTION.

22nd Sept. 1881.

SIR,—I think, now that tea is being produced in large quantities in Ceylon, that some one should set up in Colombo, offering to buy tea in bulk, paying for it according to quality; blending and exporting as deemed best.

I am sure that an institution of this sort would pay well, and save the producer much labour and trouble, having simply to send away his store boxes and have them returned when empty.—Yours faithfully,
TEA IN STORE.

LIBERIAN COFFEE CULTIVATION.

SIR,—There is a letter in the "Times" written by a party with a deliberate intent to injure the progress of the new industry. He concludes by signing himself "Don't," but he gives not one sound reason for abandoning the cultivation of this variety of coffee. He is evidently a grossly ignorant individual, and has very little idea of cultivation. When the maritime provinces were taken by the British, there existed a trade in coffee such as found its way from the native gardens. Several years after the capture of the Central Province, the cultivation began and took nearly 10 years before it began to attract much capital. The plants and stumps could then have been got for the mere collecting.

In these depressed times, with the price of Liberian seed and plants is too high for the mass, it is a matter of surprise, that the cultivation of this species has made so much progress in three years. Now that the seed is approaching reasonable prices, the cultivation will rapidly increase and is increasing, if a comparison is made with the present and last year's planting. I know that mistakes in the selection of land will be made. It was a mistake to suppose that it will suit any soil in the low-country; but that there are between 20 to 30 thousand acres available in and around the Central Province chiefly, I have no doubt. In three years to expect a new cultivation to assert itself is absurd. Even the oldest estates can hardly expect much, so soon. The tree takes five to six years to be well developed. The writer seems disappointed in not finding the gentlemen he mentions millionaires already; but if his connection with the island lasts 10 years more, he will see the day when it will export as much coffee as it did in 1875 and 1876, but of this coffee more than $\frac{1}{3}$ and likely a half will be of this Liberian variety, realizing nearly as much as the Arabian; for John Bull's prejudices will be then considerably toned down, as it is now in the matter of China vs. Indian teas.—Yours,
PROGRESS.

CEYLON TEA IN LONDON: TAMBIES AND
QUININE.

4, Guildhall Chambers, London, 9th September 1881.

DEAR SIR,—It will, perhaps, interest you and your Ceylon readers to hear what was said on the subject of Ceylon tea by an expert tea-taster and valuer. He said:—"The Ceylon varieties show the thin pale liquor, large half rolled leaves, and dull infusion, which formerly marked the Java teas. But vast improvement has been obtained in the latter, now fetching excellent prices. Formerly they were under the ban in the London market, as the Ceylon teas are now. The splendid bright infusion so marked in the Indian

tea is conspicuous by its absence in those from your island, which have the dark color of China qualities. Get the planters to pay less attention to the make of the leaf. Produce the yellow tip so much thought of in the London market, improve the infusion, and let there be fewer coarse leaves in the shipments. Prices are then bound to improve." This gentleman kindly supplied us with sample boxes of Indian teas and one of Java tea. These we are sending on to you by a gentleman returning this month to Ceylon; so that you can see what is required.

Let us cordially endorse all that was said upon the subject of the home sale of your teas by your Northern correspondent. Every word of his letter was to us, working in the same field, pregnant with truth.

A short time back in "Planting Notes" from the Matale direction your correspondent spoke of a tamby hawking quinine about the country at a low figure. The following may perhaps explain his query. We received from India not long ago an indent for 100 ounces of sulphate of quinine. The label was sent as a guide and a sample bottle was to follow. We forwarded the label to the manufacturers, giving the order. We received a sample bottle from them. Shortly after, the bottle from India arrived. On comparing the two, it was clearly apparent that they were very different in quality. Both were taken to the manufacturers, and the matter was very simply explained. The bottle from India contained cinchonidine (worth 3s 3d per oz.) instead of quinine (worth 5s 10d per oz.). The process was perfectly simple. The cinchonidine label had been removed upon arrival in India, and a sulphate of quinine label substituted; the swindle being the more easily effected as the waxed impression of the English firm remained intact. Be careful when purchasing quinine from tambies and "see that you get it" is the moral of the above.

It would, perhaps, have been better, if Mr. W. Turing Mackenzie's friend, who made the laborious hunt after Ceylon tea in London, had applied for the information he required at the offices of one of the firms connected with your island. Mr. W. Sabonadiere, Mr. Delmege, ourselves, and others, are established in London, and he could doubtless have obtained the tea from one of these sources. Our advertisement appears weekly in the *Ceylon Overland Observer*, and for Ceylon produce, passages, shipment of goods, and parcels, and all information regarding the island, we are at everybody's service who calls at our office. Trusting we have not taken up too much of your valuable space, yours faithfully,

HUTCHISON & Co.

ANALYSIS OF CEYLON LEDGERIANA
BARK.

Mattakelly, Lindula, 29th September 1881.

DEAR SIR,—I enclose Messrs. Howards' analysis of eight samples of bark taken from eight cinchona Ledgeriana trees grown here, being about five and a half years old when the bark was taken.

The results will, no doubt, be interesting to your numerous readers now engaged in cinchona cultivation, and may be doubly so to you, when I tell you, I am indebted to your senior for the seed from which these trees were raised.

The selection for analysis from among the other trees was made by Messrs. F. A. Fairlie and J. A. Campbell, showing that selection botanically may be cultivated to a high degree, as Nos. 1, 2 and 3 on the list will prove.

Since these were picked out for analysis, we have had the advantage of seeing most of them blossom, as well as a good many of the others grown from the same seed; and judging botanically, we expect, at least, the same average richness over the whole. I trust Mr.

Ferguson will be able to recollect the source from whence he got the seed. A historical account of these trees, when we know the source of the seed may be interesting, since as far as I know they are among the oldest amongst their species in the country, while the analysis leaves no doubt of their being pure "Ledgeriana."—Yours faithfully,
Wm. SMITH.

Analysis by Messrs. Howards London, of 8 samples of *C. Ledgeriana* bark taken from trees 5½ years old, grown on Mattakelly Estate, Lindula :—

Mark and M. No.	Quinine Sulphate	Quinincine	Cinchonidine	Cinchonine	Quinidine
1	12·8	9·6			
do 2	12·3	9·2			
do 3	12·3	9·2			
do 4	8·6	6·4	0·5		
do 5	8·0	6·0	0·9	0·1	0·1
do 6	9·4	7·0	0·2	...	0·1
do 7	9·4	7·0	0·3	...	0·1
do 8	8·8	6·6	...	Trace	0·1

GUM TREE LEAF DISEASE AND THE CONSEQUENCES.

Lindula, 24th September 1881.

DEAR SIR,—While I was in England two years ago, my gum trees were almost annihilated (in fact one or two were killed) by a peculiar leaf disease, which appears in the form of round spots, varying according to the size of the leaf from pin's head to a three-penny bit. *Hemileia* does its work from the stem outwards towards the tip of the branch: but this disease commences at the tip and works in towards the stem. It has all the potency of the true leaf disease, and is, I am sorry, to say this year not only stripping the gums of all their foliage, but playing havoc with my cinchonas, especially unfortunately with my *Ledgeriana*. That the disease comes from the gums is beyond doubt, for every piece of vegetable matter near a gum is affected, while there is not a vestige of the disease where there is no gum. I have some sixteen varieties of eucalyptus, and as far as I can see they all suffer alike. I herewith send you leaves of gum, rose, oleander, gladiolus, strawberry, plum, and cinchona, to show how similarly, indiscriminately, and virulently this fell enemy is doing his work. You will observe that the spots gradually surround the leaf, as it were, and then make short work of the centre parts. As the eucalypti have been, and are being, introduced into the country by thousands (I might safely say millions, for I know of estates where to each cinchona a gum is planted as shelter), I have thought it right to make this fact public.—I am yours faithfully,
KÁROLY FÜRDÖ.

[Mr. Marshall Ward, to whom we referred the box of leaves with a proof of "Károly Fördö's" letter writes :— "I have carefully examined the leaves sent, and fail to discover any mycelium in them. Why does your correspondent dignify the spotting (which is a common enough phenomenon, and which I have long observed on many plants) with the name of 'leaf disease'?" Of course our correspondent did not mean the spotting was the same as coffee leaf disease, but what is this attack which results in the dying out of gums and cinchonas through the loss of leafage, and which seems to spread from leaf to leaf, unless it be a leaf disease? Have planters in other districts noticed this gum-tree leaf-disease and its effects? It seems more allied to the coffee leaf rot disease of Coorg, than to the *Hemileia vastatrix*. Curiously enough in an *Australasian* received by this mail, we find a paragraph headed "The Blue-gum an Enemy of Insects," as follows :— "That the blue-gum is not an enemy of all insects is determined by the fact of its being itself a prey

to more than one species. This, however, may be quite consistent with the power claimed for it, of keeping away from fruit trees certain insects that commonly infest them. The *Maryborough Advertiser* has found on Chinaman's-flat a Mr. Mills, who is said to protect his apple and other fruit trees from the attacks of insects by calling in the aid of gum leaves. In spite of annual devastation proceeding in his neighbours' gardens, it was noticed that Mr. Mills serenely cultivated his produce without much demonstration, and, in fact, appeared to abandon himself to the luxury of smoking under his own vine and fig-tree in comfort, and in supreme indifference to the raids of the insect world. Yet, at the end of the season, it was always found that whilst his busy neighbours had meagre crops, Mr. Mills's trees were crowded with ripe blooming fruit. Inquiries were made as to the reason of this, when it was elicited that Mr. Mills makes a practice of strewing eucalypti branches in his garden in proximity to his fruit trees; and, further, he makes a rule of bringing large green strips of bark from the bush, which he fits round the stems of his fruit trees and ties thereon. The result is that Mr. Mills' garden is singularly free from insects, and thrives whilst others are blighted."—Ed.]

"THE POTTERY TREE."

Kelvin Grove, Colombo, 29th Sept. 1881.

DEAR SIR,—When I sent you my notes on the kumbuk tree as a lime-producing one, I overlooked the enclosed cutting, which I made from the *Forres and Elgin Gazette* of 19th May 1880, referring to another tree so remarkable for the quantity of silex in its bark that it is called the "Pottery Tree." The genus *Moquilea* contains several species, and belongs to the order *Chrysobalanaceæ*, common in the tropical regions of Africa and America, two genera of which *Parinarium*, and *Parastemon*, are natives of British India, and are included in the order of *Rosaceæ*, in the tribe *Chrysobalanaceæ* by Sir J. D. Hooker; but none of this tribe, exist in Ceylon. The *Moquilea utilis* must be a recent discovery, as I cannot find notice of it in any of the books to which I can refer. Here then is a new product to be introduced to Ceylon, the specific name of which indicates that it is a useful one.

By the way is it not a mistake to call the *Pithecolobium Saman* "the rain tree" (see the paragraph quoted by you from the *Madras Mail*, at the bottom of the 1st column of the 3rd page of the *Ceylon Observer* of the 22nd inst.)? In Don's *Gardener's Dictionary*, 2, 432, No. 32, a description is given of the *Cesalpinia pluviosa*, D. C., and it is called the *Rainy Brasiletto*, and I suspect this is the true rain tree and that its name has been transferred to the *P. Saman*, though I heard reasons given for this latter being called the rain tree in consequence of its drooping leaves enabling the dew or slight rain to fall on the ground beneath.—Yours truly,
W. F.

(Extract referred to.)

One of the most remarkable of those trees which bear a stony or silicious bark is the "pottery tree" of Para, on the Amazon, termed "Carapia" by the Brazilians, and known to botanists as the *Moquilea utilis*. It is a magnificent tree, and sometimes grows to 100 feet before branching. The wood is exceedingly durable, being largely impregnated with flint; but the principal value of the tree lies in its bark, which is used by the Indians for furnishing the raw material of pottery. It is not that vessels are made from the bark itself, as they are sometimes made from gourds and calabashes; but the bark is burned, and the silicious ashes mixed with a proportion of river-clay make a strong and serviceable ware.—*Cassell's Family Magazine*.

GUM TREE "LEAF DISEASE."

6th October 1881.

DEAR SIR,—Referring to "Károly Furdó's" letter which appeared in your issue of the 3rd inst., I have noticed the disease on a few trees of *Eucalyptus globulus* in the Dimbula district; but it has not yet proved fatal in any instance. I attribute the blotches on the leaves to the attacks of a small fly, somewhat resembling the May fly, with transparent, light brown wings. This insect was very numerous on the trees that were attacked, and I feel sure that the flies are in some way connected with the disease, though I have not yet found any larvæ boring in the leaves.

The blue gum is certainly not an enemy of insects, nor the red gum either. I have seen specimens of the former destroyed by cockchafer grubs, by black grub, and by whiteants, and the leaves of both species are liable to the attacks of leaf-rolling larvæ. The trees are often used as resting-places by beetles of various species. The *Cetonidæ* may sometimes be found on the trunks, feasting on the gum that exudes from the bark.—Yours faithfully,
AUSPEX.

NEW PRODUCTS.

SIR,—Permit me to suggest the names of two new products, which may be cultivated with advantage in this islands—I mean—*sansevieria*, or American aloe, * known in Tamil as *maral*; and *Asclepias gigantea*, called in Tamil *erukkally*.

The former grows in abundance in the Jaffna peninsula and the Vanniya district uncared for by the people. It grows to a height of two to six feet, according to the fertility of the soil. Its leaves are very close to the stem, and resemble the leaves of pineapple; and could be propagated by means of shoots or buds. When the leaves are cut and put into water for ten or twelve days, the fleshy portion is removed from the leaves, leaving only the fibre in an unclean state. The fibre is extremely fine, glossy and very strong. It can be used in the manufacture of silk cloth, paper, or coir rope.

The latter (I mean *Asclepias gigantea*) also grows in all parts of Ceylon, chiefly in hot districts, without any care or attention on the part of man. They neither require pruning, weeding, or watering, but grow wildly, spreading several branches. The native physicians utilize its leaves, roots, and juice for medicinal purpose. A white powder resembling lime is found in the leaves, pods, and branches. The juice is very hot and pungent. In Jaffna, people burn the sticks to charcoal, and utilize it in the preparation of fireworks (rockets) and gunpowder. I would suggest to the coffee planters to try the leaves of this plant, as manure for the estates suffering from leaf-disease. In the bark of this stick, may be found fibre of excellent quality which also can be used in the preparation of cloth, ropes, &c., and in the pods extremely soft cotton, which can be utilized for mattresses and various other uses.

LANKASNAHAN.

[NOTE.—An allied species, to the first mentioned the *S. guineensis*, or African bowstring hemp, grew in Ceylon in 1824, and may be still in the Peradeniya Gardens. The *Calatropis* is well-known for its fibre, its charcoal, for its use as floats to nets, its gum, and medicinal qualities. It is the *Mudu-wara* of the Sinhalese and the *I-kulan* of the Tamils. The *Sansevieria zeylanica* Willd. and the *Calatropis (Asclepia) gigantea* are too well-known plants in Ceylon and India to be considered as "new products." The former is found wild all round Ceylon, and its long strong fibre is well-

* I never heard this plant called American aloe before: the *Agave Americana* and *Fourcroya gigantea* are so called.—W. F.

known as the Ceylon bowstring hemp, but I do not recollect an instance of its profitable manufacture in Ceylon. It is the *Maha-niyada* of the Sinhalese and the *Araly* or *Maral* of the Tamils.—W. F.]

THE RASPBERRY-JAM WOOD of Western Australia is highly scented, and will polish equal to Spanish mahogany. For fancy cabinet-ware it will be found especially useful. British manufactures will do well to obtain samples, and judge for themselves as to the truth of these observations.—*Stationer*.

CINCHONAS: UPPER MASKELIYA, 6th October.—Your South Coorg correspondent has no reason to complain of the growth of his succirubras 6 feet in 20 months from seed. The following will give some idea of how they grow in this end of the valley:—Succirubra—6" plants put out in July 1879, are now some of them 15 feet high; 3" plants, or, as you may call them, seedlings, put out in November 1879 are now 3 feet high, Officialis,—6" plants put out in July 1880 are now 8 feet high, girth 4". Can any other district in Ceylon beat this? If Maskeliya does not hold its own in coffee with other districts, I think it has the pull over them in cinchona growing.

LEAF DISEASE.—A wail comes from the coffee districts around Palghaut. Young estates in this neighbourhood enjoying all the conditions for successful cultivation, soil, good climate everything that can be desired, elevation suitable, and rainfall perfect, are attacked in the most unaccountable way with leaf disease. The young wood which gives promise of excellent bearing capabilities for the next year, is suddenly denuded of foliage, and the wood itself dies back to the primaries all in the short space of a fortnight. No apparent cause can be assigned for this rapid progress of the disease. Everything is being done to counteract the disastrous effects of the disease, especially vigorous manuring, and time alone will decide whether the estates will bear the attack or succumb.—*South of India Observer*.

DIMBULA, 4th Oct.—I send, per accompanying post, a "poochie" which I found eating into the bark of a cinchona officialis tree. I have never seen one like it before. I am afraid I have injured the head in taking it from the tree. However, I send it, and shall be glad, if you, or any of your readers, can let me know what it is; and whether they are likely to turn into a pest? I get your *T. A.* through my P. D. and read it with great interest. It contains a great deal of valuable information, of which I was totally ignorant of before. [The "poochie" is the larva of a small moth (probably of the family *Arctiidae*, genus *Psyche*) in its portable tube constructed of bits of bark and lined with silk. Although a bark feeder, it is not likely to do much injury to cinchona plantations.—ED. C. O.]

ASHES OF THE KUMBUK TREE.—It seems that the ashes which were analyzed by Mr. Cochran for Mr. Elphinstone were from the kumbuk tree, as our correspondent "W. F." surmised. On 16th September Mr. Cochran wrote to "W. F." :—"I have estimated the amount of lime in the ashes received from you. The raw sample dry contained 93.75 per cent of carbonate of lime and the prepared sample 98.05 per cent. The first of these closely resembled in appearance the sample I received from Mr. Elphinstone. I think it is very probable that it too was from the kumbuk tree. It contained rather more lime than your sample; but, whereas yours was fully carbonated, the other contained fully 3 per cent of lime in the caustic state which would by and bye become carbonated, thus reducing its percentage of lime a little." On 21st September Mr. Cochran wrote to say that he had heard from Mr. Elphinstone that the ashes he had sent were those of the kumbuk.

CULTIVATION OF CASUARINAS.

(From a Correspondent.)

Permit me, (the writer of the article on Casuarina Cultivation which originally appeared in the *Eurasian and Anglo-Indian Advocate*, and which you republished in your issue of the 20th July), to make a few remarks in reply to strictures passed on my statements by the Secretary of the Madras Agri-Horticultural Society. That gentleman, who claims to have considerable experience in this matter, says, that on the average only 300 trees can be planted on an acre, and estimates the yield at R1,440 for six acres. He then wishes the public to believe that my estimated expenditure of R1,400 on six acres will yield only R40 nett profit, or in other words only 2 6-7th per cent. or, say, 3 per cent. He seems to have forgotten that since he has reduced the number of trees on six acres to 1,800 from 18,000, he should also have proportionately reduced the expenditure. In my estimate the cost of watering 18,000 trees is put down at R600. It would not be correct to say that one-tenth the number of trees would cost only one-tenth the sum for watering. While the quantity of water required would be very much less, the area over which the trees are scattered would be the same, still I think one-tenth the number of trees would not cost for watering more than one-third the original sum, i.e., $\frac{2}{3}$ of R600=R200. Similarly the cost of watching, superintendence, &c., was put down at R44; but when a large estate is purchased the cost for six acres would be very little; I think, one-fourth of the 44 would be ample, i.e., R11. Now, taking the Honorary Secretary's figures as to yield, let us see what the profit is on 6 acres containing only 1,800 trees.

	R.	A.
1,800 plants at R5 per 1,000	9	0
Ploughing 6 acres at R3 per acre	18	0
Planting and first watering at 12 As per 1,000	1	6
40 cart loads of manure at 8 As a cart... ..	20	0
Watering for first year	200	0
Watching &c.,	111	0
	<hr/>	
Total...	R359	6
or say	R360	0
	<hr/>	
INCOME.		
From 6 acres at R240 each	1,440	0
Deduct Expenditure	360	0
	<hr/>	
Net profit...	1,080	0

or a return of 300 per cent on the original outlay.

Now, sir, the Hon. Secretary says the outturn is only 3 per cent., and from his own figures I prove it is 300 per cent. May I not fairly ask which is the more exaggerated statement?

I do not wish to take up any more of your valuable space, but it would be unfair to myself were I not to state my authority for saying that 3,600 trees could be planted on an acre, and that the trees would grow well if thus planted. The following is an extract from a paper by the Assistant Superintendent, Government Farms, and is taken from the Report of the Saidapet Farm for the year ending 31st March, 1879. Page 130:—"The casuarinas were planted more closely than in previous years. This was done partly for the sake of the shade the trees will afford each other, and thereby be able to protect themselves better from the sun than when planted far apart, but chiefly to induce the trees to grow straight and upright, it having been observed that, when casuarina trees are planted far apart, instead of developing a straight stem their main stem is sometimes liable to fork, and to produce many side branches, but no proper main stem, which considerably reduces the value of the tree. . . . In giving each tree 12 square feet,

3,630 trees can be planted on an acre of ground." My own opinion at present is that 12 square feet is not sufficient for a tree to grow very well, but that 25 or 30 square feet would be ample. I am borne out in this view by the fact that at Tranquebar there is a plantation of 60,000 trees doing remarkably well, although each tree has only 36 square feet of ground at the most. I am quite sure the Honorary Secretary's motive in exposing (as he thought) the fallacious hopes held out by me, was really to place people of small means on their guard; but I contend that when one in his position attacks me so publicly he ought to be at least accurate. I may add that the Perseverance Casuarina Company (Limited) has been formed with a capital of R20,000, and that it seems to be in fair way of being a success.—*Madras Mail*.

BEE-CULTURE IN INDIA.

Bees' wax and honey form no very insignificant items in our trade returns. People in India care very little for bee-culture; they are content to know that particular districts of Southern India afford both these items of luxury and medicament; some few may try to be critical about Cuddapah honey, but about the honey-bee of India most of us are as ignorant as those simple rustic folk in England, who, though "bee-masters" themselves, yet are in blissful ignorance of the full value of their interesting charge, their instincts and habits. Among the insects of commerce which India possesses, there is a *hiatus* 'eff in respect of bees which amounts almost to neglect of the gifts of Providence. Not many months ago a project was talked of for utilising the countless tons of bats' manure which the hill-caves of Cuddapah were said to contain; whether it is to come to any head, or is to remain in the category of this *non posse*, remains to be seen. In the meantime, it is interesting to know that Indian bees are beginning to be recognised as very promising producers of wealth, and that a venture is about to be made for utilising the Indian bee to the purpose, if not to the same extent, that it is in France and elsewhere. Possibly, with those peculiar views held by certain classes of Mussulmans of the sacredness of the bee, some little opposition in its being domesticated may ensue, but it is not likely to be long-lived. It is a very remarkable fact that customs and prejudices exist long after the age which gave birth to them. The hill-men of Cuddapah go out after the honey and wax, which they exchange with the low country-folk with instruments of barbaric sound. We wonder if they have heard at any time of Virgil and the directions he gives,—when you see the swarm issue from the hive, watch them attentively and raise tinkling sounds and clash the cymbals of Cybele. Somehow, the prejudice is both an old and deeply-rooted one which ascribes to bees a love for discordant sounds. To return to our muttons: an adventurous gentleman, whom a recent number of the *Tropical Agriculturist* named, is, we learn, about to start bee-culture in India. People have ventured on silk worms, and recorded successful issues, and we see no reason for believing the bees of the country to be more intractable. Bee-culture may have some little difficulties at first to contend with; so has silk-worm rearing, and what patience and unremitting care has compassed in one instance, they may succeed also in compassing in another. Cuddapah honey bears a high commercial value: when pure, it has a bright light yellow hue; it is only after it gets into the hands of the bazaar man that it acquires the mawkish taste and color that it does when it is brought into the market. We venture to predict a promising future for bee-culture in districts whose conditions are favourable

to the industry, and trust, Narbonne may find a formidable rival in Cuddapah and other honey-yielding tracts. It is not likely that the little honey used in hospital practice is always from Europe; and we see in the determination of Government to utilise as far as practicable local supplies an earnest and a guarantee that local efforts will meet with all the support that their real merits entitle them to. To the present day the caves of Salsette and Elephanta are as much frequented by bees as were formerly the clefts of rocks in Palestine, and as now are the fissures and crannies of the Cuddapah hills; no one either in this presidency or at Bombay, or for that matter any part of Asia, has tried to domesticate the bee, and the credit will be all the greater when some one shall be found to dissipate the illusion that the honey-bee of India is an unmanageable creature.—*Madras Times.*

THE SCIENCE OF AGRICULTURE.

Mr. Buckmaster of South Kensington, lately delivered a most interesting lecture on "Agricultural Scientific Education." It is now proposed in rural parishes to establish classes for teaching the science of agriculture, a subject which was added to our list three or four years ago, but which had not received very much attention. The teachers of these agricultural classes must be qualified either by passing an examination in the subject, or by the diploma of the Highland Society, or they must be graduates of some recognised University. The pupils must receive not less than twenty lessons between the examination of one year and the examination of the succeeding year, and the instruction must be given according to a syllabus prepared by the professional examiner in this subject. The pupils must be instructed in the nature of soils. This is a subject on which we all need more information. It is the raw material in which the farmer has to work, and it should be a part of his business and education to study this raw material, and to know all that he can know about it. The distribution and formation of soils, their classification; substances found in the ashes of plants, the sources from which these substances were obtained; active and dormant matter in the soil; conditions which regulate the conversion of dormant matter into a state available for plant food. Influence of the mechanical condition of the soil on the growth of plants, good and bad management of farm-yard manure; artificial manure; phosphates, superphosphates, ammoniacal manures, nitrates, salt, chalk, lime, soot—their use and special properties; drainage of land, its influence on temperature and health of stock. rotation of crops, good courses of crops, bad courses of crops, chemical composition of the substances used as food, materials necessary for the growth of the body, maintenance of animal heat, formation of fat, muscle and bone, the economical uses of foods, mixed foods, and general rules for the preservation of health. The examination will be within the range of this course of instruction, and every qualified teacher will receive a payment of £1 or £2 for every pupil who passes the examination, and this payment comes out of the annual Parliamentary grant for education. The pupils are encouraged by prizes of books, certificates, and bursaries. Such was a general outline of the scheme for promoting the establishment of classes for teaching the science of agriculture. It may not be all that some think necessary, but faithfully carried out, it was capable of accomplishing a useful educational work in a direction not hitherto attempted, for there was nothing in the education of Scotland which had any reference to its industries. The agriculture of the future must every day become more and more thoughtful

and scientific. Cheap bread and cheap meat may not be inconsistent with profitable agriculture. No one will pretend to say that he knows all that is to be known on this subject, or that the earth produces all that it is capable of producing. Agriculture, like every other civilised industry, could make but slow progress until those sciences on which the industry depends were more generally cultivated and understood. It is our increased knowledge of geology, chemistry, and physiology, which enables us to understand and explain many things which were regarded by our forefathers as unaccountable mysteries—(applause). The laws which regulate the growth of a blade of grass or the transformation of a turnip-fly or a fluke, are just as fixed as the law of gravity. It should be part of the education of every farmer to study these things, to try and understand them, and turn them to useful purpose in his daily work. All new methods of cultivation, and every new manure, have had one subject—viz., to increase the productive power of the earth, and to make it bring forth more abundantly. We have largely aided our national resources by the importation and manufacture of artificial manures, of which our forefathers knew nothing. We have economised labour in every direction by the introduction of improved machinery. We now stand on the threshold of still greater changes, which are only to be limited by the highest intellectual effect of our nature. It is impossible to make any progress in any industrial art without a knowledge of those laws and principles upon which the art is based. To manage your land in this particular way, to grow this particular crop in succession to some other crop, for no other reason than our forefathers used to do it, and they used to do it because their forefathers did it—(applause)—with a creed of this kind no industry can make progress, and the higher nature of a man, instead of being quickened, must stagnate in his daily work. The progress of agriculture, like that of every other industry, is a constant struggle with natural laws and natural forces. It is only by knowledge that we can subjugate these forces to our use, and make them our willing subjects and slaves. Science discovers law; art applies them. The science of an industry is for the most part a distinct thing from its practice, but the most successful farmer is he who is able to unite in his daily life science with practice. There can be no such thing as two kinds of agriculture—one scientific and the other practical. All practical agriculture to be successful must be scientific, and yet there is no opinion more deeply impressed on the minds of some men than the very common belief that science and practice are opposed to each other.

COCONUT CULTIVATION: SOUTHERN INDIA.

About a month or six weeks ago we made a few remarks on the coconut planting industry and stated that many advantages are likely to be derived by small capitalists giving this subject greater attention than it has lately received. We have been favored by a correspondent with a pamphlet on casuarina and coconut planting published in Madras some 15 years ago, when the planting industry occupied greater attention than it now does, and when small capitalists applied for land in places near Madras for the purpose of planting casuarina which was all the rage at the time. We find on a reference to the pamphlet which, by the way we may mention, contains a good deal of valuable information about casuarina planting, that coconut plants may be safely planted with casuarina and after the latter are cut up and sold, the coconut top will be there and from it the owner may obtain the revenue which is always available from the coconut tree. Coconut plantations are known to have

thriven in the suburbs of Madras and to this day, to the north and south of the city, large plantations may be seen. It appears, however, that at a place known as Edakanaad, situated between Sadras and Pondicherry, coconut plantations are in a thriving condition, but the owners of plantations "are far from being perfect in the art of planting." In the Godavery district, coconut planting is carried on with great success, and those engaged in the industry in Madras may well borrow a leaf from the system adopted in the granary of the Northern Circars in respect to this industry. It is to be regretted that the author of the pamphlet does not give particulars of the system adopted in the Godavery district which may be usefully followed in other places. The great difference in planting coconuts on the Malabar and Coromandel Coasts is this—in the former, the heavy and continuous showers of rain for almost nine months in the year, render the watering of the plants unnecessary after six or eight months. On the Coromandel Coast, the rainfall is very much less, and it is necessary to water the trees till they begin to bear, and even after that, when toddy is drawn, it is necessary that the supply of water should be continuous. Plantations should be situated on land where fresh water is to be had near the surface. The plantations in and about Madras are situated on *clayey* soil which is easily irrigated and the trees can be planted closer than in a plantation of sandy soil. It is, however, not considered advisable to plant the trees too close, for if they are so planted, the yield of coconuts will not be as large as it would be otherwise. The writer of the pamphlet says that the profit from each coconut tree bearing toddy is as small as two rupees per annum—owing to this small revenue, the owners of gardens prefer to obtain the coconuts and sell them. We are not disposed to accept the statements of the pamphleteer that the yield of toddy from a coconut tree results in so small a profit as two rupees per annum. If that is the case, there is not likely to be such a large yield of toddy in Madras and in the suburbs as there is at present where some hundreds of shops—there are fully three hundred shops within the limits of the Municipality—are in existence and there is no question as to the large quantity of toddy sold by their owners. The pamphlet contains many useful hints on coconut cultivation, such as the raising of plants in nurseries, the cost of conveyance by rail, and of the valuable species of coconut grown in Ceylon and in parts of the Nicobar islands between which and the west coast a large trade in dried coconuts is carried on for exportation to Europe and other parts. To those engaged in growth of casuarina some of the suggestions contained in the pamphlet may prove useful. They may be induced to adopt the writer's suggestions to plant coconut trees with casuarina and some of the hints may also be useful in dispelling the wild theories that have lately been promulgated in respect to the profits to be derived from casuarina planting. On this subject, the Secretary of the Agri-Horticultural Society at Madras has lately published some useful statistics which go to show that casuarina planting will yield a fair return, but not to the extent anticipated by the promoters of a newly established company at Madras. Nevertheless, we think, that were greater attention given to coconut planting in Madras and in places where plantations are likely to thrive, it will turn out to be a successful and paying undertaking.—*Madras Standard*.

ORANGE CULTURE IN SYRIA.

Some notes on orange culture in a recent consular report from Beyrout, are quoted in the *London Times*, from which we learn that the two districts in which oranges are the most plentiful are those of Jaffa and

Sidon. The orange trade began to assume considerable proportions some 40 years ago, and the new Government of Egypt took shape, and it is now one of the most profitable in the two towns above mentioned. Unfortunately the inhabitants, allured by first gains, commenced planting gardens, and expending money beyond their resources, the result of which has been that, in spite of all remunerations for small outlays, their improvidence has placed most of them in the power of money-lenders, who continue to advance at interest of 15 to 20 per cent. However, a Company has lately been formed in Jaffa to negotiate loans with orange cultivators, and if its operations be carried on fairly, we may expect an extension of horticulture, with benefit alike to the Company and the borrowers. At the present moment Jaffa possesses some 340 gardens, averaging from 2,000 to 2,500 trees in each. The crop of fruit from these may be put down at about 30,000,000. A garden costs from 40,000f. to 50,000f., and brings in 4,000f. to 5,000f. per annum. For several miles round Jaffa extends a fertile plain, on which water is always to be found at a depth of 40 ft. or 50 ft. With capital and enterprise much of this might be planted, and the orange trade doubled in a short time. The present system of irrigation is that of small wells, from which the water is drawn by mules; but experiments have proved that very little engineering skill would be required in order to turn the streams of the River Andjah, some four miles from the town, over the plain. The land near Jaffa would then be cheapened in proportion as the value of that freshly-watered rose. At present, unplanted land close to Jaffa, able to support 2,000 trees, is worth 2,000f. to 3,000f.; but at two or three hours' distance it will fetch only 5f. to 6f. a dennum. The export is carried on chiefly by sailing boats for Egypt and Constantinople, and by steamers for Russia, Trieste, and Marseilles. Exportation in cases is a comparatively recent introduction, which has given considerable impulse to business with Europe. The orange gardens of Sidon are cultivated on the same principle as those of Jaffa. An acre of land at Sidon is generally valued at from 6,000f. to 7,000f., and is capable of bringing in an income of about 600f. The exportation begins in September, and is at first almost exclusively directed to Russia, till the winter closes the Black Sea ports, when it is continued to Trieste and Egypt. European cargoes are packed in paper and close cases; the rest are sent in open crates. Each case contains some 300 oranges or lemons, and last year's export is reckoned at 20,000 cases, all of which fetched very high prices, especially lemons in Russia. The average prices are for 1,000 lemons 150 to 170 piastres; while for 1,250 oranges, reckoned as a trade 1,000, the cultivator receives 70 to 80 piastres.—*Journal of the Society of Arts*.

AGRICULTURE ON THE CONTINENT OF EUROPE.

(Special letter.)

PARIS, 10th September.

The French are very extensive spinners and weavers of Australian wool: it forms the basis of the woolen and silken stuffs which they export to that colony. The pure breed of French merinos, such as it exists at Rambouillet, differs on several important points from the Australian merino; the latter is less heavy and smaller; the staple of its fleece is, however, finer, in the sense that its diameter is narrower, but the Australian merino wool is less elastic and its undulations not so regular as that from the perfect Rambouillet sheep. Now Australian wool growers aim at fineness of fleece: hence, why many consider the crossing of native merinos with

the best imported Rambouillets would be an advantage. Perhaps it would also tend to diminish the darker-coloured flesh of the Australian sheep. Following M. Bourdil, an ex-Commissioner, Australia had in 1879 66 millions of sheep, and exported in that year 143,000 tons of wool, at an average price of 1/0½d per lb.; in 1877, the mean weight of an unscoured fleece was 4½ lb., and of washed 2½ lb. The most appreciated wools are grown, according to the same authority, in Tasmania and Victoria. New South Wales, in 1878, possessed only 29 sheep; at present she has 29 millions. To Tasmania reverts the honour of having first imported merinos from Saxony.

The *Société Nationale d'Agriculture* has the excellent habit to pass in review the history of the country's agriculture for each year: the *résumé* is ever the product of M. Barral, who, in addition to being an able chemist, is one of the most practical minds in France, and whose long public career has ever been associated with the progress of the age. A few gleanings from that interesting document:—It draws attention to the discoveries of Pasteur, who not only has found a remedy in inoculation against the terrible stock plague *charbon*, but has pointed out that the origin of that malady is due to the burial of diseased animals in lands over which cattle subsequently range, and thus catch the animalcules or plague-germs, as thrown up by worms from the pits where the carcasses have been interred. The United States are accused of having introduced the phyloxera into France: whether the charge be accurate or not, the antidote has come from the same source, as the grafting of American vine stocks has been found efficacious in resisting the ravages of the vine bug. Testimony is borne to the happy results attending also the employment of sulphuret of carbon, and, above all, to the adoption of autumnal irrigations and rich spring manurings, known as the Faucon process, and whose author has been recompensed by an *objet d'art*. In what may be designated industrial agriculture, the cultivation of sugar beet ranks high, and its development has received a fresh impulse from the reduction of the inland duty on sugar. Connected with this progress is the now general adoption of the extraction of the juice by the process known as *diffusion*, imported from Austria, instead of the old plan of presses. The pulp resulting from the new system has been found to be more nutritive for feeding purposes. In the northern and central regions of the country, where beet culture prevails, this pulp has next to revolutionized stock farming: agriculturists in the neighbourhood of the factories no longer rear stocks; they purchase the lean kine in other districts and fat them. It is a branch of farming very remunerative, as the demand for fresh meat exceeds the supply, and no danger is apprehended that America will be able to compete in furnishing live stock to the butchers. The distillation of alcohol from beet and maize also has made important progress, and M. Savalle has demonstrated that rectified alcohol is so chemically pure, that it is of no importance from what substance it be obtained. Despite the development in the preparation of the cheese and butter industries in Denmark, England, and Sweden, France continues to hold her own. It is satisfactory to observe that M. Duclaux has obtained a medal for his Benedictine labours on the rôle of animalcules in the manufacture and ripening of cheese. Respecting eggs, France not only exports millions for consumption, but for hatching too, and for the latter supplies incubators. M. Joseph Boussingault, son of the veteran chemist, has also been honored for his researches in Agricultural Chemistry; nor have the national teachers been overlooked for their humble but important services. One schoolmaster aged 75, and after 50 years in harness, has been pensioned; he is happy, as he boasts, "I am going now to commence new experiments." Some local Agricultural Societies award premiums to the schoolmistresses for inculcating general notions

of farming, dairy management and house-keeping to their pupils.

This year's harvest will be inferior to last season's; wheat will represent a less yield of 30 millions of bushels; barley is fair; rye, good; oats, bad; maize, passable. On the whole, in point of cereals, France and Russia are the most favored countries in Europe. Forage is next to a failure; beet is suffering from abnormal fluctuations of temperature, but the vintage promises to be excellent in quantity and quality.

The Electricity International Exhibition has, from an agricultural point of view, some attractions. In principle the application of electricity is simply a transmission of force; the secret of the economic utility of that power has been found; the applications will come in due course. Professor Déhéraïn exhibits his experiences on the influence of electric light on vegetation; M. Felix, on the application of electricity to ploughing and threshing; M. Albaref, to the lighting of farmyards and agricultural operations, and the examination of eggs by electricity.

In the south of France, where the climate is hot and the country mountainous, rearing sheep for their milk, to produce cheese (Roquefort), is largely extending. The best milking ewes ought to have four or six teats, the udder voluminous, the wool rare, and secreting much grease, ears long, head small and without horns. Sheep with four teats ought to be sought. In the Agricultural College of Montpellier there is a ewe with two lambs, and yielding milk from six teats. So far the experiments have not succeeded of obtaining an animal producing much milk and a good fleece at the same time. Counting milk, lamb, and wool, a ewe produces net about fr. 48 yearly; six quarts of milk yield 1 lb. of cheese. The Chilians, to obtain special skins much sought after, cross the sheep with the goat; experiments are being conducted in the end of a similar crossing, for improving the milking capacities of ewes. Goat farming does not pay: the animal is destructive, its flesh held in little repute, and its offal of no value.

To combat the epidemic of typhoid fever from which horses now suffer, a veterinary urges the use of arsenic as an infallible cure or preventive; he holds back, however, the recipe. The stable ought to be sprinkled with a solution of carbolic acid, two ounces in a quart of water. Arsenic imparts a fresh and sleek look to the coat, and in Vienna is given to make carriage horses foam at the mouth.

Up to the present the mechanical fattening of poultry consisted in storing the birds in a pigeon-holed revolving tower, and making each shelf with its tenants pass before a man with a bucket of prepared liquid food, that he injected in measured quantities through a tube, working by a treadle, into the throat of the bird. In Italy and France the Humane Societies attempted, but without success, to put down this mode of rapidly contributing to our food supplies. An improvement has taken place: instead of the revolving tower, the birds are placed, 6 to 8 in number, under a kind of box or melon frame, and left to enjoy all the liberty they can find therein; the feeding apparatus is maintained, each bird being taken out to be dosed, and then put back to enjoy its confined "constitutional." The frame is heated to a certain temperature, that which aids the putting up of flesh.

M. Guignet draws attention to cases of pigs having been poisoned, by giving in spring cooked potatoes and their germs, or later a mash of green potato stalks; he adds, excepting the tubercle, every other part of the potato contains as deadly a poison as nightshade.

Among the many prizes offered by the National Agronomical Institution of France, is one of much importance: the right of two of the most successful candidates of the annual examinations to reside abroad in the centres of the best farming districts for three years, at the expense of the Government, they furnishing reports on the farming of such countries.

ESPARTO OR ALFA.

By C. G. WARNFORD LOCK.

The celebrated German traveller, Dr. Gerhard Rohlfs, devotes a whole chapter of his new book, "Neue Beiträge zur Entdeckung und Erforschung Africa's" to the subject of "Esparto, and its increasing Importance in European Commerce," from which the following notes are condensed :—

A portion of the Sahara, known to the French as *le petit désert*, comes within the influence of moisture-laden winds, and is clothed with vegetation. One of the most useful plants, covering almost the whole district, is esparto^o or alfa (*Macrochloa* or *Stipa tenacissima*). Long known and locally utilised for mat-making, it is only within recent years that the true value of this plant, which needs neither care nor culture, and thrives with a minimum of moisture, has been recognised. It grows in thick branches close together, presenting a subulate appearance, and reaching a height of six to ten feet. The tenacity of its fibre constitutes its industrial value, for it is scarcely fitted for consumption as fodder. Indeed, Duveyrier states that it has such a powerful constipative effect, that the shepherds of the desert edge drive their camels and sheep every third or fourth day to drink at mineral springs, in order to counteract the binding action of the esparto diet. Rohlfs himself noticed how soon the camels and sheep grew tired of grazing upon it.

The one word paper explains the whole importance of esparto. The day has long since passed when rags and similar stuff sufficed to supply the world's needs of paper. The moment has arrived when new sources of paper material must constantly be sought. This is easily explained when we reflect that the yearly consumption of paper by the four great cultured nations of the world stands thus :—England, 13½ lb. *per capitem* of the population; America, 12 lb.; Germany, 10½ lb.; France, 8½ lb. These figures are always on the increase. And though Russia takes only about 1 lb., and Austria 4½ lb., the amount in both these countries double themselves with every generation.

No plant seems better adapted for paper-making than esparto. It may be regarded as an inexhaustible source of wealth, not only in Algeria, but for all northern Africa. Algeria already owes a portion of her railways to this plant. The section from Arzew to Saida is approaching completion, and others are in progress. Some seven or eight million acres of esparto ground exist in Algeria alone.

Hitherto, the greater part of the esparto grown both in Spain and North Africa has gone to England, though the Americans are beginning to import direct from Africa. Up to the present, German paper-makers have not availed themselves of the use of this plant. England, in 1868, imported 95,828 tons—92,927 being from Spain, and the rest from Algeria. But Algeria rapidly attained greater importance, while Spain fell off. In 1874, England's imports were 119,188 tons—54,942 from Spain, and 37,516 from Algeria. Since 1870 other countries have contributed to the total. Tunis and Tripoli figure in 1871 with 11,579 tons, increased to 18,670 in 1874. Malta provided 3,261 tons in 1871, and 7,185 in 1874, not of its own production, but derived from Cyrenaica, and the co-called Libyan coast plateau.

The influence of other lands, Tunis, Tripoli, Cyrenaica, and perhaps the Libyan coast plateau, upon the Algerian and Spanish trade, has, especially of late years, caused a reduction in price. As, however, in most of these lands, robbery is still rife, Spain and Algeria will long continue to enjoy a practical monopoly. How strongly the rational conservation of this valuable plant is urged in France may be gathered from

the following words of the journal, *L'Exploration* (1878, p. 156) :—"As in France laws have been made against the felling and destruction of forests, so must the Colonial Government busy itself with the protection of this great staple of the high plateau, and not only severely punish the before-mentioned crimes (burning by the Arabs, and killing of the plants by careless gathering), but also fortify the esparto region against the constant encroachments of the sand of the Sahara. [Rohlfs characterises the latter as a groundless fear, the sand-dunes being on the whole stationary.] It must not be lost sight of that all Europe and America are dependent upon Algeria and that, should the whole esparto district be carelessly left to greedy robbers, who care little for the public property, finally nothing will remain but a neglected waste, an unfruitful steppe." It is as well to observe that, firstly, Algeria possesses, at the utmost, not more than one-sixth of the esparto region, and, secondly, the same land will, when desired, grow excellent wine.

On the subject of adulteration and faulty packing, Dr. Rohlfs quotes at length from Noble's circular of 14th January 1875.

The preceding remarks indicate what stress is laid upon the export of this plant to France, Great Britain, and the United States, while Germany remains outside. Yet none will suppose that Germany is blessed with a superabundance of paper material. The Leipzig paper trade alone has of recent years a value of about ten million marks (£500,000). It is therefore a reproach to German merchants that they should have paid so little attention to this material. With this object, it is not at all advisable to go to Algeria, nor to Spain, where German merchants would find it difficult to gain a footing in competition with the old English houses. But is not the whole remainder of North Africa open? Not to speak of Morocco, where, especially south from Cape Ger, a wide stretch of country still remains unoccupied, on which esparto forms the chief vegetation—the esparto-grown portions of Tunis, Tripoli, Barca, and the eastward-lying Libyan coast plateau, stretching to Alexandria, are absolutely without any rational commerce; as the natives tear up the esparto, root and branch, so is it carried to the shipping ports, sorted, and sent into the market. Here is a field for German enterprise. Dr. Rohlfs suggests the possibility of establishing esparto paper factories in convenient localities, and supposes that about half of each plant would be available as fuel.

The remainder of the chapter deals with African trade generally, but the whole tenour of it is to urge the Germans to no longer remain passive and unmindful of the resources of North Africa: and Dr. Rohlfs is not likely to preach in vain to his countrymen. Now, if these waving acres of esparto offer such great inducements to the astute and cautious German, do they not merit even greater attention from ourselves? Already our paper makers have cause to tremble for the future, since France has made such strides on Tunis, and if our merchants allow themselves to be outstripped by German rivals on neutral territory, we shall soon have to import all our paper from the Continent, in spite of all that Mr. Routledge is doing for us.—*Journal of the Society of Arts.*

GOLD PRODUCTION.—It is reported that the total product of gold in the whole world last year was 118,000,000 dols., nearly half of which was mined on the continent of America. The product of silver is said to be 94,000,000 dols., of which 78,000,000 dols. was produced in that country. The grand total of precious metals was, therefore, 212,000,000 dols., an increase, as compared with the three preceding years. —*Journal of the Society of Arts.*

PRUNING CONIFERS.

(Field, 10th September 1881.)

There is a prevalent notion that conifers do not like pruning; and in many cases trees that would make good specimens get ruined from want of a little timely attention in this way during their earliest stages of growth. In forests, where trees are planted thickly, there is no chance for them but to run up straight; they get crowded by their neighbours and lose their lower branches by reason of the dense shade in which they are placed; but when planted at wider intervals for ornamental purposes the side branches retain their vigour, and unless checked by timely pruning rob the leader of its proper supply of sap, until, instead of making a handsome pyramidal tree, it becomes merely a scrubby bush. Now, I find that where they have made several leaders, and have become quite stunted in growth, they may be renovated by careful pruning, although, of course, the process is slow, for conifers will not make shoots from old hard wood like a deciduous tree; but by keeping all the lower branches stopped in for a time, a leading side branch will straighten up and become a good leader. In fact, we have many Wellingtonias and other varieties of conifer that have been beheaded by violent gales of wind, snapping the succulent leaders short off; yet by carefully stopping the side growths they have quickly formed a new leader, and the junction of the two is hardly visible. When conifers are grown for either ornament or profit, I would strongly advise the careful use of the knife and saw as an indispensable part of their treatment; for a really ornamental well-proportioned tree means a profitable tree, as none of our older kinds of forest trees form so large a quantity of timber in a given number of years as do some of the newer kinds of conifers. J. G.

A CHEAP FERTILISER.

(Field, 27th August 1881.)

Sir,—Shortly before his decease, I received the following letter from Mr. J. J. Mechi of Tiptree Hall:

Dear Sir,—Very many thanks for your interesting and valuable pamphlet of American agricultural statistics. What a fortunate thing for three-fourths of our population that they will not want bread, which they certainly would do if dependent solely on home supplies. I have no fear of foreign competition, either in corn or meat, provided I am enabled, by capital and skill, to produce maximum crops in ordinary seasons. In such an exceptional one as the last, neither skill nor capital were of avail. I hope America may escape such a disaster. My crops promise well. Come down in July and see them, and take a crust and cheese, perhaps both "American."—Truly yours, J. J. MECHE.

P. S.—The non-improvers will suffer by foreign competition, and will be forced "out of the market." According to my estimate, at least £400,000,000 is required in agricultural improvements by land-owners and tenants—I mean in agricultural improvements and investment of capital.

What proportion of the £400,000,000 Mr. Mechi conceived necessary to be expended in fertilisers, in order to put the British farmer in a position to compete with his American rival, cannot now be ascertained. It must, however, have been considerable; and the question may fairly be asked, From what sources are these fertilisers to come?

The estate from which its owners "calculate" upon extracting so much wealth has evidently been the bed of an extinct lake. The area is some 6,000 acres, or nine square miles. Except in one direction, where there is a small opening, it is surrounded with hills. The opening, it is plain to be seen, has been caused by the lake breaking through its bounds, and rushing away to join the sister lake, Seneca. This must have occurred at a remote epoch, as the upper crust or covering of

the bed of marl is fully 4ft. thick, and is composed of rich vegetable mould, representing the growth and decay of ages.

Underlying this is the marl or albemarle, as it is termed, though it is not white, but a rich grey. The deposit varies from 60ft. to 6ft. in thickness, and each 100 acres has been estimated to contain 2,000,000 tons of fertiliser, giving for the 6,000 acres some 100,000,000 tons, which, it is claimed, sells here in the States for £2 a ton. On taking a piece in hand it is found to consist of myriads of minute shells, of various forms and sizes, which crumble into powder under the slightest pressure. The analyses of chemists show it to be composed of decayed vegetable and animal matter. About seventeen miles distance is Syracuse, the centre of the great salt industry in the States, and it is averred that salt has been found underlying the fertiliser. The water of the lake was originally salt or brackish—a condition favourable to the rapid growth of these lacustrine shells.

A word on guano, which I see is causing some discussion in England. I have recently returned from an extended tour in Peru and Chili, where I had occasion to investigate this subject thoroughly. The supply of some 800,000 tons a year may last five or six years longer. The quality will grow inferior year by year, as it has done since the Chinchas were exhausted. In America the farmers and planters are ceasing to use it. The first say it is the source of the foot-and-mouth disease; the second that it has destroyed the fine old-fashioned flavour of the tobacco.

The value of the marl as a fertiliser depends, of course, upon the amount of phosphate of lime that it contains, and some of the analyses estimate this at a very high figure, by reason of its fossiliferous ingredients. New York, July 20. J. H.

LIQUORICE ROOT.*

There are several districts in Spain, writes United States Consul Morston, from Malaga, to the Department of State, in which liquorice root is obtained, and large exports are made from Spanish seaports to the United States. France also consumes large quantities of this root in the manufacture of liquorice paste, and probably takes nearly as much of the United States.

This root is used in the United States principally for sweetening in the manufacture of plug and other kinds of tobacco; it is also used in the manufacture of drugs and in the preparation of medicines. It grows wild in the lower lands, in marshy-ground, and on the banks of rivers. Probably the best quality obtained in Spain is found in the provinces of Aragon, Murcia, and Toledo. The very best Spanish liquorice root is found near the margin of the Ebro, in Aragon. The next in point of quality is obtained near Cordova. When it once takes root it is almost impossible to eradicate it. It grows in many countries, and varies in quality according to soil. Spanish liquorice differs quite materially in the several provinces, the principal variations being that in some parts the bark is red, brown, or light colour, the inside varying from light yellow to brown; the proportions of saccharine and starch vary also. Many kinds are fibrous, while others are almost as hard as wood. The ground is pulled at intervals of three, four or five years, according to circumstances, by digging trenches, pulling everything visible as long as possible until it breaks. After a year or two it shows above the ground with a little stem; in the spring over this stem there are flowers. From the time this stem appears until the flowers have all fallen this root is not in condition to extract, for the sap does not return to the root until then. Each year, till the ground is culled, the quantity of roots and tops increase, until the ground is unfit for cultivation of any kind.

* From the *Oil and Drug News*, September 6, 1881.

It is from September till March that the root is gathered, and goes through a process of drying or curing before it is considered marketable.

Liquorice root is also found and gathered in Asiatic Turkey, Greece, Italy and the Sicilies, and in Spain. In Italy and the Sicilies very little, if any, is exported as root, it being used in the manufacture of roll or stick liquorice. There is a small section in England which produces a limited quantity. The United States also have liquorice root in several parts of the country, but the quality is not such as to give it value.

The quality of root produced in the different countries is as follows:—Asiatic Turkey, decidedly bitter; Greece, bitter, but not so bitter as Asiatic Turkey; Sicily, sweet; but less so than Spanish; Spain, rich and sweet; Italy, richest and sweetest of all.

Malaga has not, up to the present season, been considered an important shipping port for the root, Seville, Alcante, Barcelona, and Bilbao being nearer the producing districts. It is probable that during the coming year of 1881 there will be some shipments from Malaga.

The value of this root does not admit of its being increased in crop by cultivation, and the quantity gathered depends greatly upon the severity or mildness of the winter. If severe, it lessens the quantity gathered. Again, if other crops are good, labour being scarce, less root is gathered; consequently prices are higher. There are one or two large French establishments in Spain for making paste and stick liquorice, one in Seville and the other in Saragossa, besides a few small Spanish concerns also engaged in the manufacture of liquorice paste.

A YEAR IN FIJI; OR, AN ENQUIRY INTO THE BOTANICAL, AGRICULTURAL, AND ECONOMICAL RESOURCES OF THE COLONY.

By JOHN HORNE, F.L.S., &c. (STANFORD.)

(Academy, 17th September 1881.)

Mr. Horne investigated most thoroughly the two large islands of Viti Levu and Vanua Levu, and visited several of the smaller ones, the number of which is reckoned at about 200. Furnished by the Governor with a circular-letter to all the chiefs, he met with attention, civility, and assistance wherever he went. Indeed, his experience reflects the highest credit on the civilising agencies, both lay and spiritual, which have been at work among the Fijians. In each town both a church and school were to be found. In small villages one building served both purposes. The schools were well attended, most of the rising generation being able to read, write, and cipher to some extent. And family worship was conducted in most native homes both night and morning. What difficulties he met with in his journeys arose from the nature of the country, not from any jealousy on the part of the natives, whom he found "extremely kind."

It would be difficult to find any other portion of our globe so well adapted, both from climate and soil, to varied and extended production as Fiji. Yams, bananas, sugar-canes, coconuts, bread-fruit, and *dalo*, or *taro* a tuberous plant, have long been cultivated by the Fijians, of whom Mr. Horne says that their instincts are agricultural, and that they find a use for all the vegetable products of their country, and have a name (sometimes several) for each individual plant; coffee, cotton, tobacco, and arrowroot are grown with success; most of the exotic fruits, spices, and vegetables which have been introduced have succeeded; and the climate is, in the opinion of the author, well adapted to all our vegetables, to potatoes, cinchona, tea, rice, and the rearing of silkworms. The fruits of the temperate regions do not generally succeed; the grape-vine, though it grows fairly, becomes an evergreen, and bears only occasionally a few

bunches of fruit. The climate is not too hot, but the want of success in the production of grapes is due to the vine not getting a season for rest. Cattle, as well as sheep and angora goats, thrive. Maize is grown chiefly for the discharge of taxes, which are paid in kind. The principal staples of the Fijian group are likely to be sugar and coffee, but the production of both requires much labour, and the former machinery in addition. The procuring sufficient and competent labourers is one of the great difficulties the settlers have to face. The Fijians are not to be depended on; and, in the opinion of Mr. Horne, India is the country to be looked to for supplying this pressing want. The Fijians have a passion for the sugar-cane; they are constantly sucking its juices, and the quantity they will consume in an idle hour, or when listening to a story, is astonishing. Though the natives spend some skill and labour in cultivation, yet they allow the land they have been at the pains of clearing, and from which they have taken but one crop, to return to its natural state. So vigorous is vegetation in that favoured climate that land so abandoned is at once overgrown with reeds, wild sugar-cane, tree ferns, and large creepers, and after a few years it is covered with forest trees. Mr. Horne considers the climate of Fiji, though tropical, to be very healthy. Malarial fevers are entirely unknown, even on the edge of mangrove swamps. However, during the months of December, January, and February, a heavy, languid, oppressive feeling is experienced, accompanied by an unwillingness for the least exertion, either mental or physical. The dull, indolent habits of the natives, too, have a depressing effect on those who are in contact with them. To judge from the meteorological tables furnished in the Appendix, the climate is singularly equable: cold is unknown, and the mean temperature of the year only varies by three degrees. The rainfall is excessive, and the damp was very hostile to Mr. Horne's botanical collections. With the exception of some tender ferns, he found it impossible to dry his specimens in paper, and was at last reduced to wither them well in the sun and air before they were pressed at all. The flora of the group is very interesting, and is carefully treated by the author. He added to the plants of Fiji already known 300 species of flowering plants and thirty-five ferns. One observation of his is specially worthy of notice, that, though the mountains attain a height of 3,000 feet, there appears to be no ascending scale of vegetation, great numbers of plants ranging from the tops of the mountains to the sea-level, and many sea-level plants being found at the highest elevations. The forests of Fiji furnish many sorts of valuable timber, but they are diminishing from the constant fires, and Mr. Horne is urgent as to the necessity of replanting. It certainly seems anomalous that in so damp and rainy a climate bush fires should be so frequent.

MANURING FRUIT TREES.

(Field, 3rd September 1881.)

In no part of gardening has a greater change been observable between the last few years than in that of fruit culture, more especially as regards the application of rich solid or liquid foods in the shape of top-dressings or abundant applications of manure water; for it is now pretty generally admitted that our old terror of farmyard manure, as being the forerunner of most of the ills that fruit trees are heir to, was entirely without foundation, and that barrenness is oftener the result of exhaustion than of over-luxuriance. I have lately had the good fortune to see some of the finest examples of fruit culture that I believe are to be found in the United Kingdom. I may mention Barham Court, where what may be called the French system is so well carried out that I question if sunny France or the Channel Islands can show a better example of all-round fruit culture; for not only is every kind of pear and

apple worthy of culture here found in such a position as to insure its perfect development, but plums, peaches, cherries, vines, melons, and, in fact, every edible fruit, is not only large in quantity, but far above the average of excellence as regards quality. But I need only refer in a casual manner to this subject, for in all sorts of seasons the crops have been good here. What I want to impress is how this excellence is attained, for the natural soil is by no means extra fertile; on the contrary, it is rather poor and hungry, and such as would be called unsuitable in many counties. But if this precluded such land being converted into fruit gardens, I fear that Kent would not have much more area under fruit than other counties. The fact is, fruit trees are not so fastidious as regards soil as was at one time imagined, and in this case a moderately fertile soil, well broken up, has been converted into an exceedingly fruitful garden by the application of rich top dressings of best farmyard manure, for between the rows of cordons or espaliers of various forms, the soil that is solely devoted to the trees was ankle-deep in manure; all vinery and forcing fruit house borders were mulched, and pot fruit trees were all plunged in soil covered with manure. The extraordinary vigour of the wood would have made "root pruners" anxious to commence operations; but here, by studying the kind of stock that each sort succeeds best on, and by double grafting in many cases, and, above all, by great care in pinching the young growths at particular stages of growth—the energy of the tree is expended in perfecting fruit and fruit buds for another year, instead of useless spray-like watery shoots. The old plan of cutting the breast wood off within two or three leaves of the spur from which it sprang is entirely discontinued, and the growth is allowed to make six or eight joints before being stopped. By that time the crop is swelling fast, and the trees show but little inclination to make wood growth, or if they do, it is from the tips that will be cut off at the following winter's pruning, while the buds for another season's crop are perfecting at the base of the spur, without danger of being driven into wood growth, as in the case when other outlets for the sap is cut off.

Fruit farms or gardens where the trees or bushes are grown in more natural forms than in the preceding instance are numerous in this neighbourhood, and I may refer to the well-known firm of Messrs. Skinner & Sons as an instance of successful fruit cultivators for market, for on various farms belonging to this firm may be found such fine crops as would scarcely be credited in localities where the manure cart is still dreaded; and I may briefly sum up the grounds for their success, which, although more conspicuous in a good fruit season like the present, when the trees and bushes are borne down by the weight of fruit, has been steadily increasing through all the bad seasons we have had—for good cultivation is the best antidote for "bad seasons." But to return to modes of culture. Here we find the extension system in its widest sense and fullest development, apple trees that bear 40 sieves on a single tree, and other trees in proportion; even the bush fruits such as gooseberries and currants are giants of their kinds, and filberts and coignuts, which although pruned the severest of any fruit trees, extend to gigantic proportions, and the weight of nuts borne by one bush is hardly credible. But to support this drain upon the land a constant system of high feeding is practised; all kinds of London street refuse and manures are got together during the year, and such dressings applied as would have frightened our forefathers, for growers for market are now fully alive to the fact that a good article always commands the top price in market and a ready sale, and they find it to their interest to grow good reliable sorts in the highest state of perfection in which they can be produced. Cultivated orchards that are planted with standard fruits of various sorts, and bush fruits between, are heavily manured and dug in winter, and any trees, especially heavily cropped, have

a top dressing over the roots while the fruit is swelling and abundant applications of liquid manure. And at this time, when one finds hop poles and cross bearers put under the branches to keep them from breaking down with the weight of their fruit, there can be no question that the trees need all the help or stimulus that can be given them to perfect such crops year after year.

In orchards on the grass devoted solely to standard or half-standard trees, where the grass is fed off by sheep, one gets the most conclusive evidence of the value of rich top dressings, for where the grass is cut and carried away the trees quickly fail to be prolific, unless a winter dressing of manure is applied, the same as on cultivated soils. But where sheep are constantly fed and pastured under the trees, they remain vigorous and prolific as long as a limb is left standing. In these orchards any kind of garden refuse or green food from the farm can be usefully applied to supplement the keep of the sheep, as the larger the number the better for the trees; and if every farm had its orchard, we might soon hope to have fruit both abundant and cheap, for this system of combining fruit culture with farming or stock rearing promises to be a source of benefit both to the producer and consumer.

J. G.

Maidstone.

VEGETABLES FOR THE TROPICS.

(From *Sutton's Tropical Garden Guide.*)

(Continued from page 379.)

CABBAGE (*Brassica capitata*).

There is generally only a short season during which it is possible to cultivate cabbage, so that there is no occasion for the great variety of sorts used in England. Any of the following will be found very useful—Early York, Nonpareil, and Sutton's Imperial. Sowing cabbage before September is attended with great trouble, and generally results in failure. From the beginning of this month seed may be sown for successional crops until the end of the year. The first sowings will need protection from the rains, and may be planted in large gumlahs. Do not sow too thickly, and if the plants come up well and become at all crowded, thin out immediately to prevent damping off. On no account plant out until the rains are over, in the beginning or middle of October. Make the soil very rich on which the plants are put out. Put the plants about 18 inches apart. A plantain leaf makes a very good protection for the young plant for a few days until thoroughly established. Watering and the application of liquid manure is important. After the first cabbage heart has been removed, the stem will throw out an abundance of sprouts and greens for a long time.

SAVOY CABBAGE (*Brassica bullata major*).

Same cultivation as for cabbage.

CAPSICUM AND CHILI (*Capsicum annuum*).

These annuals are very easily grown. Sow at commencement of rains in beds, and transplant when a few inches high, 18 inches apart. Water with liquid manure once a week, and to obtain large specimens pick off some of the first flowers. Avoid too frequent watering, as it causes the roots to rot.

COUVE TRONCHUDA OR PORTUGAL CABBAGE

(*Brassica costata oblonga*).

This is a delicious vegetable. The top forms a fine cabbage of delicate flavour, and the midribs of the largest leaves are excellent when dressed as Sea Kale.

CARROT (*Daucus Carota*).

It is of no use to sow before the rains are over. The ground should be well pulverised by repeated digging, and should not be too heavy. Sow either broadcast or in drills; if the latter, 8 inches apart. When the plants are established, hoe out to 6 inches apart. The soil

should not be heavily manured, but plenty of water should be given. In storing carrots it is a good precaution to cut off the tops a day or two before raising the roots. When taken up and tolerably dry, store in sand or friable dry soil in large earthen vessels.

CELERY (*Apium graveolens*).

This root may be grown to as great perfection in tropical climates as in England. The secret appears to be to keep it in constant growth by a liberal supply of water and liquid manure. Sow as soon as possible after August for earliest crop, and again later for succession. Sow in gullahs in a light soil, where the plants should remain until they are 3 or 4 inches high. The seed is sometimes six weeks before it germinates. Dig trenches 18 inches apart, 18 inches wide, and the same depth. At the bottom place a liberal supply of cow-dung, well decayed, on the top 4 inches of mellow mould, and in this plant the seedlings 18 inches apart, and water liberally. Do not commence earthing up much before the fourth month from time of sowing. It is generally in best condition for the table when five months old, for, though not full grown, it is of far better flavour than when more advanced. To obtain a very early crop the following season it is possible to sow at the end of January, and keep the plants through the hot and rainy seasons for planting out in September or October following.

CAULIFLOWER (*Brassica Botrytis cauliflora*).

All the directions given for the cultivation of cabbage apply equally to cauliflower. The soil cannot be too rich, nor the application of liquid manure too great. It is well worth while to pot off the young seedlings when very young, and keep them thus until the time for planting out. The cramping and starving the plants materially modify the tendency of cauliflowers to form leaf instead of heads.

CUCUMBER (*Cucumis sativus*).

This is particularly difficult to bring to perfection in India, on account of the ravages committed by a small red beetle, which infests the plants from the commencement. Muslin guards are an efficient protection against the attacks of these insects. Sow the seed at the end of October in good rich leaf mould, friable and well decayed. The plants may be placed in large pots or pans, and made to grow up a palisade or verandah.

CRESS (*Lepidium sativum*).

This may be sown almost all the year round in small pans, thus keeping up a succession. A few days after sowing it is ready for cutting. The seed should not be covered, but sown broadcast on the surface after the soil is well watered.

WATER CRESS.

During the cold season this is raised without any difficulty. Sow in shallow pans with holes in the bottom. Stand these in a running stream or a pond so that the bottoms only are immersed. It is important that the water should have free access through the holes so as to keep the roots of the cress always wet.

DANDELION (*Leontodon Taraxacum*).

This plant is valuable as a medicinal salad. Its cultivation is very simple: sow as soon as the rain commences, in drills 10 inches apart, on a bed of rich soil not too heavy. Water frequently, and thin out to 8 inches in the rows, and when fairly grown keep the leaves off the ground by means of gravel or dry earth, covering with an inverted flower-pot. In the district of Gunesh Khind several acres are grown for the supply of the Indian Medicinal Department.

EGG PLANT (*Solanum ovigerum*).

This is most successful when sown during the rains. Select a seed-bed of well-prepared soil, and when the plants are large enough transplant to 18 inches apart, on well-manured land prepared for irrigation. Water with liquid manure about once a week.

ENDIVE (*Cichorium Endivia*).

Sow about the middle of October, broadcast. As they do not bear transplanting well it is best to thin out the plants to 9 or 12 inches apart. Blanch by tying up the leaves into a cone with plantain leaf fibre.

(To be continued.)

THE NEED OF SPECIAL CULTURE FOR THE FINER GARDEN FLOWERS.

(Field, 3rd September 1881.)

In these days, when so many people are wishing to do something for the improvement of their flower garden and the fuller embellishment of their places with hardy flowers, many mistakes are being made every day as regards the selection and placing of the plants. The selection is a serious business, owing to the immense number of things that are offered, and the little knowledge people generally have of them. But, supposing we get over this difficulty, and get the finest collection of plants possible in Europe, much may go wrong if we do not place the plants rightly. The common way is to put almost every choice thing in what is called the mixed border, and placing it there very often means losing it in quick time. No doubt the well-made mixed border is one of the prettiest sights one can see; but the knowledge of plants and the taste requisite to make it are very rarely found. We have not seen three good mixed borders in twenty years. This is caused (1) by the repetition of the same thing, where it happens to be a popular or showy plant, all along the border; (2) by allowing a number of subjects to exist in the border, which speedily overrun it, and exhaust the others; and (3) by the ill-placing of nearly all the plants. The gardener who made a really satisfactory mixed border without much naked earth throughout the spring, summer, and autumn, and without filling up his gaps with weedy bedding plants and annuals, would be deserving of honourable distinction. Besides, the mixed border is not fitted to be brought into the open garden landscape, so to say, when made as it generally is; it is rather suited for the quiet walk or on the kitchen garden borders. However, the point of this article is to show that if we are to succeed with our finer races of hardy flowers, it cannot be in the mixed border. Each important family of flowers is worthy of special culture, and without it no satisfactory result can be obtained. Whether we take to carnations, pinks, pansies, phloxes or lillies, stocks, double wallflowers, cloves, tall scarlet lobelias, or any of the beautiful families of plants now obtainable, in every case they ought to have special culture in fresh soil if we are to have the best result. Even an annual that one fancies, such as the Rhodanthe, or a beautiful ornamental grass like one of the Brizas, it is not easy to succeed with, unless the plant has a fair chance apart from the confusion and weariness of the ordinary border.

Now this special culture is possible in two ways at least—either in the beds of the flower garden or on the lawn, and also in a plot of ground which ought to be set aside for nursery beds of the choicer flowers. Such plants as carnations, cloves, stocks, and pansies last a considerable time in bloom, and, therefore, may be introduced with taste into almost any position—not, perhaps, into a set pattern of carpet beds; but still, by themselves, on a lawn or associated with other things, the tasteful gardener will find a good place for them. It is not that they always want a bed to themselves, but they may often be grouped with other plants. For instance, carnations may go with a thin crop of standard roses, or may be followed by late-blooming gladioli, rising thinly over the carpet of grey leaves. So, again, pansies have admirable uses for mixtures of this kind, but the mixture must be “balanced”—plants put together that help each other, not rob or injure each

other—and in such a way a great deal of good work may be done in the flower garden or on the lawn.

But, apart from these ways, the plan wholly indispensable for an interesting garden is to have a piece of ground in or near the kitchen garden or any other open position sheltered, but not shaded, for the growth of any good plants we are interested in. Such ground should be treated as a good market gardener or kitchen gardener would treat it—well enriched, open, not encumbered with impediments of any kind. It must have a walk round it, within a wide border; but, apart from this, the fewer walks the better. It can be thrown into strips, say, from five to seven yards long, and these in their turn thrown into 4 ft. beds; but in this case the little pathways need not be gravelled or edged, they may be simply marked out with the feet. It is better to see the ground covered with twice the quantity of flowering plants than a great number of edgings and much gravel. If any edging is used in such a place, it should be of thin stone sunk in the earth, as these edgings are never offensive, troublesome, or costly. Flints or half-sunken bricks will do as well, if the thin stones so easily got in the western counties are not obtainable. With the aid of such a division of the garden, the cultivation of many charming plants becomes a pleasure, whether it is a bed of seedling verbenas, of alpine auriculas, of any favoured flower much used for cutting, and the culture is the most certain and pleasurable that one can follow. Well furnished, such a garden is a pleasure to the owner and all his visitors. Granting good cultivation, a dual kind of arrangement may be well carried out here. Thus, for example, hyacinths grown in the open air may be left in the ground for several years, their roots planted deep, and when they die down, or just before they die down, some beautiful annual or other light rooting plant may be put in the same beds to furnish them gracefully, but not in the least rob the roots. This we have seen done frequently, without in the least deteriorating the bloom of the open air hyacinth growing in well-prepared beds. In these little distinct beds, with one or two things combined in each, and fully exposed to the sun, with good preparation at first, we get the best result, and there is very little trouble afterwards. When the things do get tired of the soil, or require a change, having no plan, it is more easy to establish a kind of rotation, making our pink beds of the past few years the annual plant ones for the next, and so on. It would be easy to so change one's favourites from year to year, that richly feeding plants should follow those of a surface-rooting kind, and thus the freshness and novelty of the garden would be kept up. The abolition of all edgings, beyond one or two main lines through the space, would tend to more careful culture, as the whole spot could be so readily dug up and manured, or otherwise attended to.

Such a plot well done would be a paradise for ladies who wish to cut their flowers in quantity, and also a great aid to the gardener in replenishing such other arrangements of similar plants as he desires to establish in other quarters—on the margins of shrubberies, in the flower garden proper, or on the rock garden. It is also a great help to those who wish to exchange with their friends or neighbours in the generous way that all true gardeners like. The space that such an arrangement should occupy will of course depend upon the size and wants of the place in every case; but anywhere where the room could be spared an eighth of an acre of ground might be devoted to the culture in simple beds of favourite flowers, and even the smallest place should have a plot of the same kind.

ORANGE TREES.

TO THE EDITOR OF THE "AUSTRALASIAN."

SIR,—Will you kindly tell me in your next issue the proper mode of pruning orange trees? Ought the lower

branches to be cut off, making them into regular trees, or should the branches be allowed to grow close down to the ground? Do you recommend much thinning out?

Eldorado.

T. H.

[Experience has shown the desirability of allowing the branches to hang low enough to shade the stem of the tree from the sun. Orange trees are subject to a disease of the bark near the ground, and as this occurs chiefly on the north-west side of the tree, growers have concluded that it is either caused or aggravated by the heat of the sun when its power is greatest—about 3 p.m. The small weak branches should be taken out, the head generally should not be much thinned.—ED.]

A PREVENTIVE OR CURE FOR BLIGHT ON FRUIT TREES.

SIR,—Your correspondent's letter respecting the use of the above recalls to me a remark which fell from Mr. Bosisto confirming the above statement. He said that at his distillery he had a number of apple trees growing, and the refuse from the still had been employed, and cured them of blight.—Yours, &c.,

J. H.

Sandhurst, Sept. 6.

FARMERS AND 'THE MANUFACTURE OF FERTILISERS.

(Field, 10th Sept. 1881.)

SIR,—In your editorial on the Agricultural Lookout in last week's *Field*, you say, "All are agreed that the only chance the British farmer has of competing successfully with the foreign producer rests in the application of capital to the soil for the purpose of maintaining and increasing its fertility, and of improving the modes and appliances of agriculture." You go on to say, "The question is, seeing that sooner or later—and the sooner the better—something must be done, by whom is it to be effected?"

You have here put the difficulty fair and square before your readers, and you have left it to their common sense and their self-interest to supply the practical answer. It is not out of place to suggest a reply to one aspect of the question, *i.e.*, to that important one involving the subject of expense, which will to some extent cover the difficulty.

It is well understood that the supply of guano is running short, and that some of the best houses in the trade are with difficulty able to respond to the orders they receive. However, as demand tends to regulate supply, there is little doubt that the necessary substitute will be available when the time comes. But in these hard times the profit of production is something to think of, and believing that such might be as useful to themselves as to an outsider, why do not the British landowner and the British farmer become their own manufacturers of artificial fertilisers, taking time by the forelock to prevent the manufacturers making them pay fifty per cent over the cost price of an article they must have if they are to continue growing corn as hitherto?

It is possible to produce, for instance, a superphosphate of lime, seventy-five per cent soluble, at a cost of, say, about six pounds a ton to the manufacturer, if he goes the proper way about it; and if such be the fact in his case, there is no reason that it should not be so in that of others.

I do not, of course, suggest the home manufacture of fertilisers; such an idea is out of the question. A combination on the part of landowners and farmers to keep down prices by no longer permitting a monopoly in the artificial manure trade is within their own power to accomplish, and they may possibly find that raw material procurable at home could be worked up with greater profit than that derivable from the application to their land of American lacustrine deposit, which

they would hardly be able to put down under five pounds a ton, and which, judging from its selling price in the States, cannot be very rich in soluble phosphate of lime, however rich it may be in total phosphates, the percentage of which, by the bye, your correspondent "J.H." forgot to mention in his interesting letter in *The Field* of Aug. 27. J. E. P.

THE MODE IN WHICH SEED BURIES ITSELF IN THE GROUND.

(*Gardeners' Chronicle*, 17th September 1881.)

Sir John Lubbock, Bart., President, read a paper at the British Association, on "The Mode in which the Seed of *Stipa* buries itself in the Ground." One of the most interesting parts in botany, he said, was the consideration of the reasons which led to the different forms, colours, and structures of seeds; and it was, he thought, pretty well made out that a large proportion of those might be accounted for either as serving to protect the seed or to assist in its conveyance to a place suitable for its growth. If the seeds of trees fell directly to the ground, it was obvious that very few of them would have a chance of growing. It was an advantage to them, therefore, of which many availed themselves, to throw out wings, in consequence of which the wind wafted them to a greater or less distance. Others, such as the whole tribe of nuts being edible, were carried about by beasts and birds, and though some were sacrificed, others survived. Fruits, again, in consequence of their sweetness, were carried about by animals, which, after partaking of the fleshy portion, dropped the seeds themselves. Many seeds were covered with hooks, and thus adhering to the wool of sheep and other animals, were carried to greater or less distances. Others, like those of our common Dandelion, were provided with fairy parachutes, and were thus borne away by the wind. Others again, like some of the Violets, Geraniums, Vetches, Brooms, Cucumbers, Cardamine, Oxalis, and others, had beautiful and varied contrivances, by which they actually threw the seeds to a distance, in some cases, of more than 20 feet. Others, again, were enabled to penetrate the earth, and thus sow themselves in the ground. In one of our English clovers, *Trifolium subterraneum*, after the flower had faded, it turned downwards, and buried itself in the ground. The ground-nut of the West Indies, and more than one species of Vetch, had a similar habit. In the *Erodiums* or Cranebills the fruit is a capsule, which opens elastically, and as in the case of the allied Geraniums, sometimes threw seeds to some little distance. The seeds themselves were in some cases spindle-shaped, hairy, and produced into a twisted awn. The number of turns on the awn depended upon the amount of moisture. If a seed be laid upon the ground, it remained quiet, as long as it was dry, but as soon as it was moistened, the outer side of the awn contracted and the hairs surrounding the seed moved outwards, the result of which was to raise the seed into an upright position. The awn then gradually unrolled, consequently elongating itself upwards, with the result that if it was entangled amongst any of the surrounding herbage the seed was forced into the ground. A still more remarkable case was that of the *Stipa pennata*. The actual seed was small, with a sharp point, and with stiff short hairs, pointing backwards. The upper end of the seed was continued into a fine twisted rod; then came a plain cylindrical portion attached at an angle to the corkscrew, and ending in a long and beautiful feather—the whole being about 1 foot in length. The end was supposed by Mr. Francis Darwin, to whom they were indebted for a very interesting memoir on the subject, to act very much in the same manner as that of *Erodium*, already mentioned. He did not doubt that the end would bury itself in the manner described by Mr. Darwin, but he doubted whether it always did so. One fine day, not long ago, he chanced to be looking at a plant of that species, and around it were

several seeds more or less firmly buried in the ground. There was a little wind blowing at the time, and it struck him that the long-feathering awn was admirably adapted to catch the wind, while on the other hand it seemed almost too delicate to drive the seed into the ground in the manner described by Darwin. He therefore took a seed and placed it upright on the turf. The day was perfectly fine, and there could therefore be no question of hygroscopic action. Nevertheless, when he returned after a few hours, he found that the seed had buried itself some little distance in the ground. He repeated the observation several times, always with the same result; thus convincing himself that one method, at any rate, by which seeds bury themselves is by taking advantage of the action of the wind, and that the twisted position of the awn, by its corkscrew-like movement, facilitates the entry of the seed into the ground.

TEA-CULTURE IN AUSTRALIA.

The following article will be read with interest by the planters. It is taken from the "Town and Country Journal," a weekly journal published at Sydney, dated 9th July:—

It may prove interesting to furnish a few particulars concerning this, one of the most interesting plants that can be met with in our gardens. We have been induced to refer to the tea-plant on this occasion, chiefly because the honour of first introducing it, and of preparing the herbage for use, has recently, and on previous occasions, been claimed in other colonies, and by persons who have not the shadow of a right to do so. It was cultivated in Sydney before either of the colonies referred to had a name. It was introduced and cultivated by the late Thomas Shepherd, at the Darling Nursery, Sydney, as early as 1830, where the original plant might have been seen up to a few years since, when alterations in the grounds required its removal. From this old plant thousands of young ones were distributed during the many years it stood, producing annually large crops of seed and numerous young plants from layers, throughout this and the neighbouring colonies. It may be that within 20 or 25 years past, plants have been brought to the colonies from China or elsewhere, and as a matter of fact we know such to be the case, but it is quite certain that the originals in all the Australian colonies, were the offspring of this early introduced one. Some of the earliest young tea plants propagated to the Sydney Botanic Gardens, and if we are not mistaken these very plants are still to be seen there.

With regard to preparing tea leaf it may be said that nothing of consequence was attempted until about 1846-7, when two samples of cured leaf were exhibited by Mr. T. W. Shepherd, who had succeeded his father at the nursery, at one of the Horticultural Society's exhibitions. One of the samples consisted of young leaves, just emerged from the buds, and curled in the orthodox manner to represent the tea known as gunpowder. Beside this sample, which consisted of about 2lb one of a Chinese gunpowder, tea, specially brought from China for the exhibitor, was placed for comparison. This was a very high priced tea; we have an idea that it was about 16s per lb. The two teas were much alike both in appearance and taste, indeed some of the visitors were almost inclined to doubt the genuine character of the exhibit. A great deal of pains had been taken in gathering, sweating, and curling the leaves to give them as much the appearance of the Chinese tea as possible. The trial was satisfactory as to quality, but such tea could not be produced at a profit even at 16s per lb without much cheaper labour. The other sample consisted of full grown leaves not curled but merely sweated and dried, and of course did not present the ordinary appearance of tea, nor was it palatable as an infusion. It was merely prepared as a trial for producing a coarse cheap tea that could be grown and prepared by any person without any appreciable cost and which would pay at a few pence per

pound. These leaves were purposely selected as affording the extreme of unsuitableness and for the purpose of showing that ordinary tea quite as good as the coarse hysonskins that at the time formed the bulk of the tea ration tea imported from China. Half grown leaves would make a fair tea, and the curl is not absolutely necessary if the leaves are otherwise properly cured. Gathering the leaves is the main expense, and this precludes all chance of tea culture in Australia as a commercial enterprise until the cost of labour fails to something like a level with that of other countries or the cost in other rises to the Australian standard. At the same time the requirements of cultivating the plant are so simple that there is no reason why it might not be found in every garden, and the leaves gathered and made use of in lieu of the imported and often adulterated costly article. The shrub is as easily grown as a rose or geranium bush, and if as generally cultivated for home use as these are, the colony of New South Wales would be a gainer to the extent of at least £100,000 sterling per annum, while many families would be relieved from a very considerable drain upon their incomes. Practically they could obtain their tea for nothing. Housekeepers in the bush, where tea is so largely consumed, will understand what a considerable saving this would be. Five shillings a week—£13 a year—for tea as a moderate estimate for the cost of tea for even a small family of five or six persons. On an average probably the expenditure would be considerably more, and all this might be saved by adding a few tea plants to those already cultivated for family use. A few years ago we published full particulars relating to tea culture in Australia, and it may be that we will soon have the articles revised and republished. If the culture became naturalised, in the way suggested, there would always be at hand the material for establishing the industry on a scale of magnitude whenever the circumstances of the colony should become so changed as to render it probable that it would prove a commercial success.

AGRICULTURE AT THE BRITISH ASSOCIATION. (Field, 10th Sept. 1881.)

Mr. F. H. Moore read an important paper on "The Depression of Agriculture: its Effects and its Lessons." Three points considered were—(1) Causes; (2) Changes brought about; (3) Remedies.

(3) Remedies.—After quoting correspondence from Professor Wrightson and Mr. Gilbert Murray, in which the latter laments the absence of sound technical teaching, Mr. Moore proceeds to sum up what, in his opinion, must be done to enable agriculture to flourish; for that with fair seasons, it can be made to answer, he does not doubt. Charges on the land will have to be reduced, and it is only reasonable that trade and income should bear an equal share. Rents will probably come down, but this is a matter that must regulate itself. Labour must be more economically used, and labour-saving machinery encouraged. We must grow such crops as will make the most money; and the farmer who expects to thrive must be able to take advantage of every appliance that this age of wonderful activity can give him. In other words, he must be properly educated. Mr. Moore, at some length, sketched out the aids of science to the art of agriculture, which too often the ignorance of the farmer prevents his using, and at the same time very properly limited the direct advantage which farmers can expect to derive from scientific teaching. The conclusion of the paper is so much to the point on this head that we venture to introduce it.

Seeing how beneficent an influence the technical application of the sciences of chemistry, biology, physics, and mechanics may exert on the future progress of agriculture, it may not be out of place to inquire how far the well-informed agriculturist should be acquainted with these subjects. Should he endeavour to become deeply versed in these sciences, he would find himself

Nourishing a youth sublime

With the fairy tales of science, and the long result of time, instead of acquiring such a practical knowledge of his art. On the other hand, he may set such high value on practical knowledge as utterly to ignore theory, and to content himself entirely with such rule-of-thumb information as he may acquire by daily work on a farm, so that however correct his knowledge may be, it is none the less empirical. Between these two extremes there is, it seems to us, a *via media* preferable to either. A well-informed agriculturist should have acquired a sufficient knowledge of the principles of science to enable him not only to understand what improvements in agriculture have been effected by science in the past, but also to form an adequate conception as to what information agriculture is likely to receive from science in the near future. The suggestions as to improved agricultural practice have emanated from chemists, mechanicians, and other scientific men, but it is the agriculturists themselves who have given effect to these suggestions, and thereby secured substantial advances. If the agriculturist is sufficiently cultured to be able to determine whether in any doubtful case the solution of the difficulty is most likely to be furnished by himself or by a scientific worker, or if, in other words, his scientific education has been such as will enable him in any doubt or difficulty to see exactly where the shoe pinches, this we apprehend is all that is necessary. Let the suggestions of scientific men fall on good ground in the minds of agriculturists, and nothing but good can result. Our fault is, in looking upon science, that we expect too much, and do not realise that it is, to use the words of Oliver Wendell Holmes, "a first-rate piece of furniture for a man's upper chamber, if he has common sense on the ground floor. But if a man hasn't got plenty of good common sense, the more science he has the worse for his patient." In fact, it can almost be said to be a certainty that, however much help we may get from the applied sciences in our social life, their help to our agriculture will never cause a very revolutionary change. After all that we can do in the shape of manuring the soil by the addition of the best manures of which experimental research and the knowledge of the chemist can point out; after we have tilled it by the most effective implements which engineering skill can produce for the purpose, and which are as different from the rude implements of our forefathers as light is from darkness; after the skill of the botanist has been exercised in the selection of nothing but the best seed and the destruction of weeds; after the application of the knowledge of the entomologist in the destruction of insect pests—after all these things the farmer has naught to do but to trust that the great controlling influence of all—the weather—will be favourable to his work, and enable him to reap a good reward for all his labour and expenditure. We cannot warm the perhaps cold earth with the telegraph wire, nor can we command sunshine by means of the mighty steam engine. We live in an age of wonderful life, but our agriculture, though partaking to a certain extent of this vitality, is still the same slow, anxious profession it was when Virgil wrote his "Georgics," when old Tusser penned his quaint "Rules of Husbandry," or when Arthur Young fought for and taught improved husbandry. That we have made gigantic strides in agricultural practice since those times is undoubtedly true; but after all, it means but little else than that we risk a very great deal more than did our forefathers to the uncertainties of our very uncertain climate. To use a sporting phrase, we lay more heavily and at shorter prices in favour of warmth and sunshine and "the earth yielding forth its increase." Goethe's expression of "Light, more light," may very well be altered to "Sunshine, more sunshine" for our crops in future, and to "Knowledge, more knowledge," on all that appertains to the soil, the animal, and the plant, for our farmers. With these, British agriculture may once again be remunerative, and perhaps even prosperous.

HORÆ HORTULANÆ:—ON SOILS.

(Gardeners' Chronicle, 17th September 1881.)

"Ah! if I had but your soil, I should get on," says the unsuccessful gardener, when viewing with envy the products of a successful brother; "it is impossible to grow these things on my land." Indeed, each of us has, I suppose, in turn complained of the disappointing character of the ground in which circumstances have led us to attempt to cultivate our favourite plants. And yet, when we come to think over it, soil is the one thing which, above all others, is in the gardener's own hands. But each of us has it in his own power so to modify the special soil of the spot where fortune has placed him as to make it suitable—in large measures, at all events, for the plants he loves.

The sea has always seemed to me a great consolation for gardeners; and in this way:—Throughout living Nature there are found two substances, often companions, in nature very similar, and yet, in the work of life, of different, perhaps of antagonistic functions: I mean potash and soda. In every living being, animal or vegetable, you will often find these two; but they are held in different proportions in the different fluids and solids of the body, and appear to play different parts in the labours or the organism. While the animal body may, with comparatively little harm, be almost drenched with that commonest of soda compounds, table salt, a much smaller dose of potash may become a distinct poison. Now the sea is salt by reason of the great mass of the soda-salt contained in it; the quantity of potash is by comparison exceedingly small. Yet one common commercial source of potash is furnished by the ashes of seaweeds. These, living and growing in the sea, reject the abundant soda and pick up the scanty potash. This strange fact is, I say, a consolation to the gardener, for it shows him that what we call soil is not in itself food, but merely a carrier, throughout which the real food need be but thinly distributed. Much the same is seen in the air we breathe; the oxygen on which we live makes up a fifth only of the atmosphere, the other four-fifths are supplied by the useless nitrogen which we take into our lungs, it is true, but send out again unchanged, making no use whatever of it in our bodies. Still less, indeed, does the plant take up into itself, out of the manifold mixture which we call soil. The real food of even the most luxuriant vegetable growth is small in quantity, and, as far as we know, comparatively simple in quality; abundance of material and complexity of composition are necessary for making the soil a fit carrier of the scanty precious real food, but are necessary for this alone.

This I take to be the first principle of the gardener's art, this the chief object of the gardener's pains—to bring and keep the soil in such a condition that the meagre handful of elements which serve as actual food shall be placed in the best circumstances, and prepared in the best possible way for reception by the plant. That the actual food (putting on one side for the present the matter of water) is scanty, every one knows. A tall tree, to take an extreme case, when burnt to ashes, dwindles to a mere handful of salts, to which you may, if you please, add, for the sake of completeness a tiny flask of ammonia to represent the nitrogen which it drew from the ground; the two together seem a trifle compared with the mass of earth through which the tree's roots wandered, and which served it as soil. Still greater is the contrast between the earth-drawn material of one of the luxuriant sunflowers, in which æsthetic visitors to my garden at the present time find so much delight, and the load of earth which circumscribes its roots; burn the gorgeous plant and it vanishes to a pinch of salts and a whiff of hartshorn. These and these alone it took from the soil; all the rest came to it from the air.

The several elements of the actual food, too, are few in number—a little potash, soda, and lime, with a sprinkling of sulphur and phosphorus, and a trace of magnesia, alumina, silica, and iron; these, with some nitrogen and hydrogen, to form ammonia compounds, are the actual food elements of every plant, and of all plants. These, letting alone for the present the debated question as to how far carbon compounds may be absorbed from the soil, are the naked elementary things on which the plant actually lives. These are found in one proportion or another in, I might almost say, every soil. In almost every barrowful of earth taken from where you please, analysis would detect enough to supply, I would venture to say, the ashes of a tree, and we must remember the living root will pick up minute fragments which would escape the chemist; they are found scattered and distributed in a mass, it may be, of alumina, or of silica, or of lime, of which the plant makes no use at all. The difference between bad soil and good soil is not so much whether these elemental things are all present or no (though sometimes, it is true, one or the other may be all but absent), as whether they are present in appropriate arrangements and suitable conditions.

The broad characters of these "arrangements" and "conditions" are very fitly indicated by the well-known gardening phrases of "dead" earth and "live" earth. A little while ago I dug up and brought to the surface the subsoil of some lightly and poorly cultivated land. I added to it ammonia salts and chemical compounds, so that as far as the mere elements of plant life were concerned, it was on a level with the cultivated patch by its side, and I sowed and planted. Joseph shook his head, prophesying that no good things could be hoped for from "that dead soil," and he was right; the seedlings in large measure failed or the seedlings dwindled and went off, and the planted perennials dragged out a stunted, poverty-stricken life, or vanished wholly out of existence. In spite of the presence of the elements of food the "dead" soil was unable to meet the wants of the plants, and to help them in the struggle of growth.

What then is the difference between "dead" earth and "live" earth? The fundamental difference is that told by the plain simple meaning of the words. Good soil, fit for the growth of plants is really and truly alive: the thin crust of the earth which we cultivate is a widespread organism in which forces contend in the same way as they do in a living body, in which atoms are whirled to and fro in molecular and chemical conflict.

A great deal of the work of the animal and indeed of the vegetable organism is done by means of agencies which we call "ferments." The action by which the tiny globule of yeast changes sugar into alcohol and carbonic acid is a type of the multitudinous and as yet mysterious actions going on not only in the digestive canal of the animal, whereby food is dissolved and transmuted, but in nearly all the passages and cells of every herb and beast, where blood or sap is being made, and where living protoplasm is being built up or broken down; and live soil is alive by virtue of its abounding in similar ferments. You pour some ammonia on to "dead" earth; it remains ammonia, and as ammonia is soon washed away. You pour the same quantity on to good "live" earth; in a short time tiny activities are at work, and the ammonia is soon changed into nitric acid, and this into some nitrate or other. Now, though all living matter, either in the changes attending on life, or in the decay which follows upon death, is, by the action also of ferments, resolved into ammonia, and though the ammonia thus produced is to a large extent the ultimate source of that nitrogen on which plants must feed in order to live, evidence is forthcoming to show that ammonia does not serve as the direct but only as the indirect food of plants; before a plant can

take up the nitrogen present in ammonia, that ammonia must be changed into a nitrate. And all over the globe the ferments in live cultivated soil are busy changing the useless, we may even say the harmful, ammonia into the beneficial nitrate.

This one ferment change going on in live soil has already been fairly worked out; but in all probability it is merely one of a vast number of similar changes going on in the earth, of whose existence we have indications, but concerning which our knowledge is imperfect and inexact. I am treading now on dangerous, untrodden ground, where we sadly need the light of careful experimental research; but I feel confident that future inquiry will justify the view that good rich soil is ever in travail, seething in molecular strife for the benefit of the plant, that the earth is not merely a storehouse whence the herb draws directly the material it needs, but rather serves at once as kitchen and stomach, where food is both cooked and digested, in order that the rootlets may take it already prepared for further use, and the cells for which it is intended be saved many a laborious task. The plant, in fact, is fed by the soil, rather than feeds on the soil; all vegetable organisms are, as it were, parasites on Mother Earth.

Nor is this view refuted by the fact that many plants may be cultivated on pure useless sand, watered with appropriate saline solutions, or even in the solutions themselves apparently free from all the ferments of which I have spoken; for every living organism has almost unbounded powers of adaptation, and will make shift for itself under widely different countries. Plants thus grown may live, but do not flourish. I, however, am speaking, not of what plants can achieve, but of what they are in the habit of doing under ordinary circumstances; and the objection which we are considering will first have force when we see market gardeners preferring to grow their produce in large vats of saline solutions.—DIETES.

(To be continued.)

SUB-TROPICAL GARDENING.

(Field, 10th Sept. 1881.)

This kind of gardening was introduced in order to avoid the eternal round of geraniums, calceolarias, and a few other common bedding plants, which, however worthy of culture they may be, can hardly be said to convey any adequate idea of the riches of the plant world capable of cultivation out of doors in our climate. For some years, however, the very name proved sufficient to deter many from giving the system a trial, from the erroneous notion that only tropical vegetation—the inmates of our stoves—was admissible. This arose through Musas, Caladiums, and similar tender plants being recommended in the first instance, together with costly preparations for supplying bottom heat, special soils, &c., all of which were at one time considered necessary. But not only have such unsuitable subjects been generally discarded, but more recent events have proved that even better and more lasting results can be attained by the use of plants of even a much harder character than soft-wooded bedding plants, the sole representatives of out-door decoration some twenty years ago. Now, with the rich store of fine-foliaged plants from temperate climes at command, it is quite possible to have a beautiful garden of hardy plants alone; for such subjects as the Ailantus, Paulownias, and other fine-leaved shrubs make beautiful beds if cut down close to the ground every year like herbaceous plants. We have also the hardy palm (Chamerops), noble yuccas, and graceful bamboos, the beauty of which can hardly be excelled by any of the inmates of our stoves; and as regards dwarfier subjects suitable for edgings, we have such hardy plants as Siebold's plantain lily (Funkia), acanthuses, and plants of a similar character; while amongst plants that are annually raised from seeds,

and merely require the protection of glass to start them, we have infinite variety between the stately Ricinus or castor-oil plant, and the dwarf Centaurea or Chamapuce, from which to select colour or form. It is by selection from the various sections that the best results are obtained, and one great advantage of using permanent plants in pots for central objects in groups, or as isolated specimens on the turf, is that, while they add variety to the arrangement during summer, they can be taken up and utilised for in-door decoration as soon as the beauty of the out-door garden begins to fade. In this way a maximum of interest and pleasure may be enjoyed from both the out-door and in-door garden, according to the season. Sub-tropical and other fine-leaved plants, therefore, used properly, become a source of pleasure, affording as they do distinct phases of beauty. One tires of the continual repetition of the same class of plants, however well or tastefully they may be arranged; and by having totally distinct types of vegetation in separate divisions, such as the sub-tropical in one, carpet beds in another, and flowering plants in another, the result will be a well-varied and interesting garden.

Although tender plants in pots are decidedly effective for special occasions, in a general way any plants that are not able to stand out of doors from the first week in June until the last week in September can hardly be called fit for summer bedding. Amongst the most suitable are several kinds of palms, such as Scaforthia elegans; Chamerops excelsa and C. humilis; Aralias of various sorts; Dracena australis and D. indivisa; Phormium tenax and its variegated form; Yucca aloifolia variegata; Hedychium gardnerianum, a noble-foliaged as well as a beautiful flowering plant; Ficus elastica, or indiarubber plant, a useful plant, either as a large or small specimen; and Eucalyptus globulus, the bluish-grey tint of which is quite unique in its way. Erythras make fine autumn beds; being very brilliant in colour, they are useful for lighting up sombre masses of foliage. Bamboos have such beautiful feathery foliage, that, when the winter is too severe to trust them out, they should be utilised as large pot plants for plunging out of doors in summer; they luxuriate on the margins of water, and look particularly well in irregular groups or clumps. Abutilons are particularly well adapted for open-air decoration, either planted or plunged; Abutilon Boule de Neige, Boule d'Or, and Darwini are all good; A. tessellatum and A. Thompsoni are also very effective, the markings of the foliage being rich and varied. The hardiest tree fern, Dicksonia antarctica, looks well plunged in shady dells where a good canopy of overhanging foliage gives shelter and shade; and several varieties of dwarf ferns, such as the Bird's-nest Fern, are admirably adapted for undergrowth to the above.

Plants raised from seed will, however, form the majority in most places, from the lack of room under glass for sheltering many large plants. Of these the most generally useful are Cannas (called Indian shot, from their very hard seeds, which require soaking before they are sown). If sown in February, in strong heat, they make fine plants for bedding; their foliage is lovely, and the flowers rich in colour. The underground roots are permanent, and increase in size and strength every year. They may be taken up and wintered under glass, or securely protected in the soil by means of external coverings. The splendid masses of cannas one sees in the public parks are generally protected in winter. The tall light-green-foliaged varieties make excellent centres for groups, as they mostly flower freely, and the dwarfier bronzy-foliaged sorts are good for edging. A new variety, called Adrienne Robin, is very good. In addition to seeds, cannas are readily increased by division of the roots. The castor-oil plant is perhaps the noblest we have that can be raised from seeds. The latter should be sown in February in heat, and the young plants shifted on as required. They often grow from 8ft. to 10ft. high, with foliage nearly a yard in width. The

dwarf bronzy-foliaged *R. Gibsoni* is very effective for margins. It usually produces seeds very freely, and they frequently ripen out of doors in warm summers. *Solanums*, treated in the same manner, are also very effective. The spiny-leaved *S. robustum*, the elegant cut-leaved *S. laciniatum*, and *S. Warszewiczii* make beautiful single specimens or edgings to groups of taller plants. *Wigandias*, *Ferdinanda eminens*, and *Melianthus major* are likewise all beautiful plants, treated as annuals; and among dwarfier subjects that can be raised with them I may mention Brazilian beet, with its richly tinted leaves and midribs; *Acacia lophantha*; *Amarantus* in variety; *Cineraria maritima*; and *Centaureas*, with their silvery, elegantly cut leaves. There are, moreover, the dwarf thistle-like *Chamæpuce diacantha* and *Cassabonæ*, *Echeverias* in variety, *Stachys lanata*, and many other dwarf plants suitable for edgings or carpeting beneath tall-growing subjects.

Of hardy or permanent plants in addition to those already enumerated, I may mention the many beautiful varieties of maples, from the well-known *Acer Negundo variegatum* to the beautifully cut-leaved *A. polymorphum* and its varieties. These, treated as dwarf standards, with the ground covered with dwarfier plants for contrast are very beautiful. *Bocconias*, with their tall spikes of graceful flowers and noble foliage, make effective and permanent plants for isolated groups. The *Pampas grass* and *Arundo* ought also to find a place in every garden, for they are beautiful at all times of the year, and on the margins of water are quite at home. Several varieties of *Rhus* or *Sumach* have very beautiful foliage, *Rhus glabra laciniata* being especially elegant. *Aralia japonica* is also well adapted for flower garden decoration, as are likewise *Retinosporas*, *Junipers*, and *Cupressus* among conifers. Of dwarfier plants for edgings or carpeting we have the gold and silver *Euonymuses*, golden honeysuckle, and a variegated vine. The *Tritomas*, with their fine rush-like foliage and flame-like spikes of flower, the *Funkias*, the variegated grasses such as *Poa trivialis argentea*, the *Polemonium coeruleum*, the *Vincas* or periwinkles, *Santolina*, *Stachys*, *Sedums*, *Cerastiums*—these and many more are all useful plants in the flower garden. In fact, the material to select from is unlimited, even if we confine ourselves to fine-foliaged plants; but there is no reason why beautiful flowering or berry-bearing plants should not be utilised with excellent effect—as, for instance, ornamental gourds, egg plants, the Cape gooseberry, &c.; while tuberous-rooted begonias, and may equally brilliant plants that do not fall in with the ordinary bedders, might in some places be associated with the fine-foliaged plants.

As to arrangement, in all cases beds or sets of beds of the simplest design are the best. Shelter from wind is also of the first importance, and for this reason recesses in shrubberies or banks clothed with foliage form the most fitting background for beds or groups to nestle in. Avoid *Musas* or *Caladiums*, the leaves of which tear into shreds if winds cannot be entirely shut out; also plants that look unhappy on the occurrence of a cold night or two; and concentrate your efforts on subjects that grow and look luxuriantly under nearly all conditions. If a dell or garden overhung by trees is at command where ordinary flowering plants run all to leaf and refuse to flower, take advantage of it for fine-foliaged plants. It will form a charming change from brilliant bedding plants or severely geometric carpet beds to come upon a garden where each plant spreads broad its delicate foliage on the grass, even in our variable climate.

J. G.

PARAFFIN.—In the *Colonies and India* it is stated that a thick vein of a peculiar substance, containing half its weight of pure paraffin, has been discovered at Hawke's Bay, New Zealand. It is said to be worth £10 a ton.—*Nature*, August 11, p. 34.

PHASKOMYLIA TEA.—Dr. Xavier Landerer, writing in the *Chemist and Druggist*, says one of the street cries of Athens is "Buy Phaskomylia tu bunn," or the Sage plant of the mountain, the apple-bearing Sage. The herbalists gather it, and tie it in bundles, which they sell in the market for about 10 leptas. A tea made from this herb is drunk in all hills and gripes, as a matter of course, without consulting the doctor; it is sold, too, in the coffee-houses and confectioners' shops. The plant is called apple-bearing, because the puncture of the insect, *Cynips salviae*, causes the growth of galls known as *Gallæ esculentæ*, and like little green Apples. These are collected and eaten after being steeped in water to remove the bitter and styptic constituents. The plant is very common in the mountains of the district of Maina, and the galls are collected and boiled in honey or sugar, the conserve thus made being used like other sweetmeats, or mixed with water as a beverage, a teaspoonful to a tumbler. This Sage plant is found in all houses of the poorer sort, and on board ships and on cold days Phaskomylia tea is drunk. The plant is also kept on hand in all the coffee-houses, even as far as Odessa, and its infusion is a favourite beverage. In Odessa a kind of punch is made of it with rum.—*Gardeners' Chronicle*.

WOOD PULP FOR MAKING BARRELS.—The latest novelty in the application of wood pulp comes to us from America, namely, for making barrels for holding both solids and liquids. The following account of this manufacture is given in a recently issued report from America:—"Wood pulp, so conspicuous of late years as a material for the manufacture of paper, has been found to afford one of the best means of making light cheap, and durable barrels, adapted for all purposes for which these useful packages are demanded. The barrel is made in one piece of coarse wood pulp, subjected to a pressure of 400 tons. The heads are made in the same way, giving a degree of compactness of grain that is sufficient for every use. When the barrels are put together they are very light, very strong, and very satisfactory in every way. Two kinds of barrels are made—one for fruit, flour, and other dry substances; the other for oil, lard, beef, pork, and liquids of all kinds. These latter are made impervious to the infiltration of oil and other liquids, by a simple process. The flour barrels are so strong, that when filled they can be dropped from a waggon without injury, and fruit packed in them keeps a long while, being excluded from all contact with the air. These packages can be made for half the cost of ordinary barrels."—*Ibid*.

ROOT PRUNING.—Unpruned trees are benefited by root pruning, like other trees; but they do not require it nearly so often, because, being allowed to extend, they run themselves out into fruit. Pruning is one way of lessening the effects of root pruning, and curtailing its usefulness. Keep up the demand for food by encouraging a large breadth of branches and leaves, and reduce the supplies by curtailing the roots, and a decided check is given to over-luxuriance at once. This is the philosophy of root pruning. I may just add that I have for many years tried the effect of tree growth and shoot extension with a minimum amount of pruning, or none at all, upon many other kinds of plants—among which may be named the hawthorn, *Cratægus pyracantha*, and other hardy shrubs, the *Bougainvillea*, *Clerodendron*, *Stephanotis*, *Allamanda*, roses, &c.—and always with the same result, that is, of ruining the plants into flower or fruit abundantly at an early age. The *Cratægus pyracantha*, it is well known, does not fruit freely when young; but we have a number of quite young plants here, growing in a strong soil, that fruit in the most profuse manner. Let the branches extend, and never shorten them, and each one will produce dense wreaths of berries. It is only when you begin to crop the shoots, as they do pears and apples, that they cease to bear fruit.—J. S. W.—*Field*.

PLANTING IN MANILA.

"There is a local industry, which for some time has become extraordinarily extended in this quarter—that of the manufacture of common hats from Balinao and Pangasinan. These hats are in great demand in Europe and America, especially in the latter, from which large orders have been sent to Manila. It is to be remarked that a good business is done in Europe and America after receiving these hats, by altering and adapting them to suit the taste of customers there."—*Diaria de Manila*, 3rd Sept.

"*Sugar*.—A well informed person who has been applying himself to studying statistics, and who investigates whatever can contribute to give greater knowledge of the riches of this country, assures us that the production of sugar in the Philippines during the present years may exceed 200,000 tons. These figures place the Philippines in an honourable position. It is certain that in year to come, the production of this valuable article will go on increasing here."—*Comercio*, 3rd Sept.

"*To Coffee growers*.—We have seen a telegram from Spain dated yesterday, announcing a further fall in the prices of coffees from these islands, and great reluctance on the part of consumers to buy Philippine coffee, of which there are new large stocks in the Peninsula. The nominal price was \$18 per Castilian quintal. This explains the complete stagnation of business here as to transactions with this article which finds no buyers at \$1,353. If holders here do not lower their rates we foresee that the stocks in hand will be increased by the first arrivals of the new crop. We believe that the quantity stored in Manila now amounts to 10,000 piculs. We are informed that in Spain, attention has been drawn to the quickness with which stored Philippine coffee loses the green colour, while that from Porto Rico, Cuba, and Mexico preserves its colour longer. Hence the latter description is more in demand and is quoted at higher rates than that from these islands. Probably this is owing to the faulty mode of collection in this country, perhaps from over haste to pluck the berries, from the trees. Hence we draw the attention of planters to it, so that on investigating the origin of this serious defect, they may be able to remedy and thus enable Philippine coffee to recover its repute. Notwithstanding that it was believed here to be superior to coffee from other countries, it must have become deteriorated, when it is quoted in the European markets at such low rates."—*Straits Times*.

THE PLANTING ENTERPRISE IN SUMATRA.

Regarding Deli, Langkat, and Serdang, the Samarang *Vaderland* of the 22nd August contains an article in which the origin of planting enterprise there and its results are thus set forth:—

Twenty-five years ago the State of Siak, which now forms the central portion of the Residency of the Eastern Coast of Sumatra, was connected with the Netherlands Indian Government by rather weak ties. The Netherlands had concluded several engagements with the Sultan of that State, but evidently more sympathy was felt there for the British, which is very explicable from the active trade between that territory and Singapore. It was not until one Wilson attempted to establish a second Sarawak at Bukit Baru and Klapa Pati, and the Sultan applied for the aid of the N. I. Government against him, that Siak was actually brought under Netherlands authority. This happened in 1858. In the following years, the numerous dependencies of Siak were visited by Mr. Netscher then Resident of Rhio and engagements were entered into successively with the headmen and people, whereby they acknowledged the supremacy of the Netherlands. The Resident also

exerted himself to call attention to the fact that the insignificant trade of these petty states was far below the productive power of the country, and also to encourage enterprising Europeans to settle there. He wrote on the subject to a trustworthy inhabitant of Batavia advising him to send a competent person to make inquiries on the spot. The result was that in 1863 Mr. J. S. G. Gramberg, from whose articles in a magazine in Holland, we derive these particulars, undertook a voyage to the east coast of Sumatra. He visited all the coast districts in Malacca Straits, entered into negotiations with the Sultan of Siak, brought with him to Batavia specimens of native produce, and showed that a European settlement in those districts would have every chance of proving a success. The mercantile community of Batavia, remaining faithful to their traditional policy of unwillingness to invest money in enterprises in little known places Mr. Gramberg met with discouragement and, for a long time, it appeared as if all the pains and trouble he had taken would be in vain. At last, one enterprising person came forward. He asked for information, received the most recent specimen of tobacco Mr. G. had brought, and decided on going to Deli to start a tobacco plantation there. This first pioneer of planting enterprise on the East coast of Sumatra was Mr. Jacobus Nieuhuys, who first set the business on foot on behalf of Mr. Van Arend, and became afterwards tobacco planter on his own account in Deli. The splendid results yielded by the first tobacco crops in Deli are generally known. The excellent quality of this product caused so great a sensation in the European market that, soon, Hollanders, British, Germans, French, and Danes came in great numbers to settle in that fertile district, and several Companies were established with the object of carrying on the planting business on a large scale. The Colony thus growing with such unusual rapidity had, however, to struggle through many difficulties. Trade increased to an extent never before known. The native princes and chiefs profited much meantime. Some of them became wealthy, but they cared little about order and security, and the European authorities stationed at Rhio and represented in Siak by only an Assistant Resident with limited jurisdiction had not sufficient power to ensure the same. It was not until 1873, when the East coast of Sumatra was formed into a separate province and an Assistant Resident stationed at Deli, that this state of things began gradually to improve. That this was necessary becomes apparent when attention is paid to the rapid increase of the foreign portion of the population. Before 1862 there was not a single European in Deli and there were only a few Chinese retail dealers and revenue farmers. In 1864 there were only three European planters near Labuan Deli, the chief town. In 1867 there were already 1,000 Chinese, chiefly coolies and the export of tobacco reached 1,300 piculs.

Further statistics show that in 1874 the estates held by Europeans were 23, being 10 more than in the previous year, planted with 31,295,555 trees yielding 19,642 piculs of tobacco. In 1876 there were 75 estates with 7,600 coolies and the population were 124 Europeans, 9 Arabs, 7,607 Chinese, 774 Foreign Orientals, and 30,204 natives. This increase of population, chiefly in the foreign element, indicates the expansion of trade and industry. In 1877 the estates were 87 in number, of which some were afterwards abandoned and nutmegs and coconuts were also planted, the latter proving however, unremunerative. The Official Colonial report for 1880 gives 70 as the number of estates, legally established in 1879 under contracts sanctioned by the European authorities, namely, 39 in Deli, 22 in Langkat and 9 in Serdang. As to production, the above report states that, on almost all the estates tobacco was cul-

tivated. On 3 of them nutmegs as well; coffee on 1; and coffee and cocoa on another, 3 of the new estates had produced nothing in 1879 and the crops of two others had not been ascertained. The tobacco yield for 1879 amounted to:—

for 32 estates in Deli	5,488,131	Amst. lb.
19 do Langkat	1,401,516	do
9 do Serdang	1,321,925	do

8,211,572 do

Certainly a remarkable result in a country where, fifteen years ago, there was hardly any trade and industry owing to misgovernment, exactions, civil war, and absence of European enterprise.

The revenue in these districts in 1879 amounted to 1,195,196 guilders, and the expenditure to 693,870. This large revenue is partially derived from excessive taxation, the incidence of which is now becoming more severely felt from a recent fall in the price of tobacco, resulting in several estates proving unremunerative, and in other being even abandoned. The above journal urges a reduction of taxation on the ground that the Opium and Gambling farms revenues there fully meet local expenditure.

Messrs. F. E. and L. C. J. Simonnar have been granted a concession for 75 years by the Netherlands Indian Government to work diamond, gold, platinum, and coal mines in the Chumpaka district in the province of the S. and E. Division of Borneo.

A petition signed by 41 mercantile firms in Batavia has been presented to the Governor General of Netherlands India, praying that book-keeping in the Dutch language, or in the Malay language written with Roman characters, be made compulsory on Chinese and Foreign Oriental traders there as a check on fraudulent bankruptcy among them.

Several British and Dutch capitalists have also formed a Steam Navigation Company at Amsterdam with a capital of \$250,000 to run a line of six steamers from there to Java, for carrying cargo only at a minimum rate of freight. The first steamer of this line was to leave Amsterdam in the middle of last month.—*Ibid.*

SPECIMENS of a new leech previously unknown in France, the *Hæmopsis sanguisuga*, have recently been exhibited at the Société de Biologie, by Dr. Megnin (*Méd. Times and Gaz.*, July 30). They were found adhering to the mucous membrane of the mouths of some artillery horses that had just returned from Tunis. The brooks of North Africa are said to be full of this kind of leech.—*Pharmaceutical Journal.*

GRAFTING.—Professor Bull says that in the Iowa College graft-room they graft not only Apple and Pear, but Plum, Cherry, Apricot, and Peach, successfully on seedling roots—preferring seedlings of the Miner Plum for the stone fruits—using it even for Cherries. They graft quite early in the winter, on roots stored in November, and then immediately plant or store them closely together in a bed of sand in a cellar with humid air, but with floor and sand never more than damp. Only the roots and the lower end of the scions are covered by the sand. For the stone fruits care is taken not to let the wax wrapping of the union of graft and stock be in actual contact with the bark. A light coat of moist clay is first applied over the cuts, and over that is closely wrapped a strip of muslin from a roll which has been soaked in a melted mixture of white rosin, linseed-oil, and a small quantity of wheat flour. This is a rather novel recipe, dispensing with the generally-used beeswax. The flour is stirred into the hot mixture to prevent the hardening and drying of the cloth which should hermetically seal the wounds. The planting should be done very early, on the first practicable day, and the grafted roots must be kept entirely dormant, but entirely fresh, until planted.—*Gardeners' Chronicle.*

MUSK RAT.—The tail of the musk rat has already made its appearance in this country. The odour seems to be intermediate between sumbul and musk seed.—*Pharmaceutical Journal.*

OVER-GROWTH.—“Since the subject of vegetable pathology,” writes Mr. Berkeley, “has been taken up so successfully by Sir James Paget, attention has lately been very much turned to anomalies as well as to ordinary forms of disease. A very curious one, if not entirely new, has lately occurred, which I lose no time in communicating to the *Gardeners' Chronicle*. I have observed for some time that a plant of *Thuya gigantea* has appeared in a very unsatisfactory condition, though one close to it is a fine sample of growth. On examination I found a large excrescence like a corn at the base of the tree, which had a diameter of more than 13 inches, while the trunk of the tree had a diameter of 3 inches only. I had a section made with a circular saw, which was impeded when half-way through. At the point where the impediment took place was a little lump of hard iron-stone, which had the curious effect of causing a strange diversion of growth, which was more rapid than it had previously been, but the principal energies of the plant were diverted; a few roots were thrown out on one side, while there was not a trace of roots on the other. The strangest part was that the growth of the stem was more rapid, but the health of the plant completely deranged. It was clearly not a case of exostosis, depending on an imperfect developed bud, but very analogous to a wen in the human frame. The case is so curious that I have sent a drawing which may, I hope, be acceptable. Since the above was written, Dr. Masters has pointed out that a similar production is noticed and figured in 1879, vol. ix., pp. 372, 377, and I have observed somewhat of the same kind at the point where plants have been grafted. I do not think it is analogous to what are called gnaws, but that it is a kind of hypertrophy.”—M. F. B.

COFFEE AND OTHER PRODUCTS IN CEYLON.—I have within the last few days received through the Director of the Royal Botanical Gardens a further report upon the coffee leaf disease by Mr. Ward. This most able and deeply interesting paper will forthwith be laid on the table. In the opinion of Dr. Trimen it exhausts the subject, and completes the work which Mr. Ward undertook, so far as it can be carried out in Ceylon. Although Mr. Ward has not been able to suggest any mode of treating the disease which shall absolutely eradicate it, he has at least given to the world in the life history of the *Hemileia* the true data upon which a mode of dealing with the disease may hereafter be founded, and in the meanwhile such remedial measures may be adopted as may enable the coffee to withstand the strain of the disease. Although vast injury has doubtless been done by the disease, the export of coffee from Ceylon will long continue to exceed in value by far all other exports put together. It is, however, very satisfactory to note that other products, both old and new, are fast increasing in quantity and value. The export in 1880 of the produce of the coconut in its various forms was valued at six millions of rupees. The quantity of cinchona bark exported has risen from under 15,000 pounds weight in 1876 to 1,061,989 pounds weight in 1880. The export of tea also has doubled. Tobacco is another staple which experience has shown can be profitably grown in Ceylon. The value of the exports of tobacco last year exceeded a million rupees, and, considering the unceasing demand for this article, the cultivation of it on a large scale on suitable soil could hardly fail to be successful. Other products such as India rubber and cocoa are being grown in increasing quantities, and I feel confident that the exports of future years will exhibit a variety of products which may in time equal the value of our coffee crops.—*Speech of Sir Jas. Longden in opening the Legislative Council of Ceylon, Sept. 28th, 1881.*