CINCHONA CULTIVATION IN CEYLON.

At a time when a good deal of despondency prevails in reference to the market for our chief staple, coffee, it is more than usually satisfactory to have cheerful accounts of the prospects before the cultivators of cinchona. There are few planters in Ceylon who cannot be counted among that body, and notwithstanding all the drawbacks of unexpected supplies of bark from South America, variable quotations, and still worse the large proportion of failures in local plantations, the financial success of the cultivation has been proved beyond all doubt. We may be told that the case of the fortunate proprietors of Frotoft estate, Ramboda, to which we are about to refer, is an exceptional one; but we do not see why it should be so regarded save in respect of their fortunately early commencement of work in the formation of a regular cinchona plantation. Frotoft and Tymawr consist of 250 acres fully planted with cinchona officinalis, and the result last year of cutting down 40 acres, when the trees were from 4¼ to 5 years old, has been a gross return of £8,000, a sum sufficient to cover the whole outlay, so far, on the properties. These properties cannot now be valued at less than £15,000, and we feel sure the owners would not part with them for less, so that we have a profit of 200 per cent within half-a-dozen years. The average yield of bark in the case of the Frotoft clearing was 1 lb. per tree, including root bark, and planted 4 by 4 feet, there were fully 2,700 trees per acre harvested. The trees, it will be noted, were rooted out, and it is particularly satisfactory to learn that young plants put down on this once-cropped land are flourishing, shewing no such signs of failure as have been observed to be the case in clearings twice planted in some other districts. Mr. Traill, to whose care and intelligence the success of Frotoft is so largely due, was trained in a good school under Mr. Taylor of Loolecondera, and he had the advantage of watching the profitable result of the first experiments made by Messrs. Keir, Dundas & Co., when, from 15 acres on Stellenberg alone, no less than £6,000 worth of bark was taken. The prices secured for the Frotoft bark were on the whole good, but not higher probably—the bulk being at 3s rising to 5s per lb.—than can always be got for good Ceylon crown bark. On other clearings in the Ramboda district, we hear that there are, perhaps, more failures than on the plantation we have particularized; but in the early days Frotoft had large patches of failures; 4 and 5 acres going out at a time. We are sorry to learn that the supposed exemption of Uva from canker and failure of cinchonas has been rudely shaken by experience on some of the Haputale estates, although one current report makes the case much worse than it really is. The fact is that no extensive continuous clearing of cinchona can be free from a considerable proportion of losses, varying with the character of the soil and climate. The Kandapola and Udapussellawa districts are perhaps as highly favoured as any in the country, and "Lover's Leap" with its intersecting belts of blue-gums—the careful design and work of Mr. James Taylor—may probably be regarded as the model cinchona plantation of the country for its size and age. A discouraging piece of experience from the younger districts is that cinchonas do not seem to prosper on "grubbed" land. Again, one of the most interesting experiments in the country is that carried on under the energetic direction of Mr. R. P. Hart on Great Valley estate, Hewaheta. Here the forest has been cleared in small fields of five or six acres surrounded by belts of the natural vegetation, so that the cinchona is growing up in detached groves very much after the fashion in which it is found, according to Markham, in its natural habitat on the Andes. So far this experiment gives promise of being a complete success, and we have here as well as on Lover's Leap the key probably to the remedy for canker, namely, small fields well protected and well drained of superfluous moisture.

The great activity now manifested in the propagation of the best (Ledgeriana) cinchona adds a further feature of interest in connection with the enterprise. The fortunate possessors of clearings, plants, or even nurseries of this rich species may well be congratulated, and now there come reports of the success of grafting far beyond even Mr. Moens' achievements. Of this experiment and of other important facts in connection with the Ceylon and Java enterprise, our readers will hear in good time.

TEA AND COFFEE FOR AUSTRALASIA.

(*North China Herald.*)

Some of the Indian papers have lately been discussing the trade with the colonies and various official and other suggestions which have been made for its extension. The assistant secretary to the Indian Department of Agriculture and Commerce has made a report on the subject, in which he says that he believes the Australians will, in a short time, take five million pounds of Indian teas. He recommends coffee-growers to look to the colonial markets, and seems to think that a trade in indigo, shell lac, cinchona, fibres for rope making, and even gram might be initiated and carried on successfully. But to foster this enterprise, he proposes, first that Indian exhibitors at Australian Exhibitions, and other dealers as well, should be represented on the spot by an agent whose duty it would be to explain to the colonists the quality of the products, the places of their growth, the modes of shipping and packing them, and so forth. Indian dealers and exhibitors might associate themselves for the maintenance of such agencies. Secondly, an agent of the Indian Government should also be on the spot to assist the agents, and make himself generally useful. Thirdly, the agents should inquire into, and report upon, the products and resources of the Australasian countries, with a view to fostering an import trade into India, from the colonies. And fourthly, a Company, availing itself of the information thus collected, should establish itself in Calcutta or Bombay, for the purpose of carrying on a general businesss with the colonies. These suggestions seem to have been favourably received in India, and whether they are carried into effect or not they are an evidence of the energy with which the official and commercial public in India are trying to extend their trade. As regards the articles with which Australia could supply India less information is forthcoming. At present the colonial export to India is represented, one paper says, principally by "Wales" and a few thousand tons of coal, and at present there does not seem a prospect of the list being greatly extended, though Australian commodities are to be sent to Calcutta for quarterly sale, and wools are for conversion into matting in the

jails. But if Indian merchants are successful in establishing a considerable export trade with the colonies, the returns for it can be made in gold of which India is taking an ever increasing-amount.

It seems rather peculiar that, while the Indian teas are strongly recommended on account of their freedom from adulteration, a correspondent of the *Indian Tea Gazette* should draw attention to the South American maté, as what, "it is just possible might make an admirable blend with our excellent, though to some people peculiarly-flavoured, Indian teas, and give them a value in the British Colonial markets which they do not now possess." *Yerva Maté* is used in the greater part of South America as tea is by Western people, and its flavour, though peculiar, resembles the coarser qualities of China tea; but it has virtues and defects which the cup that cheers but not inebriates does not possess. It is a wonderful sustainer of strength even in circumstances requiring great physical exertion, but it produces excitement of a very unpleasant kind to Europeans. It derives its stimulating and restorative properties from the same principle that is found in tea and coffee, namely theine. The correspondent of the *Tea Gazette*, when combatting the objection that the introduction of the cultivation in India of the Ilex from which maté is made because it might be used as an adulterant, says, that in time it would stand in the same relation to tea as chicory to coffee; that is, as an accepted adjuvant. He considers it possible that the tea with which it was mixed would modify, if it did not entirely counteract, its excitant properties, and further that, as it would cost little to cultivate and cure maté, it must needs be profitable to the producer. The advocacy of maté, as something which would improve Indian teas and render them more pleasant to consumers, seems an unfortunate proposal on the part of those who are so strenuously urging their merits on the world generally. In a report of the proceedings at the opening celebration of the business of the Calcutta Tea Association in Sydney, contained in the same *Gazette*, we do not find any allusion to the necessity for an adjuvant in any of the speeches which were then made. A great deal was said about Indian tea not being liked by the public because of the difficulty in obtaining a good blend of the various growths; something more of the indifferent quality of the China teas; but nothing about improving the Association's imports by maté or any other addition, which would be to them what chicory is to coffee.

MESSRS. TYTLER AND SCOTT BLACKLAW ON BRAZIL: IS A REVOLUTION IMPENDING?

It is now about a quarter of a century since Mr. R. B. Tytler, so well-known in the annals of the planting enterprise of Ceylon, contributed to the *Observer* a startling communication on the preponderating influence of Brazil in regulating the coffee market of the world. That was before the era of railways in the South American Empire and long before the process had been commenced of practically concentrating the whole available slave labour—far larger in amount, evidently, than the slaveholders were willing to let the outside world know—on the growth of one product, to the abandonment or neglect of the formerly important staples of sugar, cotton, &c.

Again, a few years ago, Mr. Tytler embodied his sentiments regarding the then position of Brazil and her possible future, in a pamphlet, taking as his text the facts embodied in Mr. Scott Blacklaw's interesting and important communications to this paper; especially his elaborate report of the discussion on future labour supply by planters and others interested in the leading enterprise of Brazil in conference assembled. At this conference, to the amusement as well as the astonishment of the world, strong objections were offered, on the ground of probable contamination of race, to the introduction of black or coloured free labourers to a country, the majority of whose inhabitants must consist of indigenous or half-bred Indians and negroes (slave and free), and the mixed race arising from intercourse between the latter and the whites.

A third time, in consequence of having had the advantage of obtaining the most recent information from Mr. Scott Blacklaw, personally, Mr. Tytler has elaborated his views on Brazil, and his letter which appears in this day's issue supplements in some most important particulars the communication with which Mr. Scott Blacklaw himself has simultaneously favoured us. It will be seen that almost the whole purpose of Mr. Scott Blacklaw's letter is to shew how mistaken he and we and many others were in the conclusions we drew, from apparently authentic information, as to the crisis which we believed had overtaken the supply of slave labour in Brazil, in consequence of the operation of emancipation laws, the decrease of slaves by death and the state of public feeling. Making every allowance for the vast advantages conferred by rapid and large railway extension, in freeing human beings and cattle from carriage of produce and goods to labour on estates, as well as in facilitating the transport of crops to Rio and Santos, we cannot but feel that the census figures for the slave population, have been deliberately, systematically, and for a purpose, falsified. That is the opinion of the able and well-informed editor of the *Rio News*, from which honest paper we have learned much of *the truth* about Brazil instead of the self-complacent romance in which Brazilians themselves are so fond of indulging. Our reasoning and conclusion would have been correct enough, had our premises been as sound as we naturally imagined them to be. The result is just the reverse of what we reasonably arrived at and honestly promulgated. Coffee production in Brazil since the cessation of the slave trade and the promulgation of the emancipation law, instead of going back or even remaining stationary for want of labour, has increased at a rate which is positively astounding. We knew that the great South American State commanded an almost unlimited area of rich coffee soil; we knew that she was adding to her railway facilities at a rate which was a reproach instead of being an example to our rulers in Ceylon; and we could easily infer the vast advantages these conferred on coffee planters by setting free mules, bullocks and their drivers for estate work. But we knew also how enormously coffee was taxed, bearing most of the burdens of Government, Imperial and Provincial, in fact, and by the trumpet flourishes of the statesmen and public writers of Brazil, we were led—*misled*, we should say—into the erroneous belief that in addition to the high death rate to which slaves are

subject, there was a general and a sincere desire, accompanied by efforts correspondingly general and sincere, amongst the community, to rid the empire of the blot, the reproach and the curse of human bondage. We were mistaken, and we shall no longer rate the ruling races of Brazil as so much higher in righteousness of motive and justness of action than the anarchical peoples of mixed Latin and Indian race around them: peoples who have made the terms republic and liberty stink in the nostrils of the nations.

Mainly by the conservation of their slave force and its concentration on the growth of coffee, the average exports (in excess of a home consumption equal to 1,200,000 cwt.) have risen from 3,500,000 cwt. in the ten years ended 1866 to 5,000,000 cwt. in the five years ending 1881 : an increase of 45 per cent in fifteen years, the figures being for Rio and Santos only. Nor does our well-informed correspondent, Mr. Blacklaw, anticipate any early decrease in this rate of production. The probability indeed, in view of the increased breadth brought into cultivation, is, that the export will go on increasing for some years to come, until arrested by disastrous proof that the slaveholders of Brazil have not only competed unfairly with those who have had to pay the fair price of free labour but have also competed with each other to the verge of mutual ruin. If we were asked why middling plantation Ceylon coffee is down to 72s, our answer would unhesitatingly be : "Brazil." But Mr. Tytler, professing to reflect information obtained from Mr. Blacklaw, anticipates for Brazil a catastrophe more terrible than could arise from merely material losses and a commercial crash, the result of inordinate diversion of labour and capital to one pursuit. Mr. Tytler predicts at no distant vate a political revolution with social trouble and commercial disaster in proportion to the extent and diolence of the change from imperial to republican government, amongst such races as constitute the population of Brazil. We cannot but admit the possibility of such a revolution, followed by such anarchy is are predicted ; and, but for the high personal character, wisdom, prudence and forbearance of the present Emperor, it seems probable that revolution and retribution which is sure to follow the crime of enslaving human beings would have been precipitated. But our previous vaticinations and their results ought to teach us modesty in drawing conclusions from facts which may seem to us unimpeachable. We should be glad to have Mr. Scott Blacklaw's own utterances before us, ere we venture to pronounce on the possible future of a country, interesting to the whole world from the vast extent of its territory and its natural resources, and for the so-far successful experiment (unique on the American continent) of rule on the model of constitutional monarchy ; as well as painfully interesting to Ceylon, in consequence of her position, mainly by means of slave labour, as by far our most formidable competitor in the production of coffee. To coffee planters in India, in Java, and in the free South and Central American States,—to all indeed who grow coffee or are connected with the important trade in this article,—the questions discussed by our correspondents are of great interest: and we think we shall not be accused of being actuated by merely selfish motives, if we express the hope that, even if the Brazilians condescend to waive the question of colour and express their willingness to relieve the British Possessions in Hindustan of a portion of the surplus population, the Government of India will not consent to permit emigration to the South American Empire, until slavery has been there abolished. Those who know what human nature is will hold most strongly that it is next to impossible to those accustomed to command the labour of slaves to mete out proper treatment to free labourers. The inevitable tendency of slavery, besides brutalizing master as well as slave, is to create a public opinion which consider labour disgraceful. The two systems, slavery and free labour, cannot be worked well and harmoniously together; and to a country where slave labour exists with the public opinion always engendered by that inhuman and degrading institution, the Government of India (acting *in loco parentis* to those who though free are very much children) should not sanction systematic emigration. Even to Ceylon, which geogr phically and socially is so closely allied to India, free emigration was not allowed until our Government passed a law forbidding the engagement of Indian coolies in this island for labour in places beyond its bounds. We are in favour of free trade, even in the case of slave-grown produce, simply because of the impossibility of carrying out discriminating laws. But moral principles ought to be applied where possible, and on every possible principle of morality and expediency, the benefit of Indian free labour should be refused to Brazil until she has, at whatever cost to herself, righted the great wrong of treating human beings as soulless brutes or inanimate chattles. Having ourselves suffered the retribution and paid the price of this species of wrong, we can with a good grace refuse to aid the continuance of the same wrong by others; even if we do not protest so emphatically as we ought against its existence.

BRAZIL AND ITS COFFEE-GROWING ENTERPRISE.

(*From Mr. A. Scott Blacklaw.*)

Scotland, 15th Dec. 1881.

Since I wrote you last, one of the coffee fathers and a benefactor of Ceylon, has been paying me a visit—R. B. T. I was surprized to see h m looking so hale and hearty. Your climate has not on the whole treated him badly. The conversation for the greater part of two days and a night was all on coffee :—Ceylon, as it is ; Ceylon as it would have been, had not the leaf-disease found lodgement in it ; and Brazil and its enormous crops formed the chief topics. This latter subject is one which engages the attéution of all coffee growers at present. The extra quantity of coffee thrown into the market has, by keeping large stocks continually in dealer's handss, brought down the price not only of Brazilian, but of other coffees. How wrong all our calculations eight years ago ! We thought that, as Brazil's large crops were produced by slaves, that, that shipments would gradually diminish. We reasoned thus :—"The whole civilized world is against slavery and Brazil alone cannot continue to hold in bondage 1,500,000 human

beings. Has not a law been passed freeing all children born of slave mothers since 1872? Was not an emancipation fund formed to free so many slaves every year; and was there not a dying-out process going on by which the number of those already slaves would be gradually diminished? and we all concluded that in ten years slavery would be nowhere. This has proved to be mere matter of opinion. The institution flourishes as grandly as ever it did. Children are being valued as property separate from their parents. The larger part of the emancipation fund has not been spent in freeing slaves, and the official returns of the number of slaves in the whole empire are still quoted about 1,500,000 or the same as ten years ago.

I was to have given you an account of the reasons for the gradual increase of the coffee exports from Brazil, but, as usual, I have been two long in commencing.

DOLLAR, SCOTLAND, 22nd Dec. 1881.

MY DEAR SIRS,—As mentioned in my last, it was a natural error for us all to fall into—the imagining that the Slave Law of 28th September 1871 had given a fatal blow to the coffee enterprize in Brazil. Previous to that date, the planters had been feeling the effects of the stoppage of the slave trade, and labourers for coffee, cane, and cotton plantations had become scarce. While the proposed law was being discussed, previous to its passing, the planters themselves believed they were going head-long to ruin. They sanctioned the law, because the civilized world was against them. The Emperor had ordered it, and their most enlightened statesmen were in favour of it. Besides, the first proposition, which was to decree unconditional emancipation to all slaves in the year 1900, was not insisted on. Although the law of September 1871 left all to remain in a state of slavery, who were born slaves before 1871, until their death, the planters still believed the country had made a great sacrifice; and like us, they thought the cultivation of coffee could not be extended. Four years after, the great crop of 1875 was believed to be quite exceptional, and was owing to there having been small crops for the three previous years, 1872, 1873 and 1874, and the trees having been loaded with young wood, when the favourable blossoming season of 1874 came round. The bad state in which the 1875 crops reached the market only further convinced us of the impossibility of the Brazilians being able to pick and send to the seaports larger crops than the maximum 4,000,000 cwts.

Let us see what the figures show, as regards exports from Rio and Santos alone, leaving out Bahia and Ceará, for, as I mentioned in one of my letters to you, this last-mentioned place must be included in all calculations as regards the Coffee Supply of the World:—

For the ten years ending June 1866 Rio and Santos gave an average of	3,500,000 cwts.	per annum.
For ten years ending 1876 ...	4,000,000 ,,	,,
For last five years ending June 1881 in round numbers	5,000,000 ,,	,,

[N.B.—There are 17 Brazilian coffee bags to a ton.]

It is not expected that the production will be less than this last figure for some time, and it seems to be picked, cured, and sent to seaport, much more easily than the 3,500,000 cwt. a year were; and, moreover, the quality of the crops, owing to improvements in machinery, and better care being taken of them as regards curing and preparing, is much superior to what it was in former years.

Now what are the causes which have brought about this increased prodution?

First come railways.—The first railways were opened in 1866-67. About that time the Don Pedro II. railway was opened into the interior of the province of Rio de Janeiro. Certainly the terminus was a long way from many of the finest coffee-producing districts: still it wasa help, and a beginning in that way of ransporting produce, and showed the leading men of the country the advantage of continuing the system futher, until, by the end of last year, the railways—trunk and branches included—bringing produce to the city of Rio de Janeiro have a total length of 650 miles.

In 1867 a railway had been opened from the town of Santos to the town of São Paulo. This was only 45 miles from the coast, and still 80 miles from the nearest coffee districts of the province of São Paulo. By 1870 these districts had, however, been reached: and, year by year, after this steady progress in railway extension had been made, until the railways in the province of São Paulo, counted 750 miles at the end of last year; and over a hundred more are in construction and will be opened by end of this year, or early in next year. Although the transport by rail is very costly in Brazil—about a shilling per ton per mile—still it can be depended on as a quick and safe means; and the farther inland the railways go there is the less dependence on the muleteer and bullock cartman, for, in former times, coffee transport was at a standstill during the rainy months—December till April following. During the making of the railways, the planters' labor-market was not affected, as the railway labourers were Portuguese, Italians, and Spaniards—a class of men brought out from Europe for this purpose, and who have no taste for agricultural pursuits. On the other hand, the opening of railway threw those who had found occupation as muleteers and bullock-drivers on to work on the coffee estates.

The opening-up of the country in this way was the means of sending men into the interior as purchasers of land, who would not have thought of attempting a long journey on horseback. People with capital flocked from the large towns and from other provinces of the Empire. Agriculture has an attraction for the retired tradesman and the sugar-cane and cotton planter looks on coffee-planting as a superior occupation to his. Besides the sugar planters in Mauritius and British Guiana could produce a better article and could make sugar pay at a price that left nothing for the unskilled Brazilian planter. Cotton, which, during the American war, and for some years after, paid the Brazilian planter well fell to such a price, after the freed American negroe began to work, that the Brazilian planter, after paying 13 per cent of duty on it, found the cultivation of cotton gave little return for the capital lying on his slaves. These all turned their attention to coffee-planting. A great many people in the interior of the other provinces, who owned slaves, but produced very few articles for export, owing to their distance from the seaport, came and bought land near the railways. They found they could grow corn and bran sufficient to feed their negroes, and sell enough fat pork to buy clothes for them or for that, they could still grow a small patch of cotton, make the children prepare it for spinning, the old women spin it, and the men take their turn at the loom at night as usual, and thus be independent of buying anything; and then the price got for the *coffee* in Santos was found money to them. This last operation you will think overdrawn, but I have had Brazilians treating several thousands of coffee trees for me with slaves of their own do this. I gave them land, in a place not suited for coffee, to grow whatever they liked, and, from what grew on that piece of ground, they would keep their whole household and the yearly payment for treating the coffee trees was clear profit.

I shall return to this subject next mail day, m anwhile I find it is time to send this to post. With kind regards, yours very truly,

A. SCOTT BLACKLAW.

COFFEE PLANTING IN BRAZIL.

(*From Mr. Tytler.*)

Having interviewed *Scott Blacklaw* at his home at Dollar, in the Scottish Kingdom of Fife (or Clackmannaan), I am to offer you the result for publication, if you should deem it worthy of your pages. The interview leaves no room for question as to Brazil being on the eve of an impending thorough revolution—political, social, and financial. It is only the life of the present popular Emperor which prevents an outbreak which is inevitable when he dies. *The Empire* is more than nine-tenths Republican. The slaveholding class, with their one and a half million slaves, are confined to only three of the twenty-three provinces, and are the subjects of the most intense jealousy on the part of all but a minority within the officials of Government, and having exclusive privileges hitherto dominant, but now fast losing hold. As for example, for many years past they, finding that the coffee enterprize was the better paying, transferred their human "stock" from the northern (hitherto producing sugar) provinces of Bahia, Pernambuco, &c, to the south—to Rio, to Santos, and São Paulo—where vast tracts of virgin land having rich soil, wholly suitable for coffee, were brought under cultivation of the latter produce, resulting in the production of the present enormous export of from six to eight million cwt. But the jealousy, and interests of the other provinces have caused the enactment of a law prohibiting such transfer of the slave population, and there can therefore be no more extension of coffee-growing by such labour. These three provinces have now to depend only upon the hands they at present possess, which are found to be inadequate to their requirements. The consequence is that the coffee interests, for a year or two back, have been trying by the introduction of free immigrants from Europe—German, Portuguese, &c.—to supply the want of labour by a system of *colonists*, under which families of such immigrants are settled on the estates, with about ten acres of coffee allotted to each family to cultivate, for wages and allowances, being paid as by contract. Thus, one thousand acres would require a hundred separate European dwellings with all etceteras, and cow pasturage, while the quality and working of such a class is most objectionable—in fact, impracticable: and this especially so as alongside a slave system. The free indigenous labour—African, half-breed, or Portuguese—are much of the following stamp. A smart gentleman of colour rides up (they all have their riding horses) and seating himself in the verandah sends for you, and after mutual civilities, with comments on the weather and such like, being asked his business, announces that he is open for engagement, stating terms, including keep of horse, cows, &c., and when informed that he is not required. there is handshaking and *adios*. Not, however, that such men are not in the majority of cases excellent and efficient workers, but, as a class of labour, too expensive, independent, and precarious for the growth of coffee. There are also gangs of slaves to be hired by the job, or by time, and they are the most to be depended upon of the class of hired labour. Where employed they have barracks wherein they are locked up at night. They receive rations of food, and are attended to in sickness, and are worked under the whip. Their babies and young children (now no longer "property" but free born), are put into *crèches*, mostly *al fresco*, and the aged and used up, *die*. The slave population are fast diminishing. No fresh importation has been permitted for many years, while laws providing for emancipation have been for long in operation, such as that children shall be held to be born free. Hence there are a large increasing number of young people, children of slaves, whose parents are still under bondage with all the contingencies of such a condition, and it is contrary to nature that such a state of things could continue long. Another element of labour presents itself in the free Europeans who have been imported as *navvies* for forming the extensive railways, who are now getting out of that work, and seeking employment, and they are open to contracting for minor jobs, such as roadmaking, fencing, ditching &c., but are not the class for coffee cultivation, or for settlement to steady periodic employment. They gravitate to the towns, and finally disappear.

Of recent years, the Brazilians, and their Government have foreseen what was inevitable in the future, and have been in throes for some remedy. With the results of West Indian Slave Emancipation before them, knowing that the liberated African slave will not, when freed, work for hire, but will squat, they have been casting about for a supply of labor, thinking of Hindustan and Chinese coolies. But apart from the expense and difficulties attending their being supplied from these countries, they are met by an insuperable objection, on the part of the general Brazilian people, to the importation into the empire of more blacks, and more especially of the yellow Mongolian Chinese. On the score, therefore, of labor to depend upon for the maintenance of the coffee culture, Brazil appears to be in extremity to such an extent as to render it certain that, before many years, its labor supply must collapse by the operation of inevitable causes, and the crisis will probably be precipitated by forces already operating, and the climax be calamitous—decrease of exports of the grand staple. This would be a calamity indeed to such a country, the revenues of which is to so large an extent dependent on coffee, on the export of which alone there is a direct duty of thirteen per cent. Already overtaxed, and coffee handicapped, with the enormous railway and other debts to meet—there is not only no margin for imports, but the prospect of railway revenue diminishing—Brazil can in no way look forward with hope. Cuba, having last year reduced her slavery to a system of apprenticeship, after oceans of bloodshed and vast waste of treasure; and America free of the foul blot upon humanity at a terrific cost, after a war of giants—and England let off with a fine of twenty millions and the forfeiture of her valuable West India possessions, now, alas, in ruin; is it possible or probable that Brazil can avert the catastrophe or prolong its advent? We may look any day for fearful intelligence from that Empire.

The system of cultivation of coffee in Brazil was something as follows. Over the ridge behind Rio Janeiro runs the valley of Parahiba, presenting an aspect of steep ridges clad in primitive forest, which fell by successive onraids after the collapse of West India coffee had raised the price. Cultivation was after the fashion we call "native" in Ceylon. Indeed, there has never been what we call "cultivation," pruning or manuring being deemed Quixotic. The trees are planted twelve feet apart, allowed to grow anyhow, with any number of stems, the intervening space being occupied by maise, manioc, bananas, yams, arrowroot, &c. Crops were (and still are) shaken off the trees when ripe, and the husks swept up and dried anyhow. Croptime falls there in the dry season. This enterprize succeeded; abundance of the most suitable land; labour found by drafting slaves from the north, and everybody anyhow going at it. Extension overflowed to the south, to the districts, inland from the seaport of Santos, and away up into the province of São Paulo. It is here where the richest of young coffee life is in vigor, much of the Parahiba and Rio having worn out, and been washed out, and played out, (as alas is much of our old Ceylon!) though still largely swelling the exports of Rio. São Paulo is mainly a tableland, an undulating expanse of prairie and wooded ridges, two

thousand feet above the sea-level, about the latitude of the tropic of Capricorn; and frost is not uncommon in the hollows during some periods of the year. But coffee thrives on the slopes, bearing abundantly, some ten cwt. per acre, and all good plants *luxuriate*; mankind alone being absent, excepting a few small tribes of roaming savages, all the way across the dip of Rio Plata and other great rivers, to the roots of the Andes, some two thousand miles.

Labor from first to last ever being the chief factor affecting all operations in Brazil, and the enormous distances having to be dealt with, Government pledged its then hopeful credit in contracting great loans to construct railways, to bring the imports and exports to meet, and to foster its great enterprize, setting free for employment in extension large bodies of men hitherto employed in transport service. There was no lack of the needful capital. Brazil thus extended fabulously its investments in reproductive industry, producing enormous exports of coffee, and leading to further loans for railway extension, with the inevitable interest to be met. The United States, when Brazil was exporting a million cwt. took about half: now that the exports are about seven millions she takes the half. But for this where had we been as coffee-growers in Ceylon? However, Mr. Blacklaw is of opinion that, were coffee growing reduced in Brazil to the bare question of so much cash down for cost of production, as is the case with us in Ceylon, Brazil coffee could not be shipped for fifty shillings per cwt. Hence the plain English of it is that she is already entrenching on her capital for current expenditure. Her slaves, valuing the able-bodied at two hundred pounds, do not return interest on that valuation by proceeds of their labor, and how many years' purchase are they worth in the face of probabilities? America opens a wide gullet for coffee. How is it to be filled when Brazilian exports diminish, not to say collapse?

R. B. TYTLER,
Aberdeen.

December 1881.

THE EXPERIMENTS IN CHECKING COFFEE LEAF-DISEASE IN THE DUMBARA VALLEY.

Gangapitiya estate was again visited on Saturday last by Mr. Schrottky, accompanied by the same gentlemen who took part in the last inspection. The following facts were established at this visit:—

Regarding the bulk of the estate, no falling-off in the general appearance, such as luxuriance of foliage and vigour of trees, is observable. There is considerably more disease about than there was at the previous visit, and, in parts of the estate, it is bad, especially in patches in the ten acres which were not treated during October and November. Ordinarily speaking, one would say that the estate was on the eve of an attack; but this loses greatly in significance, when it is borne in mind that more than a month ago the resident manager reported to that effect. There was at least a fortnight of showery weather since his report, and the attack is still found undeveloped in by far the greatest part of the estate. New wood is being rapidly made, and there is no fall of leaf perceptible, past or present. The ten-acre field near the river, to the leeward of a native estate, where the disease shewed up considerably towards the end of the south-west monsoon, and which was specially treated in November last, has much improved and looks very well now. Most fields of coffee in adjoining estates that were still looking luxuriant early in December are now looking bare, having dropped most of the leaves. The only clearing that can now be at all compared to Gangapitiya in general appearance is one of about 20 acres (adjoining) from which shade had been removed about 7 months ago, and which of course has greatly benefited thereby in every way. Broadly speaking, Gangapitiya is now by far the best looking estate of any that were seen on the way to it.

THE COFFEE EXPOSITION.

The *Rio News* gives the following account of the great coffee exhibition for which Brazil has been so long preparing:—

The first national coffee exposition in Brazil was opened on the 14th instant in the rooms of the Typographia National, in the presence of their majesties, the Emperor and Empress, and of the ministers of state, diplomatic corps, and a large number of prominent individuals. The interest manifested in this novel undertaking was very general, and contributed very largely not only to the brilliant opening but in greater measure to the large and interesting display of samples.

Of the exhibition itself very little can be said. It comprises about 1,200 samples of Brazilian coffee, and a few samples of foreign coffees obtained through the efforts of Messrs. Berla Cotrim and Co. There is also an exhibit of coffee in its various stage of preparation, from the cherry to the best selected, product, and an exhibit of the plans of the various machines employed in its preparation. The pleasant rooms of the national printing-office also contribute largely to the good effect of the exhibition. Since the opening day, the exhibition has been visited by large numbers of people.

Of the character of the exhibition, outside of those features which may interest and please the casual visitor, there is now no need of comment. The exhibits, as far as they go, are very creditable and show a product of which this or any country may well be proud; but they do not go far enough. The samples are almost wholly of the higher grades, and do not therefore give a stranger a correct idea of the total and average product. One is impressed also with a fear that the samples have been so carefully selected that tney will not represent the corresponding qualities when placed upon the market. Certainly no country can show a finer selection of samples then are here exhibited, out in a practica sense that is not enough. We want to know the average product, the quantity per a given area of ground, the costs of production, the the quality of soil, and the costs of transportation. These are economic factors of very great value, and would be invaluable to every Brazilian planter. They would make this enterprize something more than a mere exhibition.

Of the foreign exhibits there is very little that can be said. They are interesting, because we can look at them and smell them; but for purposes of comparison they are worthless. They have no other label than the name and country; of their grades and market values we know nothing. It is to be regretted that these necessary facts were overlooked, because it prevents a fair comparison between them and their corresponding grades of the Brazilian product. We sincerely hope, however, that these defects in the present exhibition will lead to a very great improvement in the next.

We are naturally reminded of the desirability of having in our local Public Museum specimens of Brazil, Java, India, Guatemala and other coffees which we residents in Ceylon and also visitors might be able to compare with the coffees we produce. So with teas, cinchona barks, &c. We may admit the necessity as the general rule that only articles, the products or manufactures of Ceylon should be admitted while space is limited. But exceptions should

certainly be made such as has been already admitted in the case of the pearl oyster. We should have the opportunity of comparing the coffees, teas, &c., of other countries with our own, and specimens of South African elephants, with their enormous ears, should be placed side by side with those of Ceylon. There is, as yet, plenty of room, and when more is needed it can be supplied to what ought to be a great instrument of education as well as an aid to enterprise and commerce. If, however, the Cinnamon Gardens Museum must be reserved as at present for local products and art specimens, then it will become the duty of Government and the general public to give all the support in their power to the De Soysa Economic Museum at the Medical College, which, under the energetic management of Dr. Vanderstraaten, is likely to develop into a most useful public institution.

CINCHONA AND TEA.

CEYLON QUININE MANUFACTORY—AN INDIAN AUTHORITY ON CEYLON TEA.

ABERDEEN, 29th Dec. 1881.

Howard boycotted! A friend who is a druggist told me: "On ordering quinine of a traveller the other day, I said: 'Howard's of course,' when he said: "Would you not take another maker's, that is equally as good and a few pence cheaper?" The fact is, several of the wholesale houses are boycotting Howard for keeping up the price of quinine." This points to what I daresay all cinchona planters are prepared for, namely a fall in prices of barks. When Howard reduces price, other makers will have to reduce further, as their hope of sale, meantime, lies in the inducement of cheapness. *A propos* of the subject of manufacturing quinine in Ceylon, I think planters are not sufficiently alive to the profits and savings an efficient establishment would be sure to effect. For many years the Aberdeen butchers played into the hands of dealers in Ades, by supplying hides &c. at whatever prices the dealers chose to give, till, exasperated at the poor returns, they co-operated in the establishment of a local market, called the Aberdeen Hide, Skin and Tallow Market Company Limited; the trade taking up the shares kept the management within themselves. The results have been good beyond anticipation, for, besides securing the highest prices for their "produce," there remains an annual dividend of about 30 per cent. to the shareholders for their invested capital. Could it not be possible to work a laboratory in Ceylon on the principle of our Scotch meal mills, where every farmer's grain is kept separate and milled by itself, the proceeds in meal, sids and dust being handed over to the owner, who pays a small charge for milling? The planter to be debited with price of "milling" according to weight of bark, and credited with weight of alkaloids yielded by his consignments. Cash, leaving margin for contingencies, to be paid to account, and, at yearly balance, the profits to be divided between shareholders and patrons, the former receiving a fair interest and the latter "supplementary account sales" on the quantities of alkaloid credited to them during the year. Although Howard leads the market, the prestige of his name will wear off as the purity (easily tested) of other makes comes to be recognized. Ceylon-made quinine has nothing to fear, and, be prices what they may in England, Ceylon will always find it more profitable to undersell the English chemists than ship barks to them. I am aware arrangements are in hand for making quinine in Ceylon, but I understand they are for a private concern, that will not be at the service of any one having bark to realize.

A gentleman resident in Aberdeen got from me two samples of Ceylon tea, which, along with other two samples, he sent to his son-in-law Mr. Jackson, late manager Scottish Assam Company, now engaged in tea cultivation (under the fostering care of the United States Government) in Georgia, America. His report on the four samples is interesting to your readers. It is:—"I have carefully watered all the four samples of tea you sent me, against teas sold in America and also my own. Kandaloya is a very fine tea, of good strength and in point of flavour is superior to all the others. Nago Dhoolee and Humwal are decidedly the strongest, but lack the rich aroma of the Kandaloya. Windsor Forest is a very pleasant tea, but in my opinion inferior both in strength and flavour to Kandaloya, although Mrs. Jackson rather prefers the flavour. Both Kandaloya and Windsor Forest are superior in every way to teas sold in Charleston and Savannah at 4s. per lb. I abstain from any comment on my own tea, until Mr. W. expresses his opinion of the sample I send you by this mail. It must be judged strictly by the liquor. It is not tea dust or fannings, but the best of leaves made by a new process, looking to the development of strength, and is not intended for sale in the present form. Both his Ceylon teas are superior to my ordinary black, but I can get high prices for my green tea here. I send a sample of a new kind of green for yourselves. I make it at less than the cost of ordinary Tea; try it and report." As the samples sent here had got damaged in transit, it would be unfair to express any opinion on them. I learn, however, of samples of green tea he sent some time ago for the opinion of a skilled tea merchant here, who reported their being good" but "quite unsuitable for the Scotch trade."

"FROM THE HILLS OF CEYLON."

THE GRAFTING OF CINCHONA LEDGERIANAS.

Lindula, 24th January 1882.

Since the 20th the maximum temperature went steadily up from 66° to 74° on the 23rd. The minimum, on the other hand, went down from 56° to 54° on the 22nd, rising to 55° on the 23rd. The cold during the night of the 22nd presaged the rain which fell so continuously and copiously yesterday (after two rainless days), and the record of which this morning is 1·07 inch. The rain scarcely marred the interest of a visit to Mattakelly, Waltrim and Conon, with reference to the growth and experiments in the grafting fo Ledgerianas, of which I hope to be able to say something, in connection with notices of similar experiments in Java. I deem it fortunate for Ceylon that the experiments referred to should be taken up by members of the planting community so intelligently observant, practically experienced, energetic and persevering as Messrs. W. Smith and J. A. Campbell. I ought not to omit mention of Mr. Campbell's partner, Mr. Fairlie, who during a visit to Java made himself thoroughly acquainted with the botanical peculiarities of the best forms of *Calisaya Ledgeriana*, and who, I am told, has used his artistic talents in the preparation of a unique collection of the large number of species and varieties of cinchonas, coloured after nature. It is hoped that the public will ultimately get the benefit of Mr. Fairlie's efforts to depict plants so exceedingly varied in type, but in all cases beautiful: whether in form and colour of leaf, or in shape, tint and exquisite fragrance of flowers. The rain moderated yesterday, as evening advanced, but was succeeded by a fierce storm of wind, the howling and "soughing" of which during the whole of last night was anything but superinducive of sleep. The records of temperature for the past twenty-four hours are: maximum 68°, minimum 57°, and this morning shews a combination of drizzle and sunshine. As a result there was a magnificent rainbow at half-past 9, which we all turned out to admire. The sun was so high in the horizon and our position with reference to the

Nanuoya valley so elevated, that the rainbow seemed to be lying horizontally over the valley. One limb seemed to touch Langdale bungalow, while the other rested on the base of Great Western, and the centre of the arch was in Gongala Gap. The width of the bow seemed equal to many times that of the ordinary phenomenon, when produced by a sun just on the horizon, and the prismatic colours glorified the scenery of mountain, river, valley and cultured fields beheld through their medium. The rain will be beneficial in many respects. Amongst the rest it will fill out and ripen the "palam" which still hangs on the coffee bushes, while warm sun following it will probably develop into blossom the buds which are now so plentifully "in spike." It is only rain too heavy and too long continued which would now do harm.

THE MADRAS GOVERNMENT'S CINCHONA ENTERPRIZE.

The result of communications which have passed between the local and the Madras Chambers of Commerce is likely to alter the prevalent opinion in reference to the Government of India continuing to hold their Nilgiris plantations. We suspect few of our readers will have been prepared for the smallness of the figures representing the total shipments of bark from Madras to London from the commencement of the cinchona enterprize to the end of 1881. The table begins with a shipment of 21 bales weighing 3,188½ lb. in 1871, and closes with seven consignments during last year amuonting to 340,000 lb., while the aggregate of the exports for the ten years is no more than 976,103 lb., or less than half the present annual export from Ceylon. An annual export of from three to four hundred thousand pounds of bark from Madras cannot be of much significance, considering that it is not the intention of the Government to increase the area under cultivation in their plantations. Still it would be much better for the private planter if the bark were locally utilized for the manufacture of sulphate of quinine and other alkaloids, as at Sikhim. When we recall the very valuable scientific and practical information obtained through the operation of the Government enterprise on the Nilgiris, and the great room there still is, under the intelligent management of Mr. Rowson and his colleagues and superiors, for further experiment and the settlement of many moot points, we quite agree with Mr. Grant-Duff, that the period when the Government should transfer their few thousands of acres into private hands should be carefully considered. But that is no reason why the natural complement of the present cultivation in the establishment of a local manufactory should not be forced on Governor Grant-Duff's attention. There is room for a vastly increased consumption of cinchona alkaloids among the millions of Southern India, and with a manufactory on the spot, the Government would undoubtedly be much more liberal in the distribution of the product. Let the practice of liberal distribution to dispensaries and a taste for the febrifuge once be established in India and China, and we have no doubt of a rapidly progressive consumption which would specially benefit the producers of bark.

We annex the return received by the local Chamber through the Madras Chamber of Commerce.

Statement showing the quantity of bark shipped for the London Market from the beginning of the Cinchona Enterprise.

Date of Government Orders.	No. of Bales.	Quantity: lb.
4th August 1871, No. 1,339 ..	21	3,188½
7th March 1872, ,, 404 ..	12	4,106
5th September 1873, ,, 952 ..	139	23,646
24th March 1875, ,, 480 ..	278	28,659½
21st March 1876, ,, 399 ..	636	63,600
9th February 1877, ,, 580 ..	261	26,100
27th ,, ,, ,, 844 ..	358	35,800
	265	26,480
11th June 1877, ,, 1,941 ..	135	13,500
21st January 1878, ,, 98 ..	577	59,658
21st February 1878, ,, 276 ..	165	16,260½
18th March 1878, ,, 413 ..	582	57,033
23rd December 1878, ,, 2,060 ..	304	31,875
16th January 1879, ,, 112 ..	215	21,500
28th February 1879, ,, 506 ..	486	50,596
19th September 1879, ,, 1,902 ..	440	44,313
17th January 1880, ,, 66 ..	728	73,424
10th March 1880, ,, 309 ..	536	54,190
7th April 1880, ,, 422 ..	16	1,612
26th January 1881, ,, 185 ..	1,465	152,044
8th March 1881, ,, 416 ..	305	31,337
16th May 1881, ,, 771 ..	488	51,355
15th July 1881, ,, 1,079 ..	56	5,697
Despatched recently (in 3 consignments)..	960	100,134
Total..	9,428	976,108½

(Signed) R. S. JAGO, Lieut-Col.
Dy. Conservator of Forests in charge.
Ootacamund, 24th November 1881.

NEW PRODUCTS.

To Mr. A. Scott Blacklaw will belong the credit of sending the first supply of seed to Ceylon of the latest "New Product," the "Carnauba or Wax-palm of Brazil." Messrs. Auwardt & Co. of Colombo have got the seed for sale. Of this tree we read in "Maunder's Treasury":—

COPERNICIA. A genus of palms named in honour of the celebrated Copernicus. It comprizes six species, inhabiting tropical America, but three of them are almost unknown. They grow twenty, thirty, rarely forty feet high, their trunks being covered by the remains of leaf-stalks, and surmounted by tufts of fan-shaped leaves, from amongst which the branching spikes of small greenish flowers are produced, each spike having several sheathing bracts scattered along its stalk. The flowers are either perfect or imperfect, and have a cup-shaped calyx with three small teeth, a bell-shaped corolla with the upper part cut into three divisions six stamens fixed to the inside of the corolla, and three ovaries more or less cohering together. The fruit is yellowish, of an elliptical form, and contains a single seed.

The Carnauba or Wax-Palm of Brazil, *C. cerifera*, grows about forty feet high, and has a trunk six or eight inches thick, composed of very hard wood, which is commonly employed in Brazil for building and other purposes, and is sometimes sent to this country and used for veneering. The upper part of the young stems, however, is soft, and yields a kind of sago; and the bitter fruits are eaten by the Indians. The young leaves are coated with wax, called carnauba wax, which is detached by shaking them, and then melted and run into cakes. It is harder than bees' wax, and has been used by Price & Co. for making candles, but as no process of bleaching has been discovered, they retain the lemon-coloured tint of the raw wax. The leaves are also used for thatching, making hats, &c., and, while young, as fodder for horses. [A. S.]

Mr. Blacklaw writes :—

"Carnauba (Copernicia cerifera) :—This tree I saw, growing all over Ceará ; on some places where nothing was seen in the soil, but sand and stones, and also in swampy places with roots and part of the stem under water.

"WAX is obtained by scratching the stem of the leaf hanging a cup under the scratched part, and without any preparation it is moulded into candles. The country people have nothing else and I saw no other candles used for lighting bedrooms in the hotels. The leaves yield a fibre from which hats, mats, and even clothing are made. The fruit is said to be delicious. The timber is good for cabinet and building purposes; and medicine is procured from the roots used for the cure of some skin diseases."

Mr. Blacklaw has sent us a specimen of the candles made from the wax which we shall be glad to shew to any one interested.

THE COFFEE MARKET.

The depressed state of the market for our staple, and the alarming quotations of prices not much more than half those which ruled a few years ago, may be traced entirely, we think, to the action of Brazil in having, within the past few years, concentrated most of her available slave labor on the growth of this product, over the vast areas of rich soil available. Patry & Pasteur report an excess of 11,000 tons in December at the chief European ports, while, if we turn to the two leading ports in Brazil, we find that on Jan. 2nd the stocks in Rio were 230,000 bags against 196,000 at the corresponding period of 1881, and at Santos the enormous quantity of 200,000 bags against only 126,000. An this notwithstanding the very large exports during 1881. From Rio alone the export in ten months had been no less than 236,000 tons or 4,720,000 cwt. At this rate the total exports from Rio in 1881 must have exceeded five millions of cwt., and Santos &c. will not be far short of two millions more! A few years ago the settled average export from all Brazil was only 200,000 tons or four millions of cwt.

Mr. Scott Blacklaw writing on 4th Jan. states :—

"The latest news I have from Brazil is dated 5th December. Coffee was falling, showing—

Superior United States	55s 4d	per cwt.
Good	47s 7d	,,
Fair to good ...	45s 4d	,,
Fair	44s 4d	,,
Good Channel ...	41s	,,
Stocks in Rio de Janeiro	340,000	bags.
do Santos	150,000	,,

(17 Brazilian bags = 20 cwt.)

"Rio total exports for 11 months 3,846,449 bags. I have not got Santos, but think it is 1,000,000 bags at least.* For month ending 30th Nov. Rio alone shipped 412,054 bags, of which 190,924 bags were for Europe."

Wilson, Smithett & Co. quote Fair Rio at New York at 10½ cents against 13½ last year and good ordinary Java at Amsterdam 34½ cents aganist 38½. There is one gleam of comfort in their report :—

The French consumption shews an increase for the first eleven months of the year of nearly 13 per cent., the figures being 57,910 tons against 51,300 tons in 1880, and 51,575 tons in 1879.

Messrs, Kern, Hayn & Co., writing on 1st Dec., state that at Rio alone the daily receipts of coffee rose from 10,850 bags in July to 18,500 in Sept. 1881. As 17 bags make up a ton, here were more than 1,000 tons or 20,000 cwt. of coffee *per diem* poured into Rio. But what will more deeply impress our readers in this way of putting it :—in the one month of Sept. the coffee which came from the interior to Rio, 554,600 bags, was equal to our estimate of the total crop of Ceylon for season 1881-82 ! * The Rio brokers add :—

Not only according to our opinion but also according to that of many of our neighbours, there exists coffee *enough* in the interior to enable an export of 4¼ to 4½ millions of bags during the crop-year, 1st July 1881 to 30th June 1882.

All what we can say as yet, regarding the next crop is, that the prospects are not unfavorable but that it very much depends upon the weather during the coming six weeks, whether today's prospects will be realized or eventually become better or worse.

* Considerably more.—ED.

THE COMMERCE OF MADRAS.

The Madras Price Current of January 24th contains some figures representing the trade in certain staples during the calendar year 1881. We observe that the import of grey and white shirtings, which had gone down to 20⅓ millions of yards in 1877, had steadily risen to 45,873,000 last year. Mule and coloured yarns seem to fluctuate a good deal. The aggregate in 1877 exceeded nine millions of pounds ; in 1880 it rose to over 13 millions, and last year the figures were :—

Mule yarns	... 5,820,000 lb.
Coloured ,, ...	... 4,783,000 ,,
Total	...10,603,000 lb.

In the period between 1871 and 1881, Madras seems to have lost much of the export of cotton, for the figures went down from 319,000 cwt. to 115,000. So with coffee, which had gone down from 79,000 cwt. to 25 626. Sugar has fluctuated exceedingly, from 82,000 cwt. in 1872 down to 1,175 in 1878 ; last year shewing a recovery to 35,559. Indigo has been somewhat steadier, ranging between 46,757 cwt. in 1871 and 35,000 in 1881. The process has been much the same with "red wood," which began with an export of over 60,000 cwt. and ended with 34,541 last year against 66,000 in 1880. Of "Madras Handkerchiefs," 1,726 *corges* were exported 1871, rising to nearly 5,000 in 1877 and ending with 2,800. The trade in sheep and goat skins has expanded largely,

* We asked a local firm, which we deemed likely to have received the figures by telegram, and they courteously responded. They state truly that the Brazil season runs from 1st July to 31st December, and they give the figures for the last half of 1881 as follows :—

Rio to Europe	56,500	tons	
,, ,, U. States	77,700	,,	
			134,200 tons
Santos to Europe	38,400	,,	
,, ,, U. States	6,500	,,	
			44,900 ,,
			179,100 ,,

equivalent to 3,582,000 cwt. As the exports were excessive during this latter part of the year, we do not ask our readers exactly to double the figures, but let us double 2,500,000 cwt. for Rio and we get 5,000,000 : while 800,000 doubled for Santos will give 1,600,000 : total, 6,600,000 cwt. Ceara and other ports in Brazil will probably make up the round 7 millions.

from 345,000 corges (?) [there is "do." below the corges applied to hkfs.,] to 564,000. Finally, hides began at 7,300, corges and ended with 44,000, having been up to 101,000 in 1877. There is an "abstract of export manifests," from which it would appear that only 18 boxes of cinchona bark were exported from the port of Madras in 1881.

Figures for the exports of cotton are given for the three ports of Madras, Tuticorin and Cocanada, "to foreign and non-subordinate ports;" meaning no doubt exports proper as contradistinguished from "exports coastwise." The figures for 1872 were 615,584 cwt., rising to 696,000 in 1874: going down to 101,000 in 1877, reaching 312,000 in 1880 and 332,643 for only 11 months of 1881.

The coffee exported from the port of Madras seems to be all from Mysore. Of buffalo horns, the number exported was 308,000; of turmeric 8,767 cwt.; and of myrobalaas only 552 cwt. They are largely used at the local tanneries.

THE TEA MARKET.

We are in receipt of Messrs. Stenning, Inskip & Co.'s Indian Tea Market Review for 1881, and we are thus able to see the great advance of Indian tea, not so much in annual import latterly as in relative (as regards China kinds) and absolute consumption. Since 1876, the imports and deliveries compare as follows:—

YEARS.	IMPORTS *lb.*	DELIVERIES *lb.*
1876 ...	...29,384,000 ...	...26,735,000
1877 ...	...31,784,000 ...	...28,013,000
1878 ...	...36,007,000 ..	...36,766,000
1879 ...	...38,483,000 ...	...35,243,000
1880 ...	...45,011,000 ...	...43,807,000
1881 ...	...45,765,000 ...	...48,863,000

It will be observed that, while exports have risen from 29⅛ millions of lb. to 45¾, consumption in the six years has advanced from 26¾ millions to nearly 49. Last year, indeed, the deliveries exceeded the imports by considerably over 3 millions of lb. Indian tea has commenced a process which will revolutionize the trade, so long confined to the produce of "far Cathay." The lessened deliveries of China tea and the increased deliveries of Indian for the past three years have been:—

YEARS.	CHINA TEA *lb.*	INDIAN TEA *lb.*
1879 ...	... 125,576,000 ...	... 35,243,000
1880 ...	... 113,919,000 ...	... 43,807,000
1881 ...	... 113,471,000 ...	... 48,863,000

The effect of this process has at length been felt in China, whence the exports have decreased by 16 millions of pounds. There is evidently a grand future for Indian tea and, we feel sure, for Ceylon tea also, on which the report is:—"Ceylon imports shew some improvement, more attention being evidently given to the manufacture than hitherto." Our readers will not forget that, side by side with increased consumption of Indian teas in Britain, new markets for those teas are being opened up in America as well as in the great tea-drinking country of Australia. We see it stated that in the London market:—

The sale of all China fancy Teas has again been greatly interfered with by the increasing demand for Indian Teas

No wonder though exports from China should be checked when low quality (very low, we should think) black leaf had fallen to 5d, and ordinary red leaf to 5½d per lb.; less in each case than the rate of duty. Meantime the history of Indian tea, in the report before us, is:—

Prices as compared with this period of 1880 are higher for common, slightly higher for medium, whilst for fine and finest they are considerably lower.

The low average price that prevailed so long in 1880 and during a great portion of 1881 although disappointing to the grower and importer has had the satisfactory result of largely extending the consumption, the increase of 5,000,000 lb. for the past year is very remarkable following as it does on the large advance of 1880 on 1879 of 6,364,000 lb.

Assam Teas of 1881-82 season are of fair quality but not quite so good as some of the earlier arrivals led us to expect, still there is a marked improvement on the outturn of 1880-81.

Cachar and Sylhet Teas with few exceptions are not up to the standard of quality so frequently attained last season.

Darjeelings were never so fine throughout a season as in the present one, a most fortunate circumstance as the demand for this district's produce seems rapidly increasing, the good prices obtained will no doubt stimulate growers, now that they clearly see the requirements of the home trade, to continue the production of similar styles; the liquors that are most sought after are those possessing dark, clear colour with fine flavour, not those of lightish colour with some pungency. Teas generally that give this latter liquor are not now so much in request.

Dooars Teas are rapidly coming into favour, they often possess a nice brisk smell and taste especially in the earlier pickings.

Chittagong Teas have again been rather inferior, it is to be hoped that more attention will be devoted to manufacture in future so they may regain the good name they had a few years ago.

Kangra Valley Teas besides not being so good as usual have somewhat suffered by the competition of Darjeeling Teas.

Chota Nagpore leaves much to be desired in the Teas produced this season, there has been a decided want of quality in the liquors.

Neilgherry growths have sold pretty well; there seems a good future for this district if useful Teas can be produced.

After the notice of Ceylon, which we have quoted, comes:—

Java.—The low prices of 1880 have had the effect of much reducing supplies to this market, the quality has also been inferior. The consumption shews a falling off of one-half.

We next quote information and advice which will be useful to Ceylon tea growers and manufacturers as well as to their Indian brethren:—

With regard to manufacture for the next season, it cannot be too strongly urged upon producers that it will be a ruinous mistake to resort to coarser plucking in consequence of the high range of values paid here during the past few months for common makes, the prices realized were due in a very great measure to good quality resulting from fine plucking and not so much to scarcity; if coarse plucking be resorted to, large quantities of poor liquoring tea will result, which will soon become as unsaleable and low in price as China teas now are; besides, the experience of low prices ruling in 1880 and the first half of 1881 when the proportion of common kinds with poor liquors was large, confirms us in the opinion that coarse plucking will be disastrous, for if bad prices were made when the export was only about 45,000,000, what values can be expected with an export of 55,000,000 lb. as that of 1882-83 will probably be? * and with such a supply it is difficult to foresee to what a low average price Indian will sink should the very serious mistake be made of sacrificing quality for quantity.

* Surely this is an excessive estimate. In any case, a good deal of the crop will be diverted from the London Market.—ED.

Whilst advocating the imperative necessity of not plucking coarsely, planters must take care not to rush into the opposite extreme and make too large a proportion of fine or high priced grades, as is the case in the present season we strongly recommend moderately fine plucking throughout.

It will be as well to bear in mind that the largest consumption of tea is of kinds under 1s 4d. per lb., the next largest is from that price up to 2s. whilst from 2s to 2s 6d. there is a good quantity taken, but over 2s 6d. the proportion that can be used throughout the year is small lately the common classes under 1s 4d. and the fine from 1s 9d. to 2s 2d. have been in most request, medium, of late years, especailly whole leaf, have not been in favour as the liquors are hardly better than those of the leaf of the next lower grades, the difference in appearance counting for so little: judging from these circumstances it seems to us that it would be advisable to some extent to break up medium leaf, carefully avoiding dust. Such broken sorts have sold much better than whole leaf at same range as the liquors being stronger and darker are more useful for mixing purposes.

SMALL PACKAGES.—Tea in Half-Chests fetches only the same price as when packed in Chests; eight Half-Chests constitute a sampling break.

Boxes of about 20 lb. nett are not in favour, except occasionally at the commencement of the season, and then only in the case of really fine Tea. Twenty Boxes constitute a sampling break, and the weight of each package should not in the least exceed 28 lb. gross, otherwise a heavy loss on account of draft (1 lb. per package) will be incurred.

BULKING.—We reprint the following remarks on this subject which appeared in our fortnightly circular, 20th Oct., 1881: "Bulking in India:—Some garden Invoices recently offered have contained different bulkings of Tea of very similar quality so 100 chests *all of much the same value* being represented by three distinct factory bulkings, much objection has in consequence been raised by buyers who complain that this system causes them an altogether unnecessary amount of tasting and consequent loss of time. The reason of this division of grades of very similar quality is no doubt absence of available space for larger bulkings, and, much as we regret to discourage the prctice of bulking in India, where it can be thoroughly carried out, it seems to us that unless larger breaks can be obtained it may be advisable to revert to quick packing and leave the bulking to be done here, the teas can then be offered in suitable lots.

"From the foregoing remarks it will be evident that the practice of splitting up breaks in Calcutta which has been so often condemned from this side should at once be discontinued."

The time is now rapidly approaching when Ceylon tea, instead of entering the London market in such small breaks as to be the object not only of neglect but of derision to conservative brokers and prejudiced dealers, will be exported in quantity. Let us see to it that quality is such as will command success.

We have just heard that Messrs. W. & J. Thompson & Co. report of a consignment of Lool Condera tea, "We never saw better from Assam."

"CINCHONA ROBUSTA": DR. TRIMEN'S OPINION OF ITS PROBABLE HYBRID ORIGIN CONFIRMED AT KEW.

On the 26th November last, we published a letter from Dr. Trimen, Director of the Royal Botanical Gardens, Peradeniya, emphatically disavowing the conviction mistakenly attributed to him by Col. Beddome, that the robust and fast growing CINCHONA, "*pubescens*," of the Nilgiris and Ceylon, was a perfectly distinct species. Without dogmatizing, Dr. Trimen was rather inclined to follow the late Mr. McIvor, and the vast majority of cinchona planters in South India and Ceylon, in regarding the plant as a hybrid. Dr. Trimen also expressed regret that Colonel Beddome should have followed Mr. Cross (who has displayed considerably more self-assertion and dogmatism than his position and qualifications seems to justify) in adopting for the plant the "mere bark collector's name of *Pàtà de Gallinazo*." However specimens sent to the English herbaria might decide the question. Dr. Trimen recommended the retention of the descriptive name *robusta*. At Dr. Trimen's request, we reprint his former letter, and it will be found below, preceding a further letter which reached us today and in which Dr Trimen shews that an examination by the authorities at Kew, who are possessed of the best possible materials for comparison, has resulted in the conclusions that the Nilgiri so-called "*magnifolia*" and "*pubescens*" are one and the same, whether growing in India or Ceyion; that the old view (that of poor McIvor and of most of us) of its being a hybrid of local (that is Indian) origin, between *C. succirubra* and *C. officinalis*, is, in all probability, correct. It consequently follows that Mr. Cross has the merit of discovering a mare's nest and causing Col. Beddome to believe that his mare's nest in Spanish, meant *Pàtà de Gallina zo*.

We are now safe in regarding the robust cinchona as a hybrid, and the practical lesson is that other planters should do what we saw Mr. Campbell of Conon doing recently, propagating a hybrid, the bark of which had given a good analysis by grafting on to succirubra stocks, just as he was doing with *Ledgerianas*. Propagation by seed is, no doubt, the speedier and cheaper method, but, if it is adopted, great care must be exercised in choosing from the nursery plants only of the best types.

What is the experience of planters who have paid attention to the subject of the perpetuation in its progeny of its own distinctive characteristics, by *Cinchona robusta*. which ought now to be the name of the new and favourite plant, in preference to *pubescens* or even the grander synonym of "*magnifolia*"?

THE ROBUST CINCHONA OF CEYLON.

Royal Botanical Gardens, Peradeniya, 25th Nov. 1881

SIR,—I have read with much interest, in your columns, Col. Beddome's account of his short visit to Ceylon, and his impressions of cinchona cultivation as carried on here. Taken in connection with his previous able report on the Nilgiri plantations, we possess his "views" in a very clear and definite form.

I purpose to make at once a few observations upon the robust and quick-growing cinchona of Ceylon and Southern India, with which it seems likely Col. Beddome's name will henceforth be connected, since he considers it in all respects *the* kind to cultivate. And first, I wish most distinctly to disavow the conviction attributed to me in this report, that I am "fully convinced that it is a perfectly distinct species." Such is far from being the fact, and I am at a loss to understand how my friend the Colonel could have deduced such a view on my part from our frequent discussions on the subject. Ever since I have known the plant, I have avoided any dogmatism as to its origin. In Mr. Owen's little "Manual"

I say of the smooth-leaved form that it "may be another variety [of officinalis] or not improbably a permanent hybrid of officinalis with succirubra," and of the pubescent form that it "approaches C. succirubra" (pp. 23-24). It *may* turn out a distinct species, but I think that data are wanting still to settle the question, and that Col. Beddome's report does not supply them. In our view of the plant being a "hybrid," we, in Ceylon, have, of course, followed McIvor, who, on many occasions since 1872, had stated such to be the case. Col. Beddome throws over the late superintendent without hesitation as untrustworthy, and pins his faith to the recollections of Mr. Cross. Apart from the latter's story of the collection of the plants (which will be found in a letter printed at p. 32 of Col. Beddome's report*), the only direct evidence against McIvor's view brought forward is that trees are found "in the oldest plantations [1862] at Nedivatam;" but it appears that this is not Col. Beddome's own observation. The earliest plantation in which he has seen trees of the kind is one of the 1865 planting, and no satisfactory evidence is given that the plants here were not supplies. The acknowledged fact that sowings of the seed always show a proportion of succirubra and officinalis in the progeny is readily disposed of by the observation that it is "of course" due to careless gathering. Careful experiment alone can decide this point—in a practical planter's view, the most important one of all: it will not be settled by dogmatic statements one way or the other. As regards the characters of the plants, they are in all respects intermediate between officinalis and succirubra, and in every point and degree in which a given specimen differs from one of these species it approaches the other. The intermediate character is also carried out on the whole in the proportions of the alkaloids in the bark, variable and uncertain as is the analysis of these trees.

No doubt Col. Beddome may prove to be perfectly right in his opinion as to the autonomy of this cinchona: I merely wish to point out that in my opinion the evidence he brings forward is by no means conclusive.

But indeed, on this matter, the Colonel's opinion possesses less weight than it might have from the singular position he has taken up with reference to hybridity in cinchona in general. This is, of course, not the place to enter into any discussion. It is scarcely necessary even to point out that the dimorphic arrangements of the flower which Col. Beddome cites as conclusive against natural crossing are precisely those which have been shown over and over again to be those specially adapted to ensure cross-fertilization by insect agency. The production of hybrids in nature is by no means an uncommon thing. In some genera they are frequent; and whether our "hybrid" cinchona turn out to be one really or not, that cross-fertilization and hybridity occur in our mixed plantations by the visits of insects I consider almost certain. Mr. Möens is now engaged in an elaborate series of experiments in artificial cross-fertilization with the object of comparing his results with the naturally-produced sports and varieties in the plantations. This is a long business, but, in due time, we may hope to have some direct evidence on this perplexing matter.

I also desire to say a few words as to the name which this cinchona should bear. It is I think much to be regretted that the name "Pàtà de Gallinazo" should have been brought out of its obscurity by Mr. Cross and adopted (even provisionally) by Col. Beddome. This is a mere bark-collector's name and is used in different parts of the Andean chain for at least 6 different kinds of bark. That which has the best claim to it (as having been first published and more often used) is the best sort of grey bark collected by Pritchett in Huanuco and referred to *C. peruviana* or *C. micrantha*. This "Pàtà de Gallinazo" was one of the first cinchonas sent to Hakgala from the Nilgiris. (See Dr. Thwaites' Report for 1860-61.) It is, of course, the case that the name is also used for the "Cascarilla serrana" or Hill red bark, which Dr. Spruce obtained on Chimborazo at 8,500 to 9,000 feet, and with which Mr. Cross (who accompanied Dr. Spruce as gardener) now identifies the plant under discussion.* But Dr. Spruce himself, with Mr. J. E. Howard, long ago determined his "Pàtà de Gallinazo" to be *C. coccinea* Pav. (see his letter quoted in Weddell, notes, page 30 (1869), and it is no doubt in accordance with this determination that Howard now refers Cross's "Pàtà" bark from the Nilgiris to that species (see Beddome's report, page 30). The plate, however, of *C. coccinea*, (taken from authentic specimens) in the "Illust. Nuev. Quinol" is totally unlike our plant.

All this is, perhaps, scarcely in place in your columns, but it will shew how far the matter is from final solution. It is to be hoped that the copious dried specimens sent home by Col. Beddome for comparison with types in the London Herbaria may clear up the matter; but this cannot be very confidently expected. Meanwhile, I would recommend the suppression of the Spanish name of "Pàtà de Gallinazo" for our "hybrid." If the tree has been duly described and named we shall, of course, give the proper appellation in time. If not or till then—since the names "pubescens," "magnifolia," "villosa," and others are all for various reasons unavailable—we cannot, I think do better than adopt that already coming into use in Southern India, *robusta*, which is a very appropriate one. By using this, we do not commit ourselves to any views as to the orgin of the plant, whether in the plantations of the Nilgiris, or the higher slopes of Chimborazo.—I am, your obedient servant,

HENRY TRIMEN.

* In conversation, Col. Beddome told me that Mr. Cross declared he had sent *seed* of this to India, but nothing is said of this in this report.

CINCHONA (HYBRIDA) ROBUSTA.

Royal Botanical Garden, Jan. 30th, 1882

SIR,—On November 26th of last year, you published a communication from me as to my views on the nature of the cinchona now generally known as the *robusta* variety. I had found it necessary to address the planting community through you on the matter, in consequence of a very erroneous statement in Col. Beddome's report on Ceylon as to my position; and I gave reasons, though avoiding any pretence of being able to decide the matter here, for supporting the view hitherto held that the plant was a hybrid of Nilgiri origin, in opposition to the *dictum* of Mr. Cross that it was identical with the "Pàtà de Gallinazo" of Chimborazo. This statement Col. Beddome had accepted and strongly supported, considering the plant to be a quite distinct species, and, in the concluding paragraph of my letter, I expressed a hope that the abundant specimens he had sent home for comparison with named types might decide the matter.

The necessary examination has been made at Kew Herbarium, by Prof. Oliver and Mr. Dyer, and I am now able to supplement my former letter by this more definite information. As a communication on the subject has been addressed by Mr. Dyer to the Indian

* Col. Beddome's report (p. 8.) contains the extraordinary assertion (derived from Mr. Cross?) that Dr. Spruce "could never have seen the trees." But the latter describes their appearance, bark and leaves—the flower and fruit he did not get—in his paper in the "Journal of the Linnean Society" iv. p. 185. Indeed, it is Mr. Cross's share in this matter that is the novelty.

Government, which we shall doubtless receive in Ceylon in due course, I need only give here the main results of the enquiry, which, it will be seen, are wholly corroborative of what I have previously written.

They are these :—

1. The Nilgiri "magnifolia" and "pubescens" are substantially the same thing. (This is equally the case in Ceylon, where however the former is much more common than the latter.)

2. There is no real foundation for Mr. Cross's identification of the plant with the "Pàtà de Gallinazo" of Chimborazo.

3. The old view is in all probability correct, and the plant a hybrid of local origin between *C. succirubra* and *C. officinalis*.

The second of these conclusions is the result of a careful re-investigation of Dr. Spruce's specimens preserved at Kew of the "Cuchicara" and "Pàtà de Gallinazo" cinchonas. It is not necessary here to go into the difficult question to what species these kinds ought to be referred. For the present purpose, it is sufficient to record that the botanical differences they possess are held by the most competent authorities to show them to be distinct from the Nilgiri and Ceylon plant, and to disprove Mr. Cross's hasty identification.

In thus taking farewell of "Pàtà de Gallinazo," I wish to express my conviction of the value of Col. Beddome's observations on the hybrid trees to which he applied that appellation. I am sensible that we in Ceylon are much indebted to him for thus calling fresh attention to this valuable sort of cinchona and encouraging its cultivation. The point of greatest importance, and which now urgently needs solution by careful experiment, is the degree of permanence or amount of reversion to the parental types met with in the progeny from seed.—I am, sir, yours faithfully,

HENRY TRIMEN.

AMERICAN COTTON CROP OF 1880-81.

According to the returns of the *Commercial and Financial Chronicle* of New York, the cotton crop of the United States for the year ending August 31st, amounts to the unprecedented quantity of 6,589,329 bales. This shows an increase of 831,932 bales over the large crop of last year. The production at the close of the war, when the new régime of free labor had just been inaugurated, was 2,059,271 bales for the crop year 1866-67. Since that time the increase has been rapid and steady up to the present time. For this period of free labor the product has been increased more than three-fold, the actual increase over the output of 1866-67 being 4,530,058 bales.

This result of free labor in the former slave-holding states of the United States is one which should not be overlooked by Brazilian planters. It is a result which has been acquired without the employment of Chinese labor and without any special favor from Government. It is the result of a better system of labour, and a better system of cultivation; the result of employing the ex-slaves at fair wages and encouraging production on a small scale.

The recent check to the abolition movement will avail nothing, for the question must and will be settled very speedily. The planters may anticipate this by inaugurating the new system voluntarily, and with their own slaves.—*Rio News.*

"WHAT CAN WE DO WITH OUR YOUNGER SONS?"

[We have received the following interesting letter from a source for the perfect trustworthiness of which we can answer, and think the warning contained in it of so much importance, that we gladly give it to our readers.—ED. *Spectator.*]

[TO THE EDITOR OF THE "SPECTATOR."]

MY DEAR ——,—You have often asked me the above hard question, and how to answer it is, I confess, becoming daily more and more a problem, but, despite the many failures I see round me, I still think there are openings here for your younger olive-branches. The great reason, I think, why so many have come to no good here is from the way in which fathers often ship off their sons like so many head of cattle, telling them that there is pasture enough somewhere in the land, and they must only wander about till they find it. I fear that while wandering they are very likely to fall into some of those pits that I have seen engulf many a hopeful young life. Unless your boy is one of those creatures with a natural dislike to civilisation, never happy in society of any kind, but intensely fond of "messing" about with animals and natural objects of all kinds, in short, the "Martin" of "Tom Brown at Rugby," don't send him out here at all, or at any rate, only to some wise guardian. A "Martin" would be in his element here; the rough life would not disgust him, and his knowledge of animals, &., would stand him in good stead for finding work; but a boy with no such knowledge, and with only the experience of life that school or business has given him, will almost certainly be compelled to try one trade after another, falling lower at each step, till at the end of some years he goes home again in despair, and you find your boy something between a "happy Hampton welsher" and a music-hall waiter.

Perhaps this seems to you incredible, but you cannot conceive how frightfully easy it is for young fellows to drift downwards in this country. We have no Mrs. Grundy, and, though that old lady may sometimes be a nuisance and an absurdity, she is also a safeguard, at any rate to the young. You send your boy out here to find "something," and he finds, as I did, University men working in mines up to their waists in water, waiting in restaurants, acting in third-rate theatrical parts, doing, in short, everything and anything that would put bread into their mouths. You will say that no honest labour is disreputable. That is so, but how about the companions that share this labour with one? You have little or no idea of the kind of men with whom one must be "hail-fellow-well-met," in the employments I have named above. I have now in my mind's eye two young fellows who came out with me to this country some years ago. I have been the "lucky" one, and certainly have nothing to complain of in my lot, but one of them succumbed to over-work and over-strain, and he is now lying in the peaceful burying-ground of Kansas City. The other is still struggling to put bread into his mouth, working now at one thing, now at another, losing all traces of education and refinement, and associating daily with men whom you would shudder to think of in contact with your son. Of course, a man deteriorates in such a life; how can he help it?

All this may seem a contradiction to the early part of this letter; but all the same, there are many advantages in this country for penniless younger sons, only you English fathers must not send an ordinary boy out here with your blessing and £100, to sink or swim for himself. *He will certainly and surely come to grief.* Let him have some one's house to come to at the first start; or still better, come with him yourself; the voyage is nothing now, and you would make acquaintance with a magnificent country; try and find a home for him in some respectable family, and, if possible, wait with him till he has found some work. Then, do not lose your "grip" on him; send him home letters and papers constantly, make him feel he has you to fall back upon in any scrape or difficulty; and then, I venture to prepict, your boy will succeed, and in a few years you will

have a man to be proud of. There are many openings in this country for any boys who will work, and, better still, people will teach work here. Plenty of youths all round me are doing well and respectably. but they are the ones who were well and wisely started. Granted, your son may have to work hard at the start and for some time afterwards; but in that there is neither disgrace nor misfortune, and the magnificent climate here pulls a man through far more than he could ever stand in England.—I am, sir, &c.,

California, September 1881. W. J.

NILGIRI BEER.

For several years past the genial climate of the Blue Mountains has ever and anon induced repeated attempts to brew beer. Most of these efforts were incited and carried out entirely by private enterprize. The beer brewed, however, was not such as to commend itself to palates accustomed to the carefully-brewed and well-ripened beer of Bass, but was accepted by the natives of the lower classes as an acceptable drink, and as such largely consumed. The profits arising from these sales were naturally small, too small to be really remunerative. On the other hand, the appliances necessary to improve the quality of the beer—which alone were wanted—were costly, too much so to allow their provision by the ordinary private capitalist. The largest of the several breweries was that owned by Major-General Morgan. The quality of its brews was remarkably good; its locale unexceptionable, and its capabilitities such as to give every reasonable prospect of considerable improvement, were funds forthcoming. The question of converting the concern into a joint-stock property was accordingly mooted and readily accepted by a Madras firm of considerable standing—Messrs. Wilson and Co. Prospectuses were privately circulated, and the necessary capital speedily subscribed without the neccessity of a public invitation. certain extensions of the works are in contemplation that will enable the brewery to supply bottled beer of a quality that will not shirk comparison with the best English beer, only at very much lower prices. Draft ale will also be available in small casks—a luxury the want of which has long reen sorely felt. We have been at some pains to hace the above particulars, as we consider that me industry deserves every encouragement. The more capitalists there can be induced to sink money in this country, the better it will be for India. The history of the success of any one enterprize might lead to the development of others. In this hope and desire we have penned the above. We cannot, however, conclude without congratulating Messrs. Wilson & Co. on their careful working of the brewery, which must ultimately prove the truth of the old lexicographer's utterance at his sale of a brewery:— "We are not come here to sell casks and such like, but the potentiality of growing wealthy beyond the dreams of avarice."—*Madras Times.*

THE COFFEE TRADE.

Few things have been more remarkable in the way of productive industry during the present century than the growth of coffee, in which Brazil has occupied more than a prominent position. In noticing this subject in our last number, a misprint in figures occurred. Referring to Rio coffee exports we stated that they amounted to no more than 10 sacks in 1880; this should have been the year 1800. In fact, the growth of coffee in Brazil is entirely due to the present century. For many years its market value was about £5 a cwt. whereas it has gradually fallen to an average of say 40s., and this difference in price is a serious drawback to the country, affecting both the Revenue and the Exchanges.

Competition with other producing countries has of course been one of the causes of this fall in value. There has not been any decrease in consumption; quite the contrary—the establishment of Coffee Taverns (as they are called) and the means taken to promote its use, all point in a different direction. whether as regards Europe or the United States, of which latter country, Brazil has almost enjoyed a monoply. The fact is, the world produces more than is required, and has surpassed the consumption.

Under these circumstances, it is a matter of grave import to Brazil that the cost of production should be reduced as much as possible, whether as regards saving of labour, the carriage by railway, or the local taxes, all which weigh heavily, and ought to be reduced in a corrresponding degree. Unfortunately railways exercise a kind of monopoly, or they charge more or less what they please, but it is in the power of the Goverument to reduce the export duty, and this ought to be done at once, if Brazil is to maintain her status in the consuming markets of Europe and the United States: otherwise coffee-producing countries not similarly weighted may gain a supremacy. —*South American Journal.*

WALKING STICK-PLANTATIONS IN JAMAICA.

To the Editor of "The Colonies and India."

SIR,—It appears to me that the article on "Umbrellas and Sticks," in your paper of October 22 last, is subject to correction.

1. I think it will be found that the number of sticks in a bundle should be taken as 50, not as 500 to 800.

2. And the value of the crop of pimento, taken as 50,000*l.* annually, is half a million for the ten years. The value of a stick may be taken as from 1½*d.* to 3½*d.*, so that 4,500 bundles of 50 sticks each, say at 2½*d.*, would be=2,000*l.*; while if the bundles had 500 sticks each, the value should have been 20,000*l.*

The average crop of pimento may be taken as 40,000 to 60,000 bags, and the value at from 20*s.* to 25*s.* per bag; thus 50,000 bags at 1*l.*=50,000*l.* annually, not 500,000*l.*

The sticks are usually shipped in small bundles, which are cut loose on board for stowage, but are made into larger bundles on arrival in the dock, say of 25 to 50 sticks in a bundle.

Yours faithfully,

Haverstock Hill, London, N.W. W. F. R.
Dec. 14.

[We are obliged to our correspondent for his figures. It is difficult in a matter of this kind to arrive at an exact basis of calculation. Our "Note" was founded on some figures published in the *Jamaica Gleaner*, while our correspondent takes different figures for his calculation. According to the information at our disposal, the number of sticks in a bundle appears to vary from about 50 in the case of the larger selected sticks, to over 800 in the case of smaller, ill-assorted sticks. The best sticks are valued in Jamaica at a merely nominal figure, certainly not exceeding that placed upon them by our correspondent, while the small sticks are not valued singly, but at twopence or threepence a dozen.

The official returns show that the value of pimento exported from Jamaica was 146,000*l.* in 1880, and these returns are admitted not to include large quantities exported from some of the smaller ports, which would probably bring the value of the gross produce of pimento up to 200,000*l.* Our Note gave it as half a million—a figure nearly as much too high as our correspondent's estimate of 50,000*l.* is too low. If these last-named figures were correct, it would really afford the strongest argument in favour of the restriction of the "walking-stick" trade.—ED. *C. & I.*]

BOTANICAL ENTERPRISE IN THE COLONIES.

Most of our tropical Colonies support an establishment similar to that which the Old Country maintains at Kew, where not only are scientific investigations in botany carried on, but practical experiments are made with a view to testing the possibility of introducing new varieties of useful plants, and so of establishing fresh industries. By the same mail from the West Indies we have received three separate official documents showing the advantages which the existence of these Botanical Gardens—these Colonial Kews—confer, not merely on the countries which support them, but upon each other. The report of Mr. G. S. Jenman, Government Botanist of British Guiana, for 1880, affords evidence of the good work done in the Botanical Gardens near Georgetown. In the story which Mr. Jenman tells of the disadvantage of the positions of the Gardens, contiguous to the east coast, where the ever prevailing sea-breezes are not calculated to be of benefit to the whole of the great variety of plants cultivated there, an important lesson is to be learnt by agriculturists. Among other interesting results of his experiments, Mr. Jenman states that the Liberian coffee plants did well and flowered when eighteen months old. They were, however, well protected by a high paling, and he thinks that they are better adapted for the alluvial lands of the interior. They should be planted near the banks of rivers, and the same precaution should be observed as in the case of cacao cultivation.

The report on the Botanic Gardens of Trinidad is a more elaborate document, and affords good evidence of the excellent work done by these institutions. The total number of plants, besides packets of seeds, distributed from the Garden last year was over 33,000, of which more than 8,000 were Liberian coffee plants, all our West Indian possessions, besides Queensland, Ceylon, and Kew, sharing in the distribution. Among these were cacao-plants for Ceylon, together with the seeds and seedlings of the necessary shade-trees, *Erythrina ambrosa* and *E. velutina;* also nearly 12,000 young Liberian coffee-plants. On the other hand, many valuable plants and seeds were received in exchange, including Panama rubber-trees (*Castilloa elastica*), the African rubber (*Landolphia*), the Chaulmugra oil-paint (*Gynocardia odorata*), *Vanilla planifolia*, a new species of the delicious fruit-yielding tree *Quina*. An extraordinary tree was discovered during the year in the island, bearing a fruit described as "unique as to size and to character of its exterior." The plant is supposed to have been introduced from Venezuela, but is believed to be unnamed. Mr. Prestoe, the Government Botanist, lays stress on a fact which has often been brought to the notice of the authorities at Home in connection with the regulation of our public parks, that the system in "well-kept grounds" of removing all fallen leaves and branches from under the large trees is inimical to their welfare, depriving their roots of the nourishment and protection from the heat of the sun which, in a state of nature, the leaves afford.

The nutmeg plantation in the Gardens has been very successful, the trees having yielded every year over 20 lb. of nutmegs each, of an average value of 2*s*. 6*d*. per lb. This crop is equivalent to a yield of 60*l*. per acre per annum, allowing only 30 female trees to the acre. A batch of these trees only 15 inches high when planted in August 1878, were 5 feet in height and stoutly branched at the end of last year. Mr. Prestoe's account of his experiments with the Liberian coffee tree, though too long to be quoted here, should be read by coffee planters all the world over.

A pleasing feature in this most interesting report is the little paragraph devoted to a notice of the birds observed on the Government lands. Mr. Prestoe says that there was not only a marked increase in the number of the ordinary kinds of birds, but that toucans, "cookoos," trogans, shrikes, grebes, or "thrushes," and others were unusually numerous.—*Colonies and India.*

MR. SCOTT BLACKLAW ON BRAZIL.

We publish a further contribution to our knowledge of our great rival in coffee-growing, Brazil, from the pen of their well-informed authority, Mr. A. Scott Blacklaw. He enforces what we already were aware of, that the three great factors in the enormous extension of coffee cultivation in Brazil were the high prices which prevailed for the article a few years ago; the large and rapid extension of railway facilities in the coffee districts, and the concentration of slave labour, as well as all available free-labour on the one pursuit. In addition, Mr. Blacklaw, who speaks as an eye-witness of the scenes he depicts, gives us a graphic but revolting picture of the revival of the slave trade, not on the ocean it is true, but round the coasts of Brazil. Most of those who had slaves in the northern districts, who could no longer make fortunes by cotton growing, sold their slaves to the coffee planters of the south. Even Mr. Blacklaw, who in his day has worked slaves, writes of the "horror" excited in his mind by seeing gangs of human beings driven to market and subjected to examination like brute beasts. He saw evidence which convinced him that not only the divine law for all humanity but the Imperial Emancipation Law of 1871 had been evaded by slave-owners who had *forbidden their slaves to marry.* If we in Ceylon are suffering from fungus and short crops as a providential visitation, and if, owing to the action of Brazil, prices have now fallen to an unremunerative standard, we shall not have to answer, when inquisition for blood is made, and punishment awarded for keeping back the wages of the poor—we shall not, in the day of account, have to answer for buying and selling droves of women and gangs of boys between 10 and 15, as if they were mules or oxen. What with abundant slave labour so procured, in violation of laws divine and human, and a slovenly system of culture, described as "letting the trees grow," on vast areas of fertile land, Brazil has beaten us, and, we suspect, ruined herself in the race. For, with reference to Mr. Tytler's vaticinations of revolution, let it be noted that, by the process described by Mr. Blacklaw, the division of interests between free north and slave-holding south, in the Empire of Brazil, is now nearly as complete as was the case in the northern republic, before the Titanic contest commenced in which the crime of human slavery was wiped out in blood. Vengeance for iniquity may be long delayed, but come, ultimately it must, and, if at the preaching of a second Jonah, there is not a repetition of Nineveh repentence in the case of Brazil, a baptism of blood seems inevitable. In any case, what we now know of Brazil, and what we have just heard about the heroic death of the rash but gallant Brownrigg,—fighting to the last against coward and caitiff odds,—is surely enough to cause us to vow, or renew our vows, that our best

will be done to remove from God's holy earth not only the slave trade but the institution of human slavery.

THE ANDAMAN ISLES AND PLANTING.

(Written by a Naval Officer for the "Ceylon Observer.")

Although the Andaman Isles have been the property of the Indian Empire during the whole of the present century, it was not till 1859 that an English settlement was formed there. About that time, the necessity for establishing a Penal Settlement began to force itself upon the Indian Government, and it was finally decided that the most southern of the Andaman Isles should be selected as a place of imprisonment for convicts sentenced to long terms of confinement. The islands at present scarcely pay their way. This arises from the fact that so very little of the convict labour is remunerative in the sense of bringing back money to the Exchequer, whilst the outlay of money for new machinery, victuals, and salaries of the officials is, of course, a considerable item. An attempt on a pretty large scale is, however, about to be made to establish Government plantations of tea, coffee, cinchona, and other plants, for which the islands are very suitable, nearly all of them being now grown by the convicts in small quantities. Communication with the island is by a fortnightly steamer from Calcutta. This steamer is guaranteed by the Indian vessel is allowed to convey six tons of cargo free for the use of the officials and troops in the settlement. The aborigines of the Andaman Islands are probably the lowest of the human race. It is a somewhat peculiar fact that such a race, distinct in itself and having no affinity or similitude whatever to any of the neighbouring races, should be residing on a group of islands in the Bay of Bengal. It is only in the immediate neighbourhood of the settlement that the Andamanese are even approachable. In the northern slands of the group it is not safe to land, as they receive inquisitive people with showers of poisoned arrows. The Chief Commissioner of the Andamans has on several occasions tried to land in these other islands, but has had to abandon the attempt, the attitude of the people being so threatening. The Andamanese, men and women, scarcely ever attain a greater height than five feet. They wander about perfectly naked, and have no houses, simply living in the jungle, and their food is the roots of trees and fish Like most barbarous natives brought into contact with civilization they are dying out rapidly, and threaten to become, before very many more years, totally extinct. Diseases contracted from the convicts have had a terrible effect on them, thousands having died from the diseases thus spread. Some attempts have been made to civilize these wretched people, but they have not been very successful. A school has been established at Port Blair for the education of Andamanese children, but the number under instruction is very small, and the seeds of barbarism seem to have been implanted so deeply in the natures of these youngsters that, even after receiviing a civilized education, the greatest difficulty is experienced in preventing them from returning to what is, apparently, their natural state. These people are wonderfully adroit in the use of the bow and arrow. Their arrows are tipped with a sort of steel hooping; and, as their bows are very large, and the arrow has a proportionately great velocity, any one struck by one of them in a vital part would have but a poor chance of recovery. Attempts have been made times without number to conciliate the fierce tribes inhabiting thu northern islands, but without success. Their habits are nomadic, and they are no doubt aware that closer ties with a civilized power would soon end in its natural result—their extinction. The Nicobar islands, 300 miles to the southward of the Andamans, of which they are a dependency, are inhabited by Malays. No convicts are at present kept there, but it is intended at some future date to utilize them as an outlet for the criminals of India. The same steamer that runs to Port Blair also proceeds to the Nicobars, from whence there is a large export trade in cocoanuts. There is no doubt that the Andamans, extremely fertile as they are, have a great future before them—say in fifty years hence when the thousands of convicts who will have passed through them by that time have settled down on the soil, and cultivated the vast tracts of land which are at present covered with jungle. The harbour of Port Blair is spacious and well protected; the climate is cool, tempered as it always is by the sea breezes which blow continuously all the year round, and there are more disagreeable spots on the face of the earth for a military man to spend a year in than the Andaman settlements.

COFFEE PROSPECTS.

(Robert Von Glehn & Sons' Monthly Coffee Circular.)

January 11th, 1882.

The stocks of coffee in Europe have increased during the past month about 11,000 tons, and prices have still further declined:—Middling plantation Ceylon coffee, which we then quoted 77s to 82s, is now barely worth 72s to 77s; and good average Santos, which was then worth 60 fr. in Havre, is now quoted 56 fr. per 50 Ko. It cannot be denied that some failures in Bordeaux, of firms but slightly interested in coffee, have contributed largely to accentuate the decline in prices. Our opinion is that the alarm which appears to be felt as to the financial position in Havre is excessively exaggerated, if not entirely unfounded, as, owing to the admirable system for advances on produce carried out by the Bank of France, no large losses are likely to remain long unpaid, and no large quantities of coffee are likely to be forced for sale at one time; the future course of the article must therefore be studied on its own merits.

We venture to maintain our opinion [as regards Rio] that the receipts will be smaller, and may even fall to such a point as will revive the lifeless markets of Europe and America.

Now one of the most important questions in forming an opinion as to the future course of prices, is, what can the shipments from Rio during these same six months of the present year amount to? We have seen above that the eminent Rio firm, from whom we have so often quoted, estimates the available quantity of coffee for the seven months from 1st December 1881, to 30th June 1882, at 2,063,400 bags, and deducting what we now know to have been shipped in December, viz., 320,000 bags, we get as available; according, to this authority, for the six months, from 1st January to 30th June 1882, 1,743,400 bags, or more than 300,000 bags less than were shipped during the same period last year.

For reasons stated above, we, however, think the deficiency will be greater, and it is possible that Rio shipments to Europe alone, which, during the last six months, have been nearly 100,000 bags less than in the same period of 1880, may, during the next six months, fall below those of the same period of 1881 by 300,000 bags.

Scarcely less important in forming our opinion of the future course of the market is the question:—"What quantity of coffee can Santos send us during the next six months?"

The Santos crop of 1881-82 is variously estimated from 1,500,000 to 1,890,000 bags, but taking it at the average of these two figures, viz., 1,650,000 bags, and deducting the shipments of the first six months of the season, viz., 758,000 bags, we find available, for the six months from 1st January to 30th June, 1882, 892,000 bags.

It looks, therefore, at present as if the shipments from Santos during the next six months were likely to be largely in excess of those during the same period of last year.

If the present Santos crop does not, however, much exceed 1,500,000 bags, which is the estimate of our own Santos correspondents, and if the Santos planters hold back rather more coffee than usual, the quantity that will be shipped to Europe during the next six months may after all not be so large.

It must, however, be remembered that Messrs. Bradshaw and other eminent authorities estimate the 1882-83 or following crop at 2,000,000 bags. Santos coffee is not likely, therefore, to be less plentiful for some time to come than it is now, and we doubt the wisdom of paying a premium for future and distant delivery of this kind of coffee, as is at present being done in the Havre market.

From the smaller coffee producing countries there is no feature of importance. The native Malabar crop is said to be large, but is held back by the natives, who are not likely to take present value until forced to do so. The Manila crop is said to be small and early. The visible supply of Java coffee to Holland is the same as last year, viz. 796,000 bags, against 795,000 bags on 1st January last year.

The Costa Rica crop is reported large, but of inferior quality.

From St. Domingo there were reports of an insurrection, which it was thought would interfere with the production of coffee, but as very good Haiti coffee is selling in Havre at 48 fcs.—about 34s per cwt.- we conclude the report is not believed. No change in the crop estimates is advised from Ceylon, but the bulk of the crop is coming to London.

The quality of the Wynaad and Coorg crops is superior to that of recent years. The Neilgherry on the other hand is inferior.

ROBERT VON GLEHN & SONS,
7, Idol Lane, London, E.C.

CEYLON TEA IN THE LONDON MARKET.

(Special Report for "Ceylon Observer.")

4, Guildhall Chambers, 33, Basinghall Street, London, E. C.
13th January 1882.

DEAR SIR,—The Indian tea market continues very firm, though without material alteration since the holidays. Prices, as compared with this period of 1880, are higher for common, slightly higher for medium, whilst for fine and finest they are considerably lower. The low prices which prevailed so long in 1880 and during the greater portion of 1881, although disappointing to the grower and mporter, have had the satisfactory result of largely extending the consumption. The increase of 5,000,000 lb. for the past year is very remarkable, following, as it does on the large advance of 1880 on 1879 of 6,364,000 lb. The liquors now most sought after are those possessing dark, clear, colour with fine flavour and not those of lightish colour with some pungency. Ceylon tea imports show some improvement, more attention evidently being given to the manufacture than hitherto. With regard to manufacture, it cannot be too strongly urged upon producers that it will be a ruinous mistake to resort to coarser plucking, in consequence of the high range of values paid here during the past few months for common makes. The prices realized were due in a very great measure to good quality, resulting from fine plucking and not so much to scarcity. If coarse plucking be resorted to, large quantities of poor liquoring tea will result, which will soon become as unsaleable and low in price as China teas now are. It would be difficult to see to what a low average price Indian teas will sink, should the very serious mistake be made of sacrificing quality to quant ity. On the other hand planters must not rush into the opposite extreme and make too large a proportion of fine or high priced grades. It will be as well to bear in mind that the largest consumption of tea is of kinds under 1s 4d, per lb., and the next up to 2s. Broken sorts have sold much better than whole leaf at the same range, as the liquors being stronger and darker are more useful for mixing purposes. Tea in half chests fetches only the same price as when packed in chests. Boxes of about 20 lb. are not much in favor with the trade, though very useful to retailers. It should be noted that the weight of each package should not in the least exceed 28 lb. gross; otherwise a heavy loss on account of draft (1 lb. per package) will be incurred. As advised in a late letter, it will be well if planters will send their tea in as large breaks as possible, leaving the bulking to be done here, if the lots are small. We give below the result of sales of Ceylon tea this week in public sale:—

Ex "Camorta."

			s. d.	
G.H.D.E.	15	chests pekoe souch.	@ 1 3½	per lb.
	57	" " "	" 1 2	"
	11	" brok. "	" 1 1½	"
	14	" brok. pekoe	" 1 6½	"
	26	" fannings	" 9⅝	"
	26	" dust	" 10¼	"

			s.	
DSRM.	19 half chests pekoe 1 box.		@ 8¼d	per lb
	19 half chests broken tea		" 10¾	"
	17 " "	congou	" 1 0¼	"

We remain, yours faithfully,
HUTCHISON & Co.

THE INSINCERITY OF BRAZIL IN REGARD TO THE SLAVE TRADE AND SLAVERY.

We publish a further contribution to the history of slavery in Brazil and the action of the Government (controlled by slaveholders) in regard first to the slave trade and then respecting emancipation. A more disgraceful exposure of systematic deceit has seldom been made, and as British subjects we have the right to express special indignation at the manner in which our statesmen have been betrayed and trifled with. It is certainly no new discovery that the existence of human bondage in a country blunts the moral feelings of the community, while, of course, the government only too truly reflects the character of those on whom its existence depends. There can be no question, we believe, of the *bona fides* of the Emperor personally, but all the revelations now being made by the honest *Rio News* and by our correspondents shew how greatly we erred in giving credit to any considerable portion of the leading Brazilians for sincerity in the loud professions they have made of desiring to free their country from the blot and the curse of slavery. We read, recently, a letter from a Brazilian addressed to a French journal, in which he lamely attempted to defend the action of his country. Having a bad case he resorted to the attorney policy of "abusing the other side." He pointed to the degraded condition of many of the French peasantry. We are perfectly familiar with this form of argument or rather attempt to divert attention from the real point at issue. It was the favourite *tu quoque* used by the slaveholders of the United States when anything was said against their "institution" of human "chattels." Mrs. Tyler, the widow of President Tyler, used it, as she thought, triumphantly. "Look at home!" she said, "and correct the destitution and degradation which prevail among your 'lower classes.' —your 'mean whites.'" No doubt that is a duty, but it is the very class who demand the liberation of the slave who do their best for degraded freemen. But our poorest are FREE: free to carry their persons and their labour where they choose; free to marry and free to keep their wives and their children to themselves. They cannot be "sold South." They are not inevitably doomed by law to the condition of brute beasts, as is the case in Brazil. If the great nations of the world agreed to regard the stealing of human beings from Africa and the traffic in them as piracy, why should a distinction be made in favour of a system of internal slavery and sale, by which, day by day and hour by hour, human beings are deprived of their inalienable rights—as the constitution of the United States puts it—of "life, liberty, and the pursuit of happiness"? He who knew human nature best of all said: "The poor ye have always with you." All freemen may not be able to secure happiness, but the chance is afforded them, which is denied to the poor slaves of Cuba and Brazil. The former country has suffered the penalty of her violation of human rights, and we cannot doubt that unless Brazil repents and makes all the restitution she can, her turn will come. Meantime, as in society men who forcibly appropriate

what does not belong to them are ostracized if not actively punished, we cannot see the propriety of treating Brazil, Spain, Egypt and other slaveholding countries as if they were respectable, clean-handed units in "the comity of nations." It is time we spoke of Brazil as she deserves to be spoken of. The fact that she is the greatest coffee-producing country in the would ought not to blind us to the connected fact that she is the greatest criminal against the laws of human nature and the Lord of human nature.

"THE TROPICAL AGRICULTURIST."

An old colonist writes from the mother country by last mail:—

"The success of the *Tropical Agriculturist* was so evident and so certainly assured from its first issue, that I have hitherto not thought it necessary to say one word in its favour, and I only write now to briefly record my candid opinion that it has more of the elements of permanency about it than, perhaps, any publication ever issued from the Indian press—not excepting the Government *Gazettes*. In all probability, it will live as long as any of the products, regarding which it records information so interesting and valuable.

"May it live as long as the Bogaha itself! Meanwhile, find my subscription for two years enclosed. The only suggestion I have to make is to implore you not to 'improve' or alter the work in any shape or form down to its fine classic cover. Let us have it uniformly the same for the next half century at least."

THE ESTATES PURCHASING AND PROSPECTING COMPANY, which lately started into existence, is, we are glad to learn, to be followed by another Company which the force of circumstances is bringing into existence. It has for some time been a matter for serious consideration how gold, known to exist in large quantities in the pyrites is to be extracted. The appliances for this process do not exist on the various mines, and are too expensive and elaborate to be undertaken by each separate concern. The representatives of the various mines at home have resolved to assist in starting a Company for smelting works, for the reduction of these pyrites and the extraction of the gold, silver and copper found in them. The various Mining Companies could obtain their ore treated at a central factory, where scientific and expensive smelting works will be erected and conducted under skilled management. Should such a Company come into existence, we hope it will follow the wise course adopted by the Estates Purchasing Company, and secure a local agency and an Indian direction.—*South of India Observer.*

NUTMEG CULTIVATION.—We have received from Mr. W. Ferguson a copy of the "Journal of the Indian Archipelago" for October 1848, containing a paper called "Some Account of Nutmeg Cultivation, by Thos. Oxley, Esq., A. B., Senior Surgeon of the Straits Settlements." This appears to be a full and thoroughly practical essay. One paragraph we may copy here:—

The nutmeg tree shows flower about the 7th year, but the longer it is before doing so, the better and stronger will it be. I cannot refrain from a smile when a sanguine planter informs me with exultation that he has obtained a nut from a tree only 3 or 4 years planted out,—so much the worse for his chance of success, too great precocity being incompatible with strength and longevity. The best trees do not shew flower before the 9th year, and one such is worth a score of the others. This will be evident when it is stated that I have seen several trees yield more than ten thousand nuts each in one year, whereas I do not believe that there is a plantation in the Straits that averages 1,000 from every tree. This very great disparity of bearing shews plainly that the cultivation of the plant is not yet thoroughly understood, or greater uniformity would prevail, and I think it clearly enough points out that a higher degree of cultivation would meet its reward. It is not quite safe to cut down the male plants upon first shewing flower, as they many times show perfectly female flowers the following year, and in that case are generally the strongest and finest trees. But there is some indication of this in the first mode of flowering. When the racemes are many times divided and have numerous flowers, there is no chance of its becoming entirely female, but where there are only two or three flowers on a raceme there is a fair prospect of its doing so. The tree has not been introduced into the Straits sufficiently long to determine its longevity, but those introduced and planted in the beginning of the present century as yet shew no symptoms of decay.

We shall submit the essay for Dr. Trimen's judgment before republishing it in the *Tropical Agriculturist.*

THE HARVESTING OF THE CINCHONA BARK.—'Have you any knowledge of the Caulfeild bottle process?' was the question put to a mercantile firm not long ago. We suppose that, effective and important as it is, the principle is as simple as that on which boys deprive alder twigs in the Highlands of Scotland of their bark taking the bark off and putting it on again unbroken in the manufacture of whistles. They used to beat the alder bark all round with the handles of their knives, and this loosened it. The same effect in a far better and more scientific manner is, doubtless, produced by the friction of the polished surface of a bottle rendered ponderable by being filled with sand. The beating process often broke the bark, which the rubbing is not likely to do. if Mr. Caulfeild really invented the idea, it is much to the credit of his sagacity. Even if he had previous hints, which he adopted, he deserves the gratitude of cinchona growers. Cinnamon is peeled when there is plenty of juice between the wood and the bark. Possibly the friction of the knife in the process of removing the outer bark may cause the inner to separate more easily. But we never saw or heard of any beating or rubbing process to induce the more easy and unbroken removal of cinnamon bark.

INDIAN AGRICULTURE.—Sir George Couper, in his address to the Talukdars of Oudh at the close of the Agricultural Exhibition last Saturday, departed somewhat from the customary empty formalities and platitudes of such occasions, and gave these wealthy landlords some very wholesome advice as to their duties and responsibilities in the important position they occupy. It was a plain talk full of good sense and sound admonition. He counseled them first to make greater exertions for increasing the value of their estates, by introducing improved machinery, better seed, more manure, and more extensive irrigation arrangements. Then he passed to what he styled far the more important division of their duties, that pertaining to the improvement of the welfare of their tenantry, in which he assured them that not only Her Majesty's Government but Her Most Gracious Majesty herself were deeply interested. He bade them take note of the widespread assertions that their tenantry had been unduly harrassed and grievously oppressed by the exactions imposed, and warned them that if this were so and were not speedily mended it would become the duty of the Government to see what legitimate means could be provided to alter this state of affairs and check the degradation of agriculture, He exhorted them to feel a kindly sympathy and take a warm personal interest in the welfare of their tenants. We trust these words will produce a good effect, and we hope they will be properly followed up. It is one of the best signs of the times that the rulers are more fully awaking to the vast importance of greater efforts to improve the condition of the many millions of patient toilers committed to their care.—*Lucknow Witness.*

Correspondence.

To the Editor of the Ceylon Observer.

BEES AND THE FERTILIZING OF COFFEE.

Kent, 22nd Dec. 1881.

DEAR SIR,—One of your correspondents, in an *Overland Observer* which has lately reached me, ridicules the idea of bees being serviceable in fertilizing the coffee tree during the blossoming season, by carrying about the pollen of the flowers, while collecting honey. He even doubts that bees frequent estates for any length of time, and thinks that they may be only seen for a few hours on the occasion of their swarming in the jungle. I am not prepared to say whether they are useful or not in spreading the pollen, not being acquainted with the sexual construction of the flower, but I well remember that, in the year 1858, while on a visit to the late Mr. Nietner, of the Fernlands estate, he pointed out to me the very great number of bees which were busily engaged in collecting honey all over the estates. He also called my attention to the bee-eaters, which hovered in considerable numbers in the air, attracted by their insect prey. It was in the month of March, and there was one of those glorious blossoms which give the appearance of the trees being thickly covered with snow—a sight which often gladdened the heart of planters in those days, but which, alas! is seldom seen now. The bees remained for several days, and, to the best of my recollection, Mr. Nietner, who, you well know, was an able naturalist, expressed the opinion that they were doing good service. In consequence of the great destruction of forest in coffee districts, bees seem to have disappeared. I, therefore, hail with satisfaction the prospect of the domestic bee being introduced, to take the place of the wild species, which have been driven from their haunts by the advancing steps of cultivation. I have no doubt that many old planters could corroborate my statement as to the presence of bees and bee-eaters all through the blossoming season. My own experience extends from the year 1846, when forest abounded in almost every district of the Central Province.

I have read with much interest Mr. Marshall Ward's final report upon leaf-disease, and regret to find that he has arrived at the conviction that there is no cure, and that all that can be hoped for is that the disease may be kept in check by the judicious application of manure and the use of lime and sulphur. Let us hope that the introduction of new products will save the island from the hard times with which it is threatened as far as coffee planting is concerned. I am inclined to think more of cocoa than quinine, as commanding more general consumption.

J. P. G.

BRAZIL PRETENDING TO ABOLISH THE SLAVE TRADE AND EMANCIPATE THE SLAVES, BUT ONLY PRETENDING.

Dollar, Scotland, 12th Jan. 1882.

DEAR SIRS,—We may have been very far wrong in our former opinions as to the near collapse of the coffee plantationsin Brazil. We have always been right, however, in asserting that it is on the *labour question* that the future of the coffee enterprize depends.

The cultivation up till now has been almost entirely carried on by slave labor. Free labourers have been employed in the felling and clearing of forest land for coffee plantations. The bullock-drivers and muleteers were generally from the same class, and building-contractors of which there were a great many while estates were being extended, also worked with free labourers. These labourers were all of the *camarada genus*, descended from ever so many mixtures of the Portuguese colonist and the Tupy Indian fellows whose idea of life is to spend half of it holiday-making, to work as little as possible, and even for that little to receive payment a year or two years in advance. A good many masons and carpenters are Portuguese, Germans, Italians, and Spaniards, who may have been formerly employed on the railways, and are very migratory individuals. On some estates, there are families of all the above nationalities who cultivate a few thousand coffee trees as so much per year, or so much per bushel of cherry coffee picked off the price of coffee land they treat. The planter has to supply each family first with a good house costing £60 to £80; second to give them a large paddock planted with artificial grasses and fenced, so that will mules and hungry work-bullocks may not go astray; third to give the family a piece of good land, although at an elevation that could not grow coffee (owing to frost) to grow Indian corn for colonists' pigs and animals, beans, rice, potatoes and other necessary vegetables for food for his household (some colonists grow on this patch cotton and sugarcane as well). Last but not least in importance the head of the family will be also given a sum of money to clear his account on the place where he was formerly employed, which advance is often lost. So that, all things considered, independent of the advance, a capital sum of £100 at least would be absorbed for each family. Free labor of this sort is not tasteful to those who have been accustomed to work with slaves, and nearly all who have tried it lose money and throw colonization adrift and take to the slaves. The slaves then being the Brazalian planter's mainstay, let us see how the institution of slavery stands at the present day, and, even at the risk of repeating what I have often written before, let us notice some of the legislative enactments relating to slavery in Brazil. Commencing from the time that the civilized world began to interest itself on behalf of the slave, we find that in 1825 a treaty was made between Great Britain and Brazil for the suppression of the slave trade. The Empire was then but three years old and had been recognized by the British Government, through the announcement of Mr. Canning, in the House of Commons, in that year, as an independent state, and, elated with its newly found liberty, Brazil was to follow the example of other nations. There might have been an intention to stop the shameful traffic. The laws of the country, however, were not made to punish Brazilian subjects for engaging in it until 1831. All slaves entering into the country after that date, 7th November 1831, *were declared free*, and persons introducing them were to be punished by the criminal law for reducing free men to a state of slavery.

This law remained a dead letter, for the slave trade was carried on with the connivance of all parties in Brazil, both official and unofficial, for many years: some assert up to the time of the rupture with Great Britain in 1861; say thirty years. Here is what an American writer of some distinction, Capt. Codman, who made a voyage to Brazil in 1847, describing when the trade was in full swing:—

"The number [of slaves] annually imported now cannot be ascertained: but I know that, while we were in Rio, (thirty days) four thousand were landed in its immediate vicinity from five small vessels. We are not informed how many were landed on other parts of this extensive coast at the same time. It is scarcely possible to conceive that one of those vessels of two hundred tons could have brought one thousand and five negroes safely, having had on board, probably, on leaving the coast about twelve hundred—twenty per cent being the usual allowance given to death. Who can imagine anything more horrible than their situation for thirty days, while crossing on the warmest latitudes of the earth, stowed with the nicest calculation of a stevedore in that vessel's hold living and dying packed together!

"The slavers are now so closely watched on the African coast that an owner makes his calculations to lose one vessel out of three; and, if necessity demands it, no hesitation is made in throwing overboard cargo to escape detection!"

The law of 1831 having been openly evaded, we can easily understand that the pressure of the Russell Government in 1846-52 induced the Brazilian Government to again legislate in earnest for the suppression of the slave trade, and on 4th September 1850 a second act was passed,

This law was similar to the one of 1831, although defining more particularly who should be considered parties, principals, accomplices, &c., and declaring the trade piracy. Like it, it declared that the blacks thus illegally introduced, should be returned to their native country, and that they should be put out to service for a term of years in order to earn as much as would pay their return passage. This term of year, was not to exceed fourteen. That this law was passed at the instigation of the British Government, I can gather from a series of lectures delivered by a distinguished Brazilian in 1873, where the lecturer gives the following lament:—"Notwithstanding the measures adopted in this law, which ought to convince England of the good intentions of the Brazilian Government, she [England] still maintained the Aberdeen Bill promulgated in 1845."

I find that this called "the Aberdeen bill" subjected Brazilian ships and Brazilian subjects to the judgment of British tribunals, if they were *suspected* of carrying on the traffic in Africans.

The subject was discussed some two years ago about the time that an Abolition Society was formed in Rio de Janeiro. The right of the Brazilians to hold as slaves negroes brought into the country, after the passing of these laws, was (two years ago) stoutly defended by some of the ablest men in the Imperial Parliament, and amongst the advocates in favour of this illegal bondage, was the Secretary of State for Foreign Affairs in the last Cabinet. Our leading journal in Rio de Janeiro declared then that, if the law of 1850 were carried out, over 500,000 human beings now held as slaves ought to be free, and that, by the law of 1831, nearly a million Africans and their descendants are at present illegally held in bondage. I have been informed by many people that it was partly owing to the evasion of these laws that the troubles began with Great Britain in 1861. Although the affair of the stealing of the cargo of a shipwrecked vessel and supposed murder of the crew on some of the southern coasts was the main cause of quarrel, yet the outcomeof the settlement in 1864 was the passing of a law on the 24th September of that year, declaring all negroes free who were imported since the passing of the abovementioned laws.

This law, like all the others, wrung out of Brazil at the instigation of a foreign Power, was also not heeded; and, again, dust was thrown in the eyes of Great Britain by the passing of the so-called Emancipation Law of 1871.

The draft of a scheme of emancipation was first promulgated and discussed both in Brazil and Europe in 1867. By it, slavery was to be abolished entirely in the year 1900. I have, to this day, great difficulty in convincing people in this country—who remember the discussion—that by the law, as ultimately passed, all who were slaves at the passing of the law remained in bondage until releasedby death.

I say dust was thrown in the eyes of the people of Great Britain: first by promulgating the draft of a law giving a stated number of years when slavery was to cease entirely, and then passing an act four years after leaving out that most important clause, and, second, in making people believe that the fund established under the new law would soon free all. The decrease at the end of ten years *including deaths* is only 2⅓ per cent, as shown by their own returns, which I shall show to you further on. A.S.B.

COFFEE PULP AS MANURE AND LEAF-DISEASE.

Nuwara Eliya, 17th Jan. 1882.

DEAR SIR,—Has it never occurred to any scientific planter that the use of coffee pulp, as a manure, might be injurious to the health of the coffee tree?

What plant, or animal, can naturally be expected to thrive fed on its own refuse? And anything more *damp* or *sour* than old coffee pulp cannot well be imagined. In my opinion, the cause of leaf-disease must be in the tree itself, and that trying to cure diseased *leaves* is simply beginning at the wrong end.

I may be "all out" in thinking that the use of pulp has anything to do with the existence of what is called *Hemileia*, but, failing science, we must trust to some lucky *guess* for a cure.—Yours truly,

IGNORAMUS.

[Caustic lime should be added to the pulp.—ED.]

JOTTINGS FROM COORG.

Jan. 17th, 1882.

DEAR SIR,—As a subscriber to your valuable paper(the *Tropical Agriculturist*), which, by the way is—though in many instances unsuited to South of India planters, as our systems are so different—thoroughly appreciated here by all who read it. As a subscriber, I say, I do not think I should let this month pass without letting you know how we are getting on here "over the water." This year has been a most exceptional one. In fact, I think I may almost say we have at last got our long-looked-for "bumper," and heaven knows it is wanted in the present state of the coffee market. Most estates are getting 10 and 20 per cent over their estimates, and all, in the bamboo district at any rate, slightly over. This pleasant state of affairs is, I think, greatly accounted for by the late and unusual rains we have been recently getting, between four and five inches in November; and about one and a half inch ushered in the new year with cold mists and sharp east winds This, of course, will not seem at all strange to you in Ceylon, but it is almost unprecedented here, and has kept our heavily laden trees in good heart, and most estates have a very fair show of wood for this year. Pruning and manuring are now in full swing, and most of us hope to have our coolies paid off by the end of next month. The little cinchona we have looks well; several nice fields of succirubra and pubescens of the last two years' planting is about all we can boast of at present. Nearly every estate is now going in for it, though none do so entirely, except one near Mercara, which was bought from Government several years ago. The little bark which has already been sent home has, I believe, fetched very fair prices, and there is no reason why it should not continue to do so, as our climate and soil, especially in the Ghauts, is very fairly suitable for it. It is generally planted here in the coffee rows, three trees of coffee to one cinchona. It then serves a double purpose. One or two have small plots of Ledgeriana Calisaya brought from the Neilgherries, but nothing large. Clearings look well everywhere; no leaf-disease to speak of, and little or no borer showing yet. It is a great thing crops are so good; something to liven us up on our estates, as our gay and festive TOWN of Mercara is, as usual, as "dull as ditch-water." In fact, the drive or ride in alone requires all the patience of Job to stand, without imperilling your soul, as you are in imminent dread of either your springs breaking, or your nag going dead lame owing to the good(?) condition of the roads. Our executive engineer having discovered a novel method (for India) of making the roads passable—a method, I think, for its deep thought and ingenuity deserving of great credit—namely the laying down of long stretches of metal in the middle of the road without the slightest attempt to bind it, and to prevent traffic along the sides and to enable the road to get into good order in a cheap way, large boulders and trunks and trees are placed on the unmetalled portion regardless of the risk to human life and limb, to say nothing of that to your horse's legs: and this is done, now of all times, when our coffee is being despatched to the coast and Bangalore, but perhaps that is a part of the plan. I must not, however, encroach further upon your valuable space and have only done so at all in the hope it may induce other of my brother planters to use your journal as a means of thoroughly ventilating any moot point, and to assist one another in the cultivation of our common staple, coffee.—Yours &c.,

CHERRY RIPE.

LIBERIAN COFFEE AT A HIGH ELEVATION.

Shawlands estate, Lunugala, 21st Jan. 1882.

DEAR SIR,—As you wish for information with re-

gard to the elevation at which Liberian coffee will grow and flourish. I may mention that I have a few trees here, now four years old and bearing heavily. One tree in particular, which ripened a few hundred cherries last year, has now a load of over 3,000 cherries on it, by computation. The cherries are growing in clusters all round the stem of the tree, where you generally see suckers. The elevation is 3,100 feet.

Those trees have had no special care taken of them and the soil is not particularly good. They have had leaf-disease as badly as the Arabian coffee in their vicinity, but have suffered less! Notwithstanding all this, I do not believe Liberian coffee will ever supplant the Arabian; and this seems to be the general opinion.—Yours faithfully, G. H. HALL.

CINCHONA CULTIVATION.

22nd Jan. 1882.

DEAR SIR,—Perhaps some of your numerous correspondents can give some useful information regarding what should be done to a clearing of cinchona officinalis under the circumstances I now proceed to mention.

It is say four-and-a-half years old, and the larger portion of it is seeding and flowering heavily. Would pruning up moderately and cutting off blossom, as far as a cooly could reach, be the right thing to do, or would it be better for the trees to be allowed to continue as they are and shed the seed?

From Mr. Owen's book, I cannot quite gather whether he recommends pruning under these circumstances or not, though he certainly does not with trees that remain without blossom.

Does the mere fact of blossoming denote that the tree is likely to die sooner than one which has none, both looking apparently healthy at the same age, four-and-a-half years?

Lastly has it not been the general experience in Ceylon, till now, that officinalis trees at that age, and even younger, have tended to seed heavily at the same time without the bark being in any way deteriorated by it, whether grown in a very suitable climate or not. It seems, from what little I have seen of officinalis, to be almost its nature to try to reproduce itself at that age. Is it the case in India, where they have much older trees than many in Ceylon?—Yours truly, ENQUIRER.

COFFEE LEAF DISEASE.

Colombo, 23rd January 1882.

DEAR SIR,—As I gather there is an impression abroad, that the results obtained at Gangapitiya are greatly neutralized by the supposed fact that an adjoining untreated estate is equally free from leaf disease, I think it necessary to correct this idea. A glance at the map will show that Gangapitiya is surrounded and immediately adjoined by Gangawatte, Ambacotta and Lower Rajewelle, with which it has been compared. On the other side of the river is some native coffee, heavily diseased. Then about three miles farther down the river comes Mahaberietenne, the visiting agent's report of which has just been shewn to me by Messrs. Whittall, stating that it was likewise considerably diseased. Then, still farther down the river at the very end of the district away from the bulk of estates, are Henegahawelle and Victoria, which are now reported to be comparatively little affected. I know nothing of the past history of these estates and whether like Gangapitiya they have for the past four years suffered severely from leaf disease during October, and again during January. It is sufficient for the purpose of the results of my experiments to have compared Gangapitiya with the immediately surrounding estates, *on every side.*

I am beginning to realize that every fact I bring forward to testify the usefulness of the treatment I have recommended is being unjustly discredited and distorted. I have devoted, to the neglect of my interests elsewhere, nearly the whole of my time for the last 18 months to the pursuit of these experiments, I have also gone to considerable actual expense; I have left nothing undone that could be done, and no one, I venture to say, would have retreated with a better grace had failure resulted. But, instead of failure, the results fully justify the opinion that with some modification the treatment might result not merely in a mitigation of the disease but in a cure. I have been endeavouring now to arrange for the continuance of my experiments during the next season, being willing to devote still more of my time to it, but I find that speaking of the past and present, not only are the results of my experiments not accepted on their absolute merits—but they are subjected rather to an under-current of adverse criticism which is based upon inaccurate and non-existent data,—and owing to this I am unable to obtain such a measure of success as I consider necessary. I think therefore that I had better retire now from the further direction of these experiments, and I must leave the coffee industry to arrange for their continuance under some other guidance. I am tired of meeting nothing but unjustified disbelief and opposition. But I challenge those who are responsible to absent proprietors and mortgagees to fold their hands and do nothing.

Surgeon-Major Shortt has testified to the value of carbolic acid as a remedy against leaf-disease. Mr. Morris has done the same. Mr. Marshall Ward has admitted that carbolic acid is a remedy against leaf-disease, he admits that a great deal might be done with it were it not for the fact that it is injurious to the trees. I don't know whether those interested will even allow that I have disproved the existence of this fact, but I claim to have proved that carbolic acid can be used against leaf-disease with perfect safety; I claim to have proved that it can be used on a practical scale and on this basis alone I now call on the Government and on those responsible to vested interests to continue the experiments taking the advantage of my experience as to time of application, etc. There are many to whom I am obliged for moral and actual support during the past year, but they are too few to justify my devoting another year to this matter; for nothing less than absolute success at at least half-a-dozen estates in different districts would, I feel assured, rouse the coffee industry of Ceylon from its present despairing apathy.

EUGENE C. SCHROTTKY.

THE WILD VANILLA.

Theobroma, Mirigama, 24th Jan. 1882.

DEAR SIR,—Walking through the jungle here, I came across an orchid, which, to my unscientific eye, looks very like vanilla. I send you by rail a few cuttings. I have been unable to procure the flower or fruit. The pod, as described by a Sinhalese man, exactly resembles the vanilla.—I am, yours faithfully,

R. H. L.

[W. F. furnishes the following note:—"The plant sent by your correspondent is the Vanilla Moonii, Thw. It was long ago discovered by Moon, and included in his Catalogue of 1824, as the Vanilla aromatica? Moon, p. 60. It is quite a common plant in various parts of the Western Province, and flowers and fruits freely, every part bearing a strong resemblance to that of the cultivated vanilla, but the fruits are not aromatic. It festoons trees profusely with its pendant stems, and is so like the cultivated vanilla plants that a person not aware of the existence of this indigenous species is liable to be deceived by it. It is pecu-

liar to Ceylon, and Dr. Thwaites has named it after Mr. Moon, the first discoverer of it. Another species, Vanilla Walkeriæ, Wight, almost leafless, and having beautiful white flowers, resembling polished silver, with stems and fruits resembling those of the vanilla, is equally common in the Western Province."]

LEAF DISEASE AND CARBOLIZED POWDER.

Colombo, 25th January, 1882.

SIR,—We notice that reference is made in last night's *Observer* by a Matale planting correspondent to the supply of carbolized powder. Be good enough to allow us to rectify a wrong impression which appears to be current regarding our position in the matter.

We are agents for Messrs. Calvert & Co., and sell their various preparations of carbolic acid. Their 15 per cent carbolic powder is sold by us at R21·50 per barrel of 200 lb. as frequently advertised in your columns. It will be thus seen that the essential element weighing 30 lb. is combined with 170 lb. of material on which likewise freight has to be paid in addition to import duty. At Mr. Schrottky's suggestion we undertook to get out the acid (which is admitted duty free) and prepare a powder here containing the same percentage of acid though on a somewhat different base. This saving of 85 per cent of freight and the whole import duty enables us to sell 200 lb. of this locally prepared carbolized powder, at R12·50, making a very appreciable reduction in cost,—a material point in connection with the purpose for which the powder was intended.—Yours faithfully, LEWIS BROWN & Co.

COFFEE LEAF-DISEASE:—MR. SCHROTTKY'S EXPERIMENTS.

January 25th, 1882.

DEAR SIR,—The planting community do not seem to realize that in my concluding notes, I have spoken with excessive moderation of the results of my experiments: it seems entirely forgotten that I have practically proved that leaf-disease can be successfully kept in bounds by carbolic acid vapour through all the variety of seasons *of a whole year* in the middle of a district where leaf-disease is almost chronically present. Let me recall the facts ascertained:—Speaking of the bulk of estates, leaf-disease in the Dumbara Valley is more or less prevalent during nearly the whole year. The periods of most severe attacks are September, October (south-west monsoon), and December, January (north-east monsoon,) and sometimes also during March. This applies specially to Gangapitiya estate, which (when I commenced my experiments) I was assured was about the worst place for my experiments, for it suffered usually even more severely than the rest, and certainly when I took it in hand it was as diseased as it could be. Gangapitiya is the only estate where the treatment was systematically carried out in the early part of the year and the disease had practically been got under by the end of May. We have spared no expense and trouble at other estates (particularly at Pallekelly where though we commenced at the same time, the treatment was suspended during what we now know the most important time of the year) in trying to gain on the fungus at a later period, but unsuccessfully. The fungus later on appears to grow almost quicker than one can kill it. Speaking now of last year, the attacks of leaf-disease during the S. W. monsoon in the Dumbara Valley were, one can say, less severe than usual, but still the disease was prevalent to a large extent. On my inspection of the district early in October, I found Pallekelly only partly affected; farther up the valley towards Gangapitiya the disease became worse and in estates immediately adjoining Gangapitiya, the disease was prevalent in a bad form. It had commenced, I was informed by the managers, at the end of June, and had increased steadily, and by one of these managers I was informed at the time that he did not believe a tree could be found on his estate that was free from disease. Gangapitiya was almost absolutely free from the disease with the exception of a field immediately to the leeward of a native estate, which had been neglected for a time, as every cooly was wanted to pick crop. When the north-east monsoon commenced, the valley began to recover, ample rain fell and everything looked luxuriant during November. Disease commenced to show again at the latter end of that month, and in beginning of December there was not a tree, nay, scarcely a leaf to be found in the estates immediately surrounding Gangapitiya, that was not diseased. At Gangapitiya it had been a case of a *continued, unabated* fight: a hundred times the fungus tried to establish itself, a hundred times it was prevented. The manager, in my absence in India during the S.W. monsoon, wrote to Messrs. Whittall & Co., "Leaf disease continues to crop up in places here and there, and I apply the powder immediately wherever I detect it." The disease was most severe during the middle of December, and up to the beginning of January, Gangapitiya remained unaffected. This closes *the whole year*, for our experiments in the Dumbara Valley were commenced in the beginning of January 1881, and it has been proved by the results at Pallekelly Estate that the fungus has no chance against the carbolic acid vapour at this time of the year. For want of material we had to abandon the struggle at Gangapitiya end of December, and the fungus is evidently endeavouring to obtain a footing now; we cannot prevent it; but the experiments are complete, the 12 months are over. A not unnatural qualification of the success of these results has been the statement that two estates at the very end of the district, appear now to be almost equally free from leaf disease. I have of course given full attention to this. I find that these estates are exceptionally situated, and that their past history essentially differs from that of the bulk of estates in the Dumbara Valley and from that of Gangapitiya estate more particularly.

EUGENE C. SCHROTTKY.

GARDEN PESTS.

Kahagalla, Haputale, Jan. 25th.

DEAR SIR,—Can you or any of your readers tell me how to get rid of the small black slugs? There are so many of them in my garden that nothing can grow properly. DEW.

[The following paragraph taken from the *Australasian* today would seem to meet the case of our correspondent. —ED.]

The *Konigsberger Land und Forstwirthshaftliche Zeitung* contains a short and interesting account of an experiment in killing insects and mildew in plants with a solution of carbolic acid. One part of carbolic acid was mixed with 20 parts of water, and left standing 24 hours, after which it was well shaken. A coating of oil and fat formed on the surface, which was carefully removed, so that nothing but water was left. The mixture was poured over a bed of radishes and cucumbers, which were badly mildewed, but the plants were destroyed by the first and second experiment. But the quantity of water was afterwards increased to 100 parts, and the mixture was successfully used for the smallest and most delicate plants. It was poured over trees, rose-bushes, and peach trees, and was most efficacious in destroying all kinds of insects. A small quantity was also poured over an ant-hill, and the insects forsook their nests with such rapidity that they left their eggs behind —a circumstance almost unknown in the annals of ant history. A small cherry-tree, the ripening fruit of which

attracted the ants in such great number that it was gradually dying, was saved by a narrow ring of the solution being made round the roots, which by being renewed every four or five days effectually kept the intruders away.

BRAZIL: ITS CONDITION AND PROSPECTS: No. 2.

Dollar, 29th December 1881.

DEAR SIR,—A second great cause of the extension of coffee cultivation was *the high price of coffee.*

Simultaneously with the rapid extension of the railway syste in Brazil came a rise in the price of coffee. From 1868 to 1878, and notably in the years 1873 74-75 and '76 the price of the article was such as left large profits to the Brazilian coffee planter. During these years, fortunes were made as quickly from coffee-growing as they had been made from cotton a few years previously. Those who had coffee estates extended them. Those who had made a little money at other occupations rushed into coffee land. If enquiry were made as to the antecedents of many of the most prosperous coffee planters in the Province of Saõ Paulo, you would find this one had begun life as a cart driver. From driver, he gradually became owner of bullocks and carts. That one was a muleteer who gradually got a pack of mules of his own; worked amongst them, himself and his children, aided, perhaps, by some of the half Indian poor labourers. The railway constructors bought up his mules at three times the original price of them. Let me here remark that all removal of earth from railway cuttings and the forming of embankments are done by small mule carts. A third was what you would call a jungle felling-contractor, who worked along with his own free labourers, half Indian like himself. With the rush into coffee land, the price for felling jungle rose. A fourth was a sawyer and contractor for squaring timber for building purposes, whose knowledge of the timber trade he turned to good account by supplying railway sleepers at so much a thousand. All these and others who had made a little money noticed the way in which poor families were made rich from the profits arising from the high price of coffee, and, being accustomed to have charge of labourers and work amongst them, made successful cultivators of coffee on the Brazilian system (of only letting the trees grow): and these were the best men for working the free *camarada*, with which he made his start, and continued until he was rich enough to buy slaves. These gradually became the large Fazendeiro we now see them. Reports of success, as they always are, were much exaggerated; so much so that a great many people who knew little of agriculture or of the management of either free or slave labourers got affected with the coffee craze; bought land; and planted it with coffee.

We have noticed that the sugar and cotton planters of the South, who could not prosper in face of low prices and heavy export duties, turned their attention to coffee. In the Provinces north of Rio de Janeiro, however, the land was not suitable, nor was the climate fitted for the growth of coffee as a commercial pursuit. This brought about the third great cause of coffee extension in Brazil.

The Exodus of Slaves from North to South.—The sugar planter in the North reasoned thus:—"Why should I continue in a branch of agriculture that gives me no profit? I have still a large capital lying on my slaves, and, owing to the large profits made on coffee-growing in the South, my slaves will fetch double the value I am accustomed to put on them if sold there. I am not to leave my old home. I don't know anything of coffee planting. Besides the institution of slavery is tottering; it cannot, in view of the working of the law of September 1871, last long. I'll realize while the price of live property is high, and invest the proceeds in Government bonds, and with the six per cent they give me I'll live quietly." We must be just, however. There are a great many good, able, and well intentioned men amongst them; and the planters in the north do not all do this. Many of them do consider the misery that such a course subjects the poor slave to. They know the slave has a particular liking for the country and district where he has been born and grown up, that, in spite of the captivity in which he is held, the ties of affection bind him to the old plantation, and so fast that even freedom can scarcely separate him from so many old people he is accustomed to call grandpapa and grandmamma; from the large number of uncles and aunts and the dozens of cousins with whom, when they were children, before being turned on to the field-gang, he used to sport and play; to puddle in the stream in the dry season and roll in the mud together in the wet; to hide from the old cook in the orange grove at meal times, or even to stand a pommelling together from the same aged individual (whom he loved none the less afterwards for it) for denying any knowledge of their only garment, while they know some parts were left on the guava trees, and others on the garden fence. They know the habits of the negro well, and that, were the old African, who but ten or fifteen years before had been torn from his kindred in his own land, but had now, through the softening influences of time, almost forgotten the fights, the village burnings, the slave hunts, and long marches which he had experience of in the "Great Dark Continent," could not without a pang be separated from the friends he had made in later years. All honour to those, who, out of commiseration for the slave, held to his plantation and tried to improve his position by adopting a better mode of cultivation by means of the plough, and by the erection of improved machinery, extracting a larger percentage of juice from the cane. A large proportion of the planters in the North, however, sold their slaves.

The Portuguese slave-dealer, who had a few years before been driven into forced retirement, saw his occupation revived, and under much better conditions. *The slave trade* was renewed with vigour. There were no British cruisers that his ship had to evade in leaving port; no risk to run of his cargo being damaged in ill-ventilated ships, while crossing a wide ocean; and no chance of being chased and of the cargo being thrown overboard to prevent his ship being taken as a prize. The buying was now done openly and quietly. The transport by sea was in clean, airy, and swift steamers, flying the flags and under the protection of the various civilized nations of Europe. The landing was not effected in a rock-hidden bay—of which there are numbers between Rio de Janeiro and Santos—but in the open harbours of Rio de Janeiro and Santos, and along with European merchants and their families and pleasure-seekers from all parts of the world. Railways carried the slave gangs at once away from the feverish sea-coast to the interior, where they were soon disposed of for large prices to eager coffee planters. I did not intend entering into the sentimental part of the subject, but I cannot help looking back with horror at the remembrance of the large gangs of slaves I have seen at the railway stations in the interior of Saõ Paulo. I noticed that gangs of boys from 10 to 15 years were readily bought up. There were often droves of women with and without children. In many cases, a sale was effected before they left the railway station, if a medical man were procurable. Many of this profession are *specialists* at examination of "niggers." The fee for medical examination is high as the value at stake is considerable. Outside of the medical profession, experts are

often called in, the same as a farmer amongst ourselves will trust the opinion of an experienced neighbour in the examination of a horse, in addition to that of a skilled veterinary surgeon. The number of women without husbands and children without parents among these shows that either the law of 1871 is not regarded, as far as relates to separation of families, or that, owing to that law, many slave-owners do not allow slaves to marry. It has been by such a trade that the planters of the provinces of Rio de Janeiro, Minas Geraes and Saõ Paulo have b en able to pick the large coffee crops from the numerous new plantations opened in late years.

We now see that railway extension, the high price of coffee in the United States and Europe, and the removal of slaves from the sugar and cotton plantations in the North to the coffee-growing provinces of the South, are the three principal factors in considering the question of the large production of coffee in Brazil.

The most important part of the question, however, for the Ceylon coffee planter is to find out how long this is to continue, and, as I before observed, this is the most difficult of all. No doubt it hangs entirely on the labour question, and that leads to the perplexing point of how long slavery is to last.

Mr. R. B. Tytler, in a letter to your valuable paper, the *Ceylon Observer*, as far back as 1852, writing on the subject of the large production of coff e in Brazil as it then affected Ceylon—when Brazil was giving little more than a third what it gives now—quoted an authority, showing that the slave question was then embarrassing the landed-proprietors; in 1871 the slave holders themselves thought the law passed that year was to bring them to speedy ruin. I myself, when writing you eight years ago, thought slavery could not last many years, and in 1875 I prophesied that the crop picked that year was the maximum of Brazil's capabilities. We have all been wrong in our conjectures. The signs of decay are very indistinct, but such as these are, I shall notice in a future communication.

P. S.—I have no doubt annoyed you by giving you these pieces in scratches, but you can please yourself about publishing them as they arrive or altogether. With the compliments of the season.—I am, yours very truly, A. SCOTT BLACKLAW.

COFFEE IN SOUTH TRAVANCORE.

South Travancore.

DEAR SIR,—As regards the statement of coffee exported from the Malabar Coast given in the January *T. A.*, allow me to remind you that this part of Travancore has two ports—Quilon exports even more coffee than Colachel—Colachel will only export about 11,000 cwt, again this year, whilst Quilon will export over 14,000 cwt. P. B. P.

EXPERIMENTS IN THE MANURING OF COFFEE.

Yoxford, Dimbula, Feb. 1st, 1882.

DEAR SIR,—In sending you the following somewhat lengthy notes of my manuring experiments, I am actuated mainly by the desire of adding to the general stock of information on the subject of manuring, and, if possible, leading planters in general to adopt a more scientific system of experiment than is customary. Some will no doubt be inclined to dispute the correctness of my conclusions, but it must be considered that the laying down and watching of such a series of experiments is in itself a sort of training, qualifying one to judge more accurately of the results than those who have not laid themselves out for a similar course of self-instruction.

The experiments were laid down in a field which had only borne one fair crop since it was first planted in 1871, at an elevation (4,300 feet) which appears to be above the line of highest crop production on this side of the country, and in a soil of only fair average Dimbula quality, which had never been manured previously. So that it can hardly be said that the results are due to the superior climate or soil of this estate over the district in general, with the exception, perhaps, of the one plot, of which after-mention will be made, and which comes in usefully to compare the value of season with manure. I would warn those who may read this report with any interest that, if they make use of the mixtures apparently most successful here, without any reference to the soil or climate they have to deal with, the result will in all probability be disappointment. The principles, however, of right application are to be gathered, but it is only by experience gained from careful experiment that any certainty of result can be expected to be attained.

How far further experiment may modify the present results time alone will shew; one year's trial cannot be expected to lead to decisive proof.

The experiments which follow, were laid down at the end of July 1880, a period which, I have since come to the conclusion, was too late for the best results at the elevation before mentioned.

The plots are parallel numbered from one to ten.

No. 1.—No manure ground forked. This plot is full of boulders of gneiss, which cropping up above the coffee and retaining the warmth, appeared to give the trees a sort of artificial climate considerably superior to any of the other plots.

No. 2.—Cattle manure 25lb. with ½lb. bones per tree.

No. 3.—Complete manure containing nitrogen, phosphoric acid, potash and lime.

No. 4.—Hughes' mixture, as recommended, castor-cake ½lb., bones ½lb., superphosphate ½lb.

No. 5.—No manure.

No. 6—Manure without potash, *i.e.*, containing all the ingredients of No. 3, except potash.

No. 7.—Manure without lime.

No 8.—Manure without nitrogen, beyond that contained in ½lb. bones (steamed).

No. 9.—Manure without phosphoric acid.

No. 10.—Complete manure No. 3 applied 6 weeks later than to the other plots.

In comparing the results, the condition of the coffee on the different plots at the time of application must be taken into consideration. Plots 1, 2 and 5 were superior coffee in good heart; next came plot 10, then plots 6 and 9; and, lastly, plots 3, 4, 7 and 8, which were thin and comparatively poor. The results were :—

Plot	1 ...	...	Cwt.	7½ per acre.
,,	2 ...	...	,,	7⅞ ,,
,,	3 ...	...	,,	5½ ,,
,,	4 ...	...	,,	2⅝ ,,
,,	5 ...	...	,,	3 ,,
,,	6 ...	...	,,	4 ,,
,,	7 ...	...	,,	4¾ ,,
,,	8 ...	...	,,	6⅓ ,,
,,	9 ...	...	,,	4⅘ ,,
,,	10 ...	...	,,	4 ,,

The comparison between plots 1 and 2 is interesting, as shewing apparently that *season* is equal to the best manuring. For further comparison, plot 1 is of little value, as in such a year as last, which was unfavourable for high coffee, it gained the advantage of a sort of artificial season by reason of the warmth retained by the boulders above-mentioned, which was so great for a short time as to cause the leaves of the trees to droop and look as if they were going to die.

Leaving out No. 1, therefore, I take No. 5 as the standard of comparison, still, however, bearing in mind the difference in the condition of the different plots

at the time of application. Plot 2, as compared with plot 3 at the time of the laying down of the experiment, was in good heart, plot 3 being at that time thin and weak. The effect of the manure on plot 3 was very marked as regards the formation of wood, but, owing to the late application, it failed to mature its new wood in time for the early blossoms, which practically gave me my last year's crop. The difference is about 2 cwt. an acre, which may therefore be taken as the difference in value between the condition of plot 2 and plots 3, 4, 7 and 8 at the time the manure was applied. The next point that strikes the attention is the superiority of plot 8 over plots 3, 4 5, 6 and 7. To what is the superiority attributable? To me it appears to be in the absence of nitrogen beyond what was to be found in the bones. The growing period seemed to be extended on the other plots beyond its proper length, for I noticed at the time of the early blossom that the trees seemed to have a greater inclination to form wood in the plots to which nitrogen had been added than on plot 8, in which as I have said, there was no nitrogen beyond what was contained in the bones. I may add that I see the same tendency exhibiting itself again this season, which, I believe, only a continued spell of dry weather can counteract.

The total failure of the manure in plot 4 is remarkable, but I believe it to be attributable to the same cause and to the fact that the nitrogen in the castor cake only became slowly available, continuing to act so as to cause the wood to go on growing at a time when growth should have been checked.

Potash appears to exert a favourable influence on each of the plots to which it was applied, though in plot 9, in which it is in excess, the benefit gained seems to bear only a moderate proportion to the amount used, *i. e.*, it would appear that beyend a certain percentage in a manure any excess is of no gain to the tree.

Lastly, plot 10, compared with plot 3, seems to show that time of application is an important factor, making, indeed, all the difference between profit and loss, for the gain on plot 10 over plot 5 is only 1 cwt., or say R50, whereas the manure cost R9·50 applied.

I do not seek to draw any further deductions from this one year's experiment, as, owing to the season, the differences are not sufficiently marked.

I sum up the results of this one year's trial as regards the question, does manuring pay?

There was a profit on plot 3 of R21·50, after deducting the cost of manuring; on plot 7 of R20; on plot 8 of R89, while on plot 2 the gain was R106·50. Plots 4, 6, 9, and 10 show a loss.

If the manures had been applied at an earlier period, I am inclined to think that the gain on plots 3, 4, 7, and 9 would have been greater.

Last year, the experiments were laid down in June, and it will be interesting to see if the above conclusion is borne out.—I am, dear sir, yours faithfully.

WM. D. BOSANQUET.

THE CEDARS OF LEBANON.—We have received from Mr Eldridge, Consul-General at Beyrout, a copy of the regulations lately issued by Rustem Pasha for the guidance of travellers and others visiting the Cedars of Lebanon. These venerable trees have now been fenced in, but, with certain restrictions, they will continue to be accessible to all who wish to inspect them. In future, no encampments will be permitted within the enclosure, except in the part marked out for that purpose by the keeper, nor may any cooking or camp fires be lighted near the trees, a regulation that has been rendered specially necessary by the partial destruction by fire of three of the largest cedars. Lastly, no animals will be allowed to enter the enclosure, and the keeper of the ground has orders to hold the dragomans and tourists' guides responsible for any infraction of the regulations.—London *Times*.

A QUININE MANUFACTORY is in a fair way to be established in Colombo; a lease of the piece of land adjoining the Slave Island Ice Mills has been taken for a period of ten or fifteen years and no time will be lost in going to work. One point on which some doubt has been expressed is whether the temperature of Colombo is not too high for the purpose of manufacturing, and whether Nuwara Eliya would not therefore be a better site for the purpose; but no doubt the present promoters know what they are about.

COFFEE.—It is true that the finer qualities of our Coffee maintain their position fairly well—R47 f. o. b. equal to 92s per cwt. in London, is still the quotation here; but the fall in respect of medium and low qualities is certainly very great. R26 now offering for "Garden Parchment" is rather a change! For certain Ceylon marks we know there are buyers for English and Continental houses who, year by year, must have their supply of the best coffee, and who care not if it costs a good deal more than the ordinary market quotation. But granted that the bulk of our Ceylon produce is far superior to either Brazil or Java coffee, and that in past years it was all taken off, it is strange, with three short crops now, that the much more limited supply of our high-class coffees should not be in better demand.

SPORES.—A M. Miguel has been making a careful examination of atmospheric dust. He finds in the air two varieties of spores. These spores are the seeds of plants, and are so small as only to be seen clearly under the microscope. Of the first variety there are about 30,000 or 40,000 contained in a cubic yard, the number varying somewhat according to the weather, and are, for the most part, not injurious to health. Of the other kind, however, there are found only about 100 in the cubic yard, and some of these, if taken into the system, may produce serious effects. During rainy weather the first variety may increase in number, so that a cubic yard of air will contain 200,000 of them, while during a drought the number falls to only 4,000 or 5,000. The second variety almost disappears during rainy weather, but may double in number during a drought. So it seems that much of the disease in the world is connected with the existence of atoms so minute that a microscope is required to render them visible.—New York *Hour*.

LEAF-DISEASE (?) ON A MANTIS.—A correspondent writes:—"Talking of leaf-disease and its hosts, one would have imagined that at least they would have been confined to the vegetable kingdom. But, examine the mantis I enclose and let your eyes answer whether or not the unfortunate insect was not suffering from an attack that might have been calculated to deprive it of its wings in a week or so had it not prematurely departed this life. Seriously it seems to me a remarkable example of how nature adapts itself to circumstances in many cases, for its support and protection. This creature was caught on my back in a clearing, and not in the jungle I had lately passed through, whence it had doubtless settled on me! So I am unable to identify the tree or shrub it was ton; but must conclude that it was suffering from a disease of which in outward appearance, the spots and markings on this mantis' wings are a true delineation: and it would be interesting to know by what subtle process the similarity, in appearance, developes itself. Is it another illustration of the means Jacob employed towards a fair division among the sheep and the cattle and the goats of his father-in-law's flocks, when he had come to an understanding with him?" [The spots are certainly curiously like those caused by *hemileia*, but an entomological authority states that "the diseased state of the wings of the praying mantis is probably due to natural decay from the old age of the insect, and not from the attacks of any insect parasite."—ED.]

THE TEA TRADE.—The custom house returns show that large supplies of tea continue to be shipped to London and Melbourne from Madras and the Coast ports. In November last the shipments of tea from Beypore aggregated 16,682 lb; from Calicut 1,705 lb and from Madras in December 6,005 lb. Of the latter quantity, 5,000 lb were sent to Great Britain, 975 lb to Bombay and 30 lb to Melbourne.—*Madras Standard.*

CUPREA BARK.—In *Comptes Rendus*, p. 593, Oct. 17, M. Arnaud describes a new alkaloid which he has obtained from a dark red-brown bark with a resinous fracture, imported from Santander, and which may be presumed to form part of the recently imported China Cuprea. He finds the bark to contain 0·8 per cent of cinchonine and 0·2 per cent of the new alkaloid. He obtains it by treating the bark with milk of lime, drying the mixture, exhausting with boiling alcohol, treating the resulting extract with hydrochloric acid in excess and crystallizing. The hydrochlorate of the new alkaloid is less soluble and crystallizes out first, the hydrochlorate of cinchonine remaining in solution. This alkaloid he has named cinchonanime. It appears to occupy an intermediate position between quinanime and cinchonine, in having two atoms less hydrogen than the former and two more than cinchonine.—*Pharmaceutical Journdl.*

GOLD IN CEYLON.—We have within the last few days had a second visit from Mr. Harvey of Australian gold-mining repute, who called here on his way from Melbourne to Southern India with a party of miners from Victoria, whose services he has secured for one of the Wynaad Gold Companies, with which he is connected. His visit to the gold fields of India will be brief, probably for not more than two months, as he has other work in view elsewhere. Mr. Harvey has not changed his opinion of the value of the auriferous deposits in South India. He continues to speak of them as formerly, as being of a varied character—a portion exceedingly rich, a portion of indifferent quality, and another portion as likely to prove worthless. The great difficulty in the Wynaad is the absence of good roads, and Mr. Harvey is decidedly of opinion that a much smaller percentage of the precious metal will pay in Ceylon than in India, in consequence of our having such excellent roads in all directions thereby lessening the cost of transport, and facilitating access to any gold reefs that may be discovered. During his recent stay in Colombo this gentleman examined a large number of quartz samples submitted to him, the produce of different districts, and although the greater portion of these were pronounced by him as cold and valueless, there were others which immediately struck him as giving promise of some practical results. These samples bore a strong resemblance to the gold-yielding quartz of Southern India, having that peculiar colour about them which betokens the presence of ore of some kind, in many cases sulphur with appearances of copper. But of course an examination with the eye is not sufficient to pronounce upon the probable value of a small sample, and when Mr. Harvey was requested by one Colombo firm to pay a visit to a district from which a very promising sample bad been taken, he pointed out the necessity first of a further exploration of the locality, so as to expose a certain depth of the reef, to enable him to come to something like a conclusion on the subject. Mr. Harvey left by the Bombay steamer for Tuticorin whence he will proceed to the Tambracherry estate, for which property he is chiefly acting, and for which he is taking the miners engaged in Australia. During his absence of six weeks or two months, explorations will be made in several localities with a view of enabling him, on his return in February, to give something like a practical opinion on the value of the samples raised; and we may add that Mr. Harvey thinks it extremely probable that gold may be found in Ceylon which, with our advantages, may be worked to a profitable account,—"C. Times."

COFFEE.—We find that the consumption of coffee has been fairly maintained, and on the continent demand has steadily increased in a most healthy manner to such an extent that if the heavy supplies could but be arrested, no doubt stocks would in time assume reasonable proportions. But in the face of continued large imports, and of the almost total disappearance of the large class of middlemen or dealers who were formerly of great use in acting as intermediaries between the importer and the retailer, and so helping to steady the market, there is no escape from present depression. An impression naturally arises, that some "bear" influence is at work helping to intensify what otherwise would be an ordinary fall in the coffee market; and should this be the case, the ultimate result may be a rebound in prices as sharp as the present fall.—"C. Times."

THE BENGAL GOVERNMENT'S PROFITS ON CINCHONA.—The Calcutta *Englishman* says that the Bengal Government, like the private trader, find cinchona a paying speculation. The last official year the Government turned out 9,296lb. of its well-known febrifuge, at an average cost of R9-3-10·625 a pound, and a total cost of R85,921-6-3. They had also in hand from the former year 3,726lb. By sales to the public of the febrifuge, seeds, and plants, a return of R56,436 odd annas and pies was obtained, and a further sum of R32,340 from the sale of yellow bark in London. Thus public sales of the produce of the cinchona establishments more than paid for the expenses incurred. In addition, however, to the produce sold, febrifuge valued at R90,880 was disposed of to the Medical depôts of Calcutta, Bombay, and Madras. Had quinine, for which this febrifuge was substituted, been procured in the open market, the quantity needed would have cost the public purse, it is estimated, R5,50,000. The sum saved the Government in a similar way since thefebrifuge was first substituted for the more expensive drug, is further calculated to have amounted to 16 lakhs.

SUCCESS OF MR. SCHROTTKY'S PATENT PROCESS OF INDIGO MANUFACTURE.—From the Calcutta *Englishman* just received, we take the following, and we commend the facts of the leading Bengal journal to the critics of Mr. Schrottky's work here, who, writing from Calcutta, endeavoured to prejudice local authorities:—

The experiments that have been carried out in Tirhut during the past indigo season with a view of testing the value of Mr. Schrottky's patent process of indigo manufacture, seem to have been thoroughly conclusive as to its success.

At Harsingpur Factory the result of a series of trials was an average excess of dry produce of from 17½ to 39½ per cent. from the patent, as compared with the ordinary, process. At Dhoolie Factory the result was an increase, in favour of the patent process, of 21 per cent.

"At other factories," to quote the patentee's account of the results obtained, "the Patent Process was chiefly tried with the view of ascertaining whether it would improve the colour, but in the majority of cases, an increase in quantity, where quality ot plant was the same, could be shown, which, however, did not always appear as an increase in the number of presses; the gain lying chiefly in a much thicker paste, and hence larger sized cakes. At Barowlie Factory, for instance, the produce was, before the use of the Patent Process, 10 presses from 12 vats, The "Mâl" or paste being very thin and difficult to press, cakes averaging 2½" to 2¾" thickness. The first day of the Patent Process the "Mâl" changed entirely its character; it became very thick and pressed easily. The number of presses were the same, *but the cakes ranged from* 3¼" to 3½" *thickness.*

It also appears to be beyond doubt that the use of the new process leads to a decided improvement in the quality of the indigo manufactured, the difference in the valuations being in many cases twenty rupees per maund in its favour.

NEW INDUSTRIES.—I see in your paper inquiries about tapioca and dried banana or plantain, made in the island. Both these articles have been, from time to time, made, of course, in small quantities, by my father, the Rev. F. Asbury, of this place (Manippay), and supplied especially to American friends here. He holds a prize-certificate of the committee of an agricultural exhibition held years ago in Madura, Southern India, for exhibiting the best tapioca; rope made of plantain fibre; collection of gums; etc., etc.—*Cor.*

MOYAR COFFEE.—The annual meeting of this Company was held on Dec. 21st, Mr. Hall in the chair. The chairman stated that that was the first meeting of the Company since they parted with a considerable portion of their land to the Devala Moyar Gold Mining Company. He had to express the regret of the directors that they had not a more favourable report to present to the shareholders in a financial point of view, the result of the last year's working, instead of a profit, having been a considerable loss, owing to a bad season for the coffee crop and the smallness of the price obtained for the coffee in this country. Whilst they expected twenty-five tons of coffee from last season's crop, they only secured fourteen tons. The three estates held by the Company covered an area of about 2,600 acres, but the extent of the coffee plantations was not very large: and about 200 acres were under cultivation, and another 100 acres were planted out last year, and 50 acres had been cleared for planting, so that altogether they would have about 350 acres under cultivation at no distant date. They were also planting out cinchona, one of the products likely eventually to give good returns. Up to March 31st last they had planted out 97,000 plants, whilst previously they had not more than 20,000. They had recently a good supply of rain water, which had done the plants much benefit, and in future it was expected they would be enabled to obtain all the water they required from the river for the purposes of irrigation. It was expected that the next season's coffee crop would amount to forty tons. The report was adopted. —*Overland Mail.*

EGYPT is pronounced by competent authorities too dry for Jute; the Western Province of Ceylon is the spot for the requisite vapour bath. A humid atmosphere must be a *sine qua non* for its fructification, then I am afraid that such practical experiences will bar its progress. I think the climate of Egypt is too dry for such an undertaking to prove profitable, and that none but a similar climate to that of Bengal with its constant moist atmosphere—a species of vapour bath—its alternate showers and sunshine during the period of the growth and maturity of the plant—will bear good and profitable results in my humble opinion.—*Cor. of Dundee Advertiser.*

CINCHONA BARK.—At the public sales held on the 20th instant, 5,742 packages were offered, as follows:—South American, Columbian, Pitayo, &c., 2.893, Cuprea 2,377. Carthagena 263; East Indian, Nilgherry district, 122; Ceylon, 87. The market during the past fortnight has been the most active on record, prices advancing day by day, the rise from the lowest point being from 40 to 50 per cent., and even more in some cases. At and immediately after the public auctions, 3,500 packages were sold, and the total sales for the fortnight, many of which are not reported, are computed to be not less than 10,000 packages. For some time, owing to the enormous arrivals of Cupra, prices receded until they were so low, that they were reported to be considerably less than the cost of production. This, coupled with the assertion that supplies of Cupra, had nearly run out, appears to have induced some speculators to operate largely for a rise.

SULPHATE OF QUININE.—The price of best English brands has been advanced from 8s to 10s per oz., but manufacturers will only take orders for small quantities, and it shighly, probably before long we shall have again to quote a further rise.

INDIAN TEA IN RUSSIA.—The *Statist* is informed by Messrs Gow & Wilson, who have made inquiries of the British Consul at St. Petersburg, that Indian tea does not find purchasers in Russia owing to its alleged rough flavour. The few merchants who have ventured to import have had to dispose of it mixed with China tea, and a well-known merchant, who imported a large parcel of Indian tea last year, being unable to find purchasers, ultimately reshipped the consignment, incurring a considerable loss by the transaction. The quantity of China tea imported into Russia, overland and by sea, in 1880, was about 28,800,000 lb. The duties on tea, according to Article 75 of the Russian Customs Traff, is—1. Flower, green and yellow 22 robins per pud. 2. Ordinary black tea; stalks, and brick tea, 15·40 roubles per pud, both payable in gold. No distinction is made in the tariff between China and Indian teas. There are two circumstances which we should think are adverse to the sale of Assam teas. One is the fact that Assams, being "tippy" teas, the duty on them would be the higher rate, and the second reason is that these teas are more pungent and rasping than Darjeeling, Kumaon, and Kangra Valley teas, which, though fine, would, in most cases, pass at the 15 rouble 40 copeka duty. The difference in duty would be great consideration to the Russian dealer. The Russians are extremely particular in the choice of teas; but, if a high class delicate quality were introduced, the present prejudice against Indian descriptions would be overcome, just as it has been in this country.

RED RUST IN WHEAT.—Mr. R. A. Perkins, of the Experimental Farm, Millicent, near Mount Gambier, South Australia, speaks of red rust as follows:—"This fearful pest first made its appearance in this colony about the year 1853 or 1854. Many will remember the year 1854 to their cost. Since then it has been more or less prevalent, and much valuable time and expense has been wasted in experiments and researches to try and find an antidote for red rust, but none of those tried have proved a sure remedy, although some are of great value. First—It has been proved that soft fluffy-strawed wheats are the most susceptible to red rust, so it behoves every farmer to sow none but what will grow a strong glossy straw. Second—Manure and Pickle.—I have tried a great number of different sorts of pickle, and the best results have been obtained from salt and lime, and the worst from bluestone. I consider that we require a stimulating pickle, of which I find lime and salt far the best. Glue and charcoal, saltpetre, sulphate of soda, and many chemical mixtures, have been tried with varying results, but none have proved of any permanent value. I have made a great many experiments, and may mention a few that have been suggested by Mr. Sabine in a paper read before a commission appointed by the Royal Agricultural and Horticultural Society to inquire into the subject of red rust:—1st.—New seed treated with bluestone. 2nd.—Old wheat treated with salt and lime. 3rd.—New wheat treated with salt and lime. 4th.—Old wheat treated with bluestone. The results of these experiments have always been in favour of salt and lime. The old seed is, I believe, of some value; the plants are stronger and more vigorous and healthy, which is of great importance, and it is an acknowledged fact that a strong, healthy, early crop has the best chance of yielding a good harvest. When those facts are acknowledged, it behoves every farmer to sow nothing but strong healthy wheats. Those most suitable are, as tried by me:—First, Oregon; second, Red Tuscan; third, White Tuscan; fourth Nonpareil. These are of strong growth and hardy nature. I find all those sorts of a soft fluffy straw are most liable to rust. I have the noted Defiance and other sorts, which I hope to be able to give a good account of next season."—*Sydney Mail.*

CINCHONA.—A paragraph has lately gone the round of the papers to the effect that Mr. Cross, who has been for some time in Ootacamund examining and reporting upon the Government Cinchona Plantations, had informed Government that the greater part of the Cinchona propagated by Government and sold to the public as C. Succirubra (red bark) was really the comparatively worthless variety known as C. Micrantha or the grey bark of commerce. This statement, put forward by so high an authority, naturally caused some anxiety to those planters in Wynaad and elsewhere who had obtained their plants and seed from the Government Plantations. We are now authorized to state that His Excellency the Governor, who is himself a most able and experienced botanist, aided by Dr. Bidie and other experts, went into the question most fully, during his recent visit to Ootacamund and after hearing all that Mr. Cross had to say in favor of his peculiar theory, has arrived at the most positive conclusion that Mr. Cross is mistaken, and in fact, that there is no evidence to support his theory, while everything goes to show that the variety which has been so widely distributed by Government is neither more nor less than it purported to be, viz, the common C. Succirubra or red bark. A practical planter to whom we mentioned the result of the investigation remarked "What does it matter whether they call it Succirubra or Micrantha? We know that it fetches a good price in the London market, and if it *is* Micrantha, why we'll plant Micrantha, that is all."—*South of India Observer.*

VEGETATION IN THE DEHRA DOON.—In a letter, under date the 8th November from the Dehra Valley, Captain J. F. Pogson writes as follows :—This is a wonderful place for Horticulture. All the large old houses have gardens, and tree plantations, and *these*, as a rule, are *botanical gardens*, though the proprietors seem quite unconscious of the fact. On Saturday, I went for a walk and stood at a gateway, astonished to behold an avenue of "keloo" trees, (*Cedrus Deodara*), with "Cheel" (*Pinus sylvestris*,) "Kyle" *P. longifolia*, Cypress and Juniper (Himalayan,) in full growth in the immediate vicinity of mangoe trees, plantains in full fruit, papaya in ripening fruit, with the large bamboo, Loquat and Lichee. The hill blackberry growing as a weed under jacktrees (kuthul) of Bengal, and guavas. As for forest trees with which the magnificent roads are shaded, I have yet to learn their names. What I have yet come across I do not know, for such a jumble of trees from all parts of the world growing in defiance of all laws, and nations on the subject I never expected to see. I have come across *Ficus elastica*, American aloe, and adjacent something very like pineapple. Lord Hartington should come here, and imagine himself in a mighty "*Chatsworth*," with the cover (glass-roofing) taken off, and then perhaps the improvement of Indian Agriculture, Horticulture, and forest tree culture would be taken up in real earnest in place of being experimented upon. En route from Saharunpore, I passed through miles of forest growing as if the height of foresting consisted in seeing how many forest trees could be packed within a given space not sufficient for the growth of half-a-dozen trees. Some day I will visit the forest and measure the number of trees to be found within a radius of twenty yards.—[Any one who has journeyed to the Doon viâ Saharunpore will recognize the truth of Capt. Pogson's description. Conspicuous in forests of sal and Sainé, are scandent *bauhinias* with foliage of enormous size. The Doon is 2,000 feet above sea-level lying under the shadow of the Himalayas, and the climate seems suitable for a meeting-place of the vegetation of "the abode of snow," of temperate and of torrid zones alike. Appropriately therefore is this place the site of the first College of Forestry in India—the first we believe in the British dominions.—ED.]

A SUBSTITUTE FOR COFFEE has lately been discovered by two gentlemen at Akyab, for which they have applied for a patent. It is the seed of a plant called in Burmese *dannaythee*. It is grown as a weed plentifully all over the province, and it is thought, if cultivated, would doubtless produce larger and finer seeds. They are very small usually, but, for the cost of picking and shelling them, a plentiful supply can be had. The seeds, after being well roasted and ground, produce a slight aroma of coffee, and with plenty of milk and sugar form a palatable drink, although Mocha is generally preferred.—*Madras Mail.*

THE COTTON INDUSTRY THRIVES APACE (says the *Bombay Gazette* in its annual review). Every year adds to the numbers of our spinning and weaving mills. The mill property of Bombay, which became depressed of 50 per cent. below par in consequence of the late famine, has now, in spite of occasional fluctuations, risen to par value and a little more, and 30,000 operatives find profitable employment in the industry. The ordinary Hindoo labourer, the representative of the Deccan ryot, has occupied this field of industry almost entirely, and here it is that the Hindoo woman appears conspicuously as a helpmeet to the family and as a breadwinner. The Mahomedan element in the mill industry is small compared with the Hindoo, and it is not easy to tempt the Mahomedan hand-weaver to relinquish his independence and join the operative class in the large mills that are worked by machinery. As far as can be seen at present, the capital which has been embarked in the mill industry of Bombay is comparatively safe and sufficiently remunerative to attract native capitalists, especially the Bunniahs and the Bhattias. [When are Messrs. de Soyza and Rajapakse to try a cotton mill in Ceylon?—ED.]

CULTIVATION OF THE GRAPE VINE IN CASHMERE.—The subject that next came before the meeting was the culture of the Grape in Cashmere for the manufacture of wine, as alluded to in a letter from Monsieur Ermens, the Director of Agriculture to His Highness the Maharajah. The following are extracts from the letter :—Cashmere is essentially a wine-growing country, and the richness of the soil is admirably adapted for vine cultivation. His Highness the Maharajah engaged me specially for the cultivation of the vine as well as for the manufacture of wines and spirits. I arrived in Cashmere in 1876, and selected the Shirmencha slope as the most suitable for vine cultivation, because the soil appeared to me suitable, and also because of the certainty of procuring water for irrigation purposes. In Europe water is no great object; but in India the soil dries up so quickly that water is indispensable. I began by planting in 1877, and the cuttings all came from France and from the best districts, the names of which are as follows :—Margaux, Tabernet, Sauviquion, Cabarnet Franc, Malbec, Merlot, and Verdot. These are the fine varieties of vine, the wine of which is known in the trade as Margaux, Chateau-Lafitte, &c. The other cuttings come from Chateau-y-queem in two varieties, the Semillion and the Sauviquion. The grapes of these are of a very fine quality, and yield a superior class of wine, Chateau-y-queem being, as you are aware, the finest white wine in the world. You will notice that I have taken cuttings from the best vines, and I have been highly successful, as on the 3rd year, I gathered lots of grapes and made an abundant harvest—a thing not to be done in France under five years. The wine made has lasted and been found excellent. This wine will have acquired all its flavour in 1883, and then be sold in the open market at a low price, compared with French wines sold in India. [If all this turns out to be correct, then India may be added to the wine countries of the world. But the quality of the wine when matured has yet to be tested. As population increases in Australia, we suspect it will beat the world for cheap as well as good wines.—ED.]

BRITISH HONDURAS.—Every endeavour is to be made to foster the fruit trade between Belize and New Orleans. The planters are constantly adding to the area under fruit cultivation, and the trade promises eventually to assume immense proportions. For want of roads, the mahagony trade is coming into standstill, though there are inexhaustible supplies of it in the forests of the interior.—*Colonies and India.*

AGRICULTURAL AND HORTICULTURAL SOCIETY FO INDIA.—TEA CULTIVATION IN THE ANDAMANS.—Read a letter from Major Protheroe, C. I. E., Officiating Commissioner of the Andamans, of which the following is an extract :—

"You will be glad to hear that the tea experiment in Port Blair, begun a few years ago, has so far been successful, and that the hybrid variety of tea, the seed of which was supplied by you from, I think, Assam, flourishes in these islands, flushes well, and the tea prepared from it has been highly valued by experts. The China and Assam varieties of tea have not, however, succeeded so well as the hybrid."

OUR LABOR SUPPLY upcountry is, in many cases, embarassingly deficient even on estates which have never been behind in the payment of wages. Instead of from 100,000 to 200,000 immigrants, as in former years, the arrivals in 1881 were only 53,000 and the departures exceeded this figure by 10,000. This is a sad and significant sign of the times, but, as there is "a tide in the affairs of men," so there must be ebb as well as flow. Even now we look for the "good time coming" for employers of coolies as well as coolies themselves.

THE HYBRID CINCHONAS ON THE NILGIRIS.—A correspondent writes :—"Colonel Beddome has changed his opinion regarding these hybrids so often that I cannot place much reliance on what he writes. I am able to deny emphatically that Mr. Cross found either of what we call hybrids in the *original* planting of 1862. True there are a few there in 1862's planting *now*,' but they were in the nursery in 1870. Mr. McIvor's report for 1875 first mentions these trees and it is not likely that, if Mr. Cross introduced one or both of them in 1861, they would have passed unnoticed for 14 years. All the analyses up to date shew that, what we call Pubescens, is equal to, if not better than, Officinalis, and the growth,—therefore the weight of bark,—is infinitely superior even on grass land."—*Madras Mail.*

MR. H. C. BURY, a well-known Uva pioneer and the proprietor of valuable plantations in Haputale, is a passenger home by an early steamer, after a short visit to the Central Province. Mr. Bury is on the whole well pleased with the appearance and prospects of coffee in the premier district. He is delighted with cinchona cultivation more especially at an elevation of 5,000 feet and upwards. The one great drawback is transport, and if it had not been for the absolute necessity to the Government themselves now, of extending the Nanuoya line to Haputale, he and other proprietors would devote all their energy to the promotion of a low-country Hambantota line with a curing establishment at that port. Such a railway, the Government, of course, will not now allow, and we have pointed out to Mr. Bury, advantages in direct communication with Colombo, even though the line only start from the top of the Pass. The over-hill line will certainly be a first-class work at the money allowed and once made, no flood or landslip need be feared such as have been experienced all round the Uva lowcountry on the Halpe, Hambantota and Batticaloa roads during the burst of the north-east monsoon. If only the "twenty-five miles' section" were commenced to settle all doubts!—Mr. Bury successfully experimented with silkworms some ten years ago in Haputale, and we must hereafter refer to his experience in this industry to encourage his successors of the present day.

THE ERYTHROXYLON COCA.—The Madras Museum is in receipt of some samples of this plant, which is a native of Peru and Equatorial America. The leaves possess very powerful stimulating and sustaining properties, and are eaten for this purpose by mountaineers in the localities where the plant grows. It use enables them to carry heavy burdens, and the leaf has also the property of assuaging hunger. Its is now being introduced on the Continent of Europe, where the leaves are used as the ganja leaves are used in India.—*Madras Mail.*

SHEVAROY, Jan. 27th.—The crop, which is very late this season, is now being despatched to the coast. The quality on the whole appears to be good, increased attention being paid to the washing of the coffee—a defect pointed out by the jurors of the Sydney Exhibition as applicable to all Indian coffee. The quantity as anticipated is lamentably small, falling in many cases far below estimates, and in all below the average Trees are, however, in good heart, and estates have never looked so well as they do at the present moment. Eight rupees per bushel of dry parchment, delivered in Yercaud, has been accepted for a small parcel on Pondicherry account.—*Madras Times.*

WHITE-ANTS AND LIVING TREES.—Most books on gardening state that white-ants will not eat anything that has life in it. The Forest Report of the Punjab, however, states that, during last year, two of the Eucalyptus trees at Changa Manga, some 60 feet high, were blown down; when it was found that white-ants had eaten up the greater part of the supporting roots. The Conservator fears that damage of this kind will seriously interfere with the raising of Eucalyptus on a large scale. The report does not show, however, whether it was quite certain that the roots had not dried up and become dead *before* the trees fell down?—*Pioneer.*

THE COFFEE CROP IN SOUTHERN INDIA.—The coffee crop is expected to be late this year. The late spring rains brought the blossoms out a little after time, and the dry weather generally that succeeded did not contribute to develope the berry. In some localities it is abnormally small, but the bean shows compact and firm. The crop will probably be characterized as light and small. Most estates are short, and even this limited outturn was menaced during the year. If prices rise, working expenses may be recovered; if not, the outturn will leave many of the estates with an increasing debit balance. The gold industry has thrown coffee back considerably, but beyond a temporary depression, this product will assert its superiority and remunerative character before long.—*Indian Agriculturist.*

SCORPION STING.—When cases of scorpion-sting were brought to me, I used to follow the old plan of treatment, viz., incision of the part stung, touching the part with Liquor Ammoniæ, and then the application of a paste of Ammoniæ Carbonas and Ipecac to the same part. After reading in your paper the different reports of Liquor Potassæ as an antidote to snake poison, I gave the Liquor Potassæ a trial in scorpion-sting, and the results were so good, that I now give all my cases the benefit of the latter treatment. I invariably give internally 30 drops of Liq. Potass, and touch the part with Liq. Potass. Both the Ammonia and Potash plans of treatment were successful. I find, however, the Potash superior. The Liq. Potassæ, when applied, gives less pain, and the patient is almost immediately relieved of the agonizing pain of the sting I may mention that I gave some Potass to a Missionary Priest, as very often cases are brought to him. He had one severe case, that of a boy. When first seen the boy was bad, he was given the benefit of the Liquor Potassæ plan of treatment, and the relief was immediate.—"R. A. J." in *Madras Mail.*

BERRIES AND SPIKE.

TO THE EDITOR OF THE "MADRAS MAIL."

SIR,—A forward spike early in December is no phenomenon. Year by year we have it, and about X'mas a blossom is usual. This blossom, as a rule, produces ripe cherry in August. During the mouth of November 1880, my estates had a blossom which yielded some 500 bushels of cherry picked in the following May. This year, a blossom came out at the same time, from which we expect at least 1,000 bushels.

I am of opinion that very early blossoms do not affect the general blossom to any appreciable extent. Moderately early blossoms do, and are, so far as my experience goes, favourable to the production of good crops. In February 1873, I had a blossom which resulted in an extremely good crop; early in January 1879, a very successful blossom that gave at least two-thirds of a good crop. During this season my estates blossomed six or seven times between the 7th January and 30th May, but, as before stated, the bulk of the crop was from the January blossom: all these blossoms ripened crop about the ordinary time.

Wynaad, 23rd Dec. BAMBOO.

THE NEW ALKALOID IN CUPREA BARK.

(*Pharmaceutical Journal*, 24th December 1881.)

From the Report of the meeting of the Chemical Society, which took place last week, it will be seen that Mr. David Howard read a paper describing the results of his observations respecting a peculiar alkaloid existing in the bark known in commerce as cuprea bark. The details there given leave no doubt that the alkaloid observed by Mr. Howard is the same as that referred to by other observers in the papers published in this Journal last week, and it is interesting to note this simultaneous and quite independent confirmation of the existence of a peculiar alkaloid in the bark in question.

From a letter just received from our valued correspondent. Dr. Hesse, in Germany, it appears that the new alkaloid has also been noticed by a friend of his in Stuttgart, who at first regarded it as cinchonidine, though he was unable to obtain any evidence of cinchonidine being present when the bark was operated upon in the ordinary course of manufacture.

From what is known of the new alkaloid in cuprea bark, it is not very difficult to explain how this happened. In the ordinary course of analysis the new alkaloid would be distinguished from quinine by its comparatively sparing solubility in ether, and the fact of its forming a tartrate of sparing solubility might readily lead to its being taken for cinchonidine. But in the process of manufacturing of quinine sulphate, these chatacteristic features of the new alkaloid and its salts would not be of any influence in pointing to its presence. The determining circumstance in that case would be the sparing solubility of the neutral sulphate, and as that is a characteristic which brings the new alkaloid into close resemblance with quinine, it would have the effect of masking its presence in the course of manufacture and even of leading to its being overlooked if the quinine sulphate containing an admixture of it were tested by the method of fractional crystallization.

From these considerations it will, moreover, be evident that means are now furnished for accounting for some of the discrepancies that have occasionally been observed to obtain between the results of analysis and of manufacturing operations in regard to cuprea bark. It is not likely that in a well-conducted analysis of that bark the new alkaloid would be returned as quinine; but in the course of manufacture it might well happen that the new alkaloid would be obtained as a sulphate, together with the quinine, thus augmenting the yield of quinine sulphate, apparently in disagreement with the result of analysis. And if the amount of the new alkaloid be on the average only as great as that indicated by Mr. Howard, viz., ·35 per cent, or about one-tenth part of the quinine, the effect of its presence would be sufficiently remarkable, while in cases such as that referred to by Mr. Whiffen, where the new alkaloid amounts to 0·8 per cent, the possible difference between analytical and manufacturing results would be rendered still more palpable in the same way.

Dr. Hesse remarks in his letter that under the rade name of "cuprea bark" are comprised a variety of different kinds of bark corresponding in texture and colour, though perhaps in no other respect, and that sometimes this name is applied to bark which has not even the copper-red colour which was originally one of its distinctive features. A pale coloured bark of this kind is mentioned by Dr. Hesse as having been examined by Professor Körner, who obtained from it a peculiar alkaloid forming finely crystallizable salts, which will form the subject of a communication before long. Besides this, the bark examined by M. Arnaud, and from which he obtained cinchonamine, seems to be of the same kind, viz., similar in texture and colour to true cuprea bark and ceming from the same district, but differing from it in containing more cinchonine and the new alkaloid described by him as cinchonamine.

AGRICULTURAL ITEMS.

It is of no use to apply remedies to the fowls to get rid of lice if the house is not rid of them. The house should be cleaned out thoroughly, every loose thing pulled out and well scrubbed with hot lime wash. The roots should be well greased all over, and then, but not until then, apply remedies to the fowls.

Water glass, soluble silicate of soda, has been used by the Germans for keeping eggs. This a clear liquid, of the consistence of syrup, and when smeared over the shell soon dries into a thin, hard, glossy coating, entirely impermeable to the air.

A DAIRY MAXIM.

If milk and butter you would have—
A right delicious treat—
Keep churn, and bowls, and milking pails
Most scrupulously sweet.
With boiling water, day by day,
Cleanse each with utmost care;
Then rear them at your doorway,
To dry in open air.

—From "Twenty Golden Rules," by F. R. (G. Bradley, Huddersfield.)

Experience has proved board floors for poultry houses to be injurious to the fowls. No amount of cleaning can keep them free from vermin and bad odours. Clean, dry earth is the proper flooring for hen houses. It should have an under strata of solid, packed earth. This should be scraped at least once a week, and again sprinkled with road dust mixed with air-slacked lime.—*Sydney Mail.*

EFFECT OF MANURES ON CROPS.

(*Field*, 19th November 1881.)

Year by year the work done in experimental agriculture increases rapidly, and the results obtained, which generally refer to the effects of manures on certain crops, are published in the monthly and weekly periodicals. But part of this work, over which much trouble and time has been expended, is in a great measure lost to the agriculturist; for, soils, climates, and local conditions varying greatly, if the experiments are repeated exactly, disappointment follows,

and labour and money are lost. It is therefore necessary, in order that the experimental results obtained by others may be made use of, that the modifications in the original plan which ought to be introduced, and which are determined by the locality, should be discovered by independent experiment in each district. We do not despair of the discovery in the future of some plan whereby agriculture will be regulated by rules other than those of thumb and chance.

It is not proposed to enter here into an account of the various disturbing influences which render the modifications referred to necessary, but rather to lay before our readers a few facts, which may simplify their labour should they at any time venture to repeat on their own land the experiments of others. What we are about to say is rendered all the more necessary by reason of the method so frequently adopted in the description of experiments as to the amount of manures employed. We read that 42 lb. of phosphoric acid, or that 3 cwt. of superphosphate, were applied per acre. We doubt very much if these statements produce any definite impression on the minds of many who have read such a report. How are they to discover the number of pounds of phosphoric acid in a "super?" or will 3cwt. of some super which they have bought be as good as that which is described in the experiments? It is an answer to these questions which we now give. Of course, if we are told that so many shillings' worth of 22 per cent superphosphate have been used, there is then no difficulty in doing likewise; the difficulty to be overcome is when we are told to use as much of a manure as shall contain a certain weight of some one constituent.

In superphosphates, phosphoric acid, as is well known, exists in two forms, as the soluble and the insoluble phosphate of lime. The analyses, a copy of which can generally be obtained at the time of sale, state (1) the percentage of "soluble or dissolved phosphate," by which is to be understood the amount of insoluble phosphate, or bone earth, rendered soluble in the process of manufacture. A second entry (2), which is explanatory of the first, is sometimes made, which states the actual amount of phosphate of lime (chemically termed monocalcium phosphate) which is soluble in water, and its percentage is always lower than that of the first. One more entry (3) may be found, namely, the percentage of insoluble phosphate of lime, or that part of the original material which has escaped alteration during the manufacture. To calculate, then, the amount per 100 lb. of the super of phosphoric acid contained in either 1 or 3, it is only necessary to multiply the percentages by 0·46, in 2 the amount is found by multiplying by 0·607. The products from 1 and 2 will be the same, as the two substances are identical, the first being a technical term, the second the chemical term. Care must therefore be taken that both figures are not employed in the calculation. As an example, we quote the following analysis:—

	Per cent.
1. "Soluble phosphate" (equal to bone earth made soluble)	21·84
2. Soluble phosphate, monocalcium phosphate..	16·39
3. Insoluble phosphate..	5·56

Multiplying the percentages of 1 and 3 by 0·46, we find that 1 contains 10 lb, and 3 contains 2½ lb. of phosphoric acid, though not in the same state of combination. If 2 be multiplied by 0·607, the same result is obtained as when 1 is multiplied by 0·46. Of course, if the manure be wholly insoluble, as in the case of bones, there can then be no doubt as to which factor to employ.

Nitrogenous manures being also largely employed, either as sulphate of ammonia, nitrate of soda, or raw bones, it is necessary to show how it is possible to translate a given number of pounds of nitrogen into sulphate of ammonia, &c., or *vice versâ*. The analyses state, besides the phosphate of lime, the percentage of ammonia which can be obtained from the bones. To calculate the amount of nitrogen to which this percentage is equivalent, divide by 1·214; or, supposing that it is desired to know how much pure sulphate of ammonia will contain the same weight of ammonia, then the ammonia in the bones must be multiplied by 3·88, and its equivalent in pure nitrate of soda will also be obtained by employing the multiplier 5.

In the same way we may calculate the quantities of guano which are equivalent to known weights of sulphate of ammonia, &c. .The only other manure to which we need specially refer is kainit, which contains at least 24 per cent. of sulphate of potash. Multiplication of the percentage of the sulphate by 0·44 gives the amount of potash present. By the aid of these figures we hope that some of our readers will be able to understand, and to appreciate more thoroughly, the experiments which have been carried on for years past by such earnest workers as Messrs Lawes and Gilbert, and others.

FORESTRY IN MOUNTAIN DISTRICTS.

(*Field*, 26th November 1881.)

Whilst the legislation of this country is feeling its way towards some remedial measures in reference to the increasing injury arising from floods, it may interest our readers to learn that so far back as the years 1860 and 1864 the French Government passed laws in reference to the planting and turfing of mountain districts with the view of preventing the formation of torrents. We are indebted to M. P. Demontzey (who holds the important position of Conservateur des Forêts) for this information, together with a vast mass of details as to the carrying out of the necessary works. M. Demontzey is well qualified to be the author of a practical treatise on the replanting and grassing of mountains, and the work is certified by the Ministers of Agriculture and Commerce.

The French Government, having the advantage of a Forestry Department, are more alive to the necessities of assisting proprietors to make improvements. We proceed to give a brief outline of the objects sought and the results. The laws to which we have referred have two branches—one of encouragement, the other of restriction. The former consists in the powers given to the State to stimulate proprietors, by grants of money and material, to replant and renew unproductive soils or exhausted pastures, of which the actual condition would contribute either to the formation of new torrents or the extension of existing ones. This measure is applicable to all mountain regions. It is essentially preventative in its action, having for its final aim the maintenance and protection of the soil by a series of replanting or regrassing, which the law has named *optional*, and which are thus useful to the general interest, as well as advantageous to proprietors. The means of coercion give the right to improve in the name of public utility similar works called *obligatory*, of which a preliminary inquiry has proved the imperious necessity. The one is for prevention, the other for cure where the malady exists.

The object of these two laws may be thus described. On one hand, to prevent the formation of torrents by the consolidation of the soil on mountain surfaces; a result obtained by optional planting and turfing, and even sometimes by obligatory turfing. On the other hand, to suppress the effects of actual torrents by obligatory works of both kinds. Finally, to obtain and maintain by the results of these two primary effects the regulation of torrential rivers and the protection of valleys below.

The observation of scientific men led to the conclu-

sion that torrents, which rend the mountains and destroy their valleys, are one of the most powerful auxiliaries of those inundations increasingly frequent in the plains, and that the primary cause of the formation, as also of the extension of torrents, was the removal of trees. M. Surell established this theory in his "Études sur les Torrents des Alpes," and demonstrated the following propositions:—

1. The presence of a forest on a soil prevents the formation of torrents.
2. The destruction of a forest leaves the soil a prey to torrents.
3. The development of forests causes the extinction of torrents.
4. The fall of forests redoubles the violence of torrents, even causing them to be reformed.

It was admitted during the discussions of the law of 1864 that in special cases the forest might be replaced advantageously, at least in part, by the close vegetation of a grassy sward. These principles being established, it was necessary to go to work gradually, and above all to carry out a series of experiments of such duration and extent as would secure unimpeachable evidence. Moreover, the laws being declared tentative, the funds supplied were only sufficient for preliminary experience. It is now more than sixteen years ago since the work was commenced. The numerous studies which have resulted, the valuable observations that have been made, and, lastly, the undeniable and living proofs obtained, have victoriously silenced all objections. M. Demontzey tells us that in the higher regions of the Alps, the classic ground of torrents, one can see now numerous forests of resinous trees suitable to the climate, showing vigorous growth, not only in the basins of reception of primary torrents attacked by these works, but even on their steep banks, fixed and protected for ever; whilst these torrents themselves, once so formidable, have become streams not only harmless but most valuable, inasmuch as they supply good and abundant water for irrigation. The earlier chapters treat of the description and formation of torrents; their effect in the heart of the mountain, description of preparatory operations, and action of dams. This portion of the work is well and numerously illustrated, and a careful study of the drawings will assist in understanding the various means adopted to alter the character of torrents and prevent their mischievous character.

The next portion of the work treats of planting. The object to be obtained is a woody vegetation which possesses the following conditions:—

1. Roots so powerful as to inclose the soils with their numerous rootlets as in a net, so making them more porous and protecting them against being washed away.
2. To afford a sufficient cover to shelter the surface from meteorological influences.
3. To furnish humus more and more abundant, valuable on one hand to fertilize the soil, and thus increase the growth; and on the other, to furnish the retardation and the regulation of rain water or snow falling on the surface.
4. To maintain, without momentary and perpetual interruption, these salutary effects, and develop them by the use of lime.

Useful information is afforded as to the selection of trees. A mixture of Alpine and silver fir with oak seems to have done best in the climate of the Alps. Corsican and Austrian pines are also favourably mentioned.

The necessary preparation of the surface for the reception of either the seed or the young trees, and which is required to a greater or less extent, according as climatic conditions are favourable or unfavourable, are described at great length. The various modes of executing works of planting and growing are carefully described, these works having been obligatory. The details as to optional works, assisted by grants from Government, are given with great minuteness, and, to some extent, are but a repetition of information previously given.

INSECT-DESTROYING APPARATUS.—The cotton-worm, Colorado beetle, and other insects injurious to the cotton-plant, may be destroyed either by sprinkling solutions of various chemicals, such as London purple, over the plant, or by dusting the foliage with various poisons in the form of dry powders. A number of appliances for showering the plants with the solutions or powders have been introduced, but none have been constructed upon so large and complete a scale as some new machines, shown at Atlanta for the first time. The largest of these sprinklers is automatic in action, may be easily moved by one horse or mule, and will thoroughly drench every plant in twenty rows at the same time. It consists of a horizontal triangular frame of wood and iron, supported on three wheels,—one guiding-wheel in front, and two trailing-wheels behind,—a tank for the liquid, and a sprinkling device of novel form. On top of the frame is erected a wooden tripod, or derrick, and from the centre is suspended, near the top, a barrel for holding the solution. A rope, pulley, and small windlass are also provided for lifting the barrel to its place. A rubber pipe extends from the bottom of the barrel to the rear of the machine, where it divides into branches —each branch hanging down behind the machine and between every second row of plants. Thus, if there are twenty rows of plants to be sprinkled, there are ten branch pipes. The elevated position of the barrel gives a good head to the streams, and the motion of the apparatus over the ground keeps the solution agitated and prevents the mixture from clogging the pipes.—*Century Magazine.*

THE KEEPING OF BEES.—The bee, an insect properly known by few, and more often erroneously exciting fear, offers through its unsurpassable industry and its productiveness an inestimable branch of industry. Above all, as surpassing in diligence and divers other qualities, as well as in bodily attractions, the "Italian bee" deserves mention. These bees are so harmless that it affords indeed pleasure to handle them, and really astonishing are their efficiency and their care of the gathered honey. The queen is of a golden yellow and extremely fertile, the former quality having also reference to the ordinary bees, making it a sight worth seeing to watch the various hues showing when the insects fly about in the sunshine, so much so as to attract even the stranger's attention and make him their friend with a little closer inspection. Their significance and profitableness cannot be underrated. Many hundredweights of American honey are annually imported at a comparatively high figure, which expenditure might be saved in cultivating the trade here. Many people besides would find both bodily and mental recreation in devoting their surplus time to a few hives, and have as compensation their table furnished with a slice or two of the beautiful honey so conducive to health. Considering the employment in a more material light —*i.e.*, the way of making a living by it—its advantages are obvious. There is no necessity of buying or renting land, as with the farmer, for either grain-growing or cattle and sheep raising purposes. The bees fly about looking for their food, simultaneously bearing fruit to the orchard and flower-garden, and thereby benefiting the fruit and flower grower. The little attention hitherto paid to the matter has caused it to remain in an inefficient, unremunerative state, which to remedy I have brought with me a number of Italian queen bees. I should be happy to enter into correspondence with any one taking an interest in the matter, with a view to turn it to account, and beg to add that the annual profit arising out of the undertaking, if properly and carefully managed, would soon exceed £200 sterling.—WILHELM ABRAM, Bee-farmer, Care of German Consulate, Sydney.—*Sydney Mail.*

BRITISH PHARMACEUTICAL CONFERENCE.

RESULTS OF EXPERIMENTS MADE UPON THE BARKS OF CINNAMON AND CASSIA, ALSO UPON THE OILS EXTRACTED THEREFROM.

*By J. Woodland, F.L.S., F.C.S., etc.**

Wishing to ascertain, if possible, the substance which causes an iodized decoction either of cinnamon or cassia to lose its blue colour, I made experiments upon the known constituents of the drugs with the result of finding that the volatile oils possess the property of absorbing iodine to a considerable extent, which peculiarity the other known constituents of the drugs seem to lack, and as far as the experiments made at present determine, the oils are the only constituents having that decolorizing power.

The oils of cinnamon and cassia both take away the blue colour imparted by iodine to a decoction of starch, and that of the former drug possesses this property to a much greater extent than is the case with that of cassia, although not in any constant proportion, the amount of iodine that is absorbed by the oils being dependent upon the age of the sample in an inverse ratio, as the greater the age of the oil the smaller is the quantity of iodine solution absorbed by it. This decolorization is more especially seen when the oil and iodine are dissolved in the same medium, such as rectified spirit or carbon bisulphide, but if the oil be diffused in water, and iodine solution with starch paste added, although the decolorization takes place quickly at first, yet after a time it proceeds but slowly, owing to the imperfect contact of the reacting agents. Iodine also dissolves in both of the oils, more quickly in that of cinnamon, and if the iodine be in excess, it imparts to the solution in oil of cinnamon a rich reddish-brown colour, whilst the more slowly formed solution in oil of cassia has a dull greenish-brown colour, with a very slight appearance of red after shaking.

The quality of cinnamon or cassia bark being dependent upon the amount of oil contained therein, it occurred to me that samples of these barks might have their value approximately determined by treating infusions or decoctions of them with a standard solution of iodine, and accordingly experiments were made which show that although the quality of a bark of cinnamon or cassia can be quickly ascertained, the total amount of oil will not be indicated on account of the time taken by the oil to absorb the iodine. Decoctions of commercial samples of the powdered drugs were made, 1 gram of each been taken, and four of them absorbed a decinormal solution of iodine in the following quantities:—

Cinnamon.	Cassia.
No. 1 took 6·9 c.c. to impart a coloration.	No. 1 took 3·7 c.c.
No. 2 took 4·5 c.c. to impart a coloration.	No. 2 took 2·1 c.c.
No. 3 took 4·9 c.c. to impart a coloration.	No. 3 took 3·3 c.c.
No. 4 took 11·8 c.c. to impart a coloration.	No. 4 took 2·3 c.c.

The iodine solution was added until after shaking well, a distinct colour was seen in the froth. Of the four samples of cinnamon, numbers 2 and 3 were poor ones, as there was not much odour emitted by them, and from these and other experiments made, a sample of an average quality ought, if 1 gram be boiled with water and then cooled, to take at least 6 c.c. of a decinormal solution of iodine to colour the froth. Cassia bark requires a much smaller amount of iodine to colour the froth, first, on account of the oil not absorbing so much as before-mentioned, and, secondly, on account of the bark containing a smaller percentage of oil.

In ascertaining if there is any other ingredient or principal in the cinnamon bark which absorbs iodine, great difficulty was experienced in expelling the whole of the volatile oil, for after boiling the powder with a strong solution of salt for four hours, the odour of the oil was still perceptible, and the decolorizing properties still evident. Hence I conclude that a considerable quantity of this ingredient must be left behind after the distillation of the bark with salt water, as I am informed is the process in Ceylon,* and I should like to have the experience of anyone who has witnessed the operation, there or elsewhere, related.

After trying various chemicals, I found that litharge liberates the oil to the largest extent, and also the most quickly, but as with the others, incompletely, although whether its action is chemical or physical, I am not prepared to say. The oil was finally got rid of by boiling the powdered bark for a considerable period with a strong brine, afterwards with a small percentage of slacked lime to convert the residue of the oil into cinnamate of calcium, and on acidifying one portion slightly with acetic acid and adding iodized starch, the colour was not removed, and no odour was perceptible on heating; through the other portion carbonic anhydride was passed, to convert any slaked lime into the carbonate, which was then boiled, and to the cool decoction iodized starch added with a negative result. These experiments lead me to suppose that the oil is the ingredient that alone possesses the decolorizing property, but what compounds are formed beyond that of hydrolic acid when the oil and iodine combine I am not at present able to state.

The same difficulty was experienced in attempting to exhaust the drug of its oil with benzol, carbon, bisulphide, chloroform, ether, rectified spirit, and alcohol, although, they were used both hot and cold, as the residue when slightly heated invariably gave off the odour of the oil, and a decoction bleached iodized starch paste.

It having recently come to my knowledge that oil of cassia is substituted for oil of cinnamon, a few experiments were performed, by some of which a distinction can be made between the two oils. If nictric acid sp. gr. 1·36 be added to oil of cinnamon (1 part of the latter to 2 of the former), and the mixture shaken, a bright orange-coloured liquid is first obtained, upon the surface of which floats an orange resinous substance which slowly becomes deeper in colour until a beautiful cherry-red colour is visible, by which time it has changed to a liquid that floats on a lighter coloured substratum, which also in a short time becomes nearly of the same tint, bubbles then commence to appear, and shortly afterwards spontaneous ebullition occurs with the evolution of nitrous fumes, and vapours of benzoic aldehyde; by the time this ebullition has ceased, the amber coloured liquid commences to clear itself and finally a *clear* amber liquid is left, with orange globules floating on the surface.

Upon oil of cassia nitric acid sp. gr. 1·36 has quite a different action, as after mixing 1 part of oil of cassia with 2 of nitric acid, a dirty green supernatant resinous mass (slowly turning brown) is seen floating on a yellowish liquid, and no further change is undergone; if a large excess of the acid be added after the first addition, the resinous mass changes to a deep reddish-brown, and the subnatant liquid takes a cherry-red colour. The same reaction occurs if a large excess of nitric acid be added to oil of cassia at first, but in neither of these cases is there any

* Read before the British Pharmaceutical Conference, 180

* As in the case of the Sikhim Cinchona bark.—Ed.

spontaneous ebullition or evolution of the nitrous fumes and benzoic aldehyde vapours.

If oil of cassia be mixed with oil of cinnamon the reaction with nitric acid takes place as with oil of cinnamon, but more tardily, according to the amount of cassia oil present, and at the end of the process a *turbid* subnatant liquid is seen instead of a clear one, as is the case with pure oil of cinnamon.

Spirit of nitrous ether can also be used to distinguish between these oils, as it forms a clear solution with that of cinnamon, but a turbid one with that of cassia.

Distinction can also be made between the powders of cinnamon and cassia, for on shaking cinnamon powder with iodine water, a greenish brown colour only is seen, whilst cassia powder treated similarly imparts a black colour. A better way, however, is to make a decoction of the powder and, when cold, add tincture of iodine in excess, when on shaking well in a test-tube the froth of the cinnamon decoction is distinctly yellow, and that of cassia grey or black, and if cassia powder be mixed with cinnamon, the characteristic froth of the cassia can be distinctly seen.

A vote of thanks was passed to the author of this paper.

Professor Attfield hoped that the author would continue his experiments with the view of ascertaining the special conditions under which this substance would absorb iodine. The absorption of iodine by essential oils was a matter involved in a good deal of obscurity. The amount absorbed appeared to depend a good deal on conditions, and if Mr. Woodland would look into those conditions, it was possible he might be able to give a good method of distinguishing between these substances.

Mr. Brady said with regard to the employment of salt water in the distillation of oil of cinnamon he had seen a statement to that effect, in Pereira's 'Materia Medica,' and it had been repeated elsewhere, but he did not think that salt was employed generally in Ceylon.* In the only distilling establishment he visited, not only was salt water not used, but the distilled water was used again and again, for a manifest economic reason.

Mr. Greenish said he had heard Mr. Brady state that there were several kinds of cinnamon,—eight or ten; he should like to know whether the particular kind of cinnamon used in these experiments was noticed, because naturally it would have an influence on the result.

Mr. Brady said the different kinds were merely planters' varieties; he did not think anyone could define them. A planter would be able to tell the different sorts, but he did not think there were even commercial names for them.

Mr. Greenish asked if there were any mode of distinguishing them.

Mr. Brady replied certainly not except by an expert. It was more like commercial sorting than botanical separation.

Mr. Greenish said probably it would have an influence on the result of the experiment.

Mr. Brady said practically oil of cinnamon was made by the poorer planters, usually half-caste Portuguese, who would not take the trouble either to cultivate the shrub properly or to prepare the bark for sale as fine cinnamon, and it was quite a question whether growing the finest cinnamon really paid the planters so well as using it in the rough condition as chips for distilling the oil.

* We remember making enquiries at the instance of the late Mr. Henry Mead, and we were distinctly informed that salt never was used.—ED.

ON RED (CINCHONA) BARK.

By John Eliot Howard, F.R.S., F.L.S. *

In order to present more definitely the results of recent information on this subject, together with some suggestions for discussion at the Conference, I must (in some sense) begin at the beginning and show what I mean by "Red Bark."

The limitation of the genus Cinchona to those plants which have capsules dehiscent from the base towards the apex seems to me most correct and natural. I think my friend, Professor Karsten, has done good service to quinology, not only by the magnificent and unique plates and descriptions, in his splendid volumes, of the *Cinchona cordifolia* and *C. lancifolia* (for instance), but also of the lesser known group which he includes to my regret under the same head of Cinchonas (*Cinchona, sectio Heterasca.*)

These have capsules variously dehiscent, though in other respects closely allied to the Cinchonæ. I have recently met with specimens of the bark of two of these, together with leaves and, in one case, very well preserved capsules, evidently of the *Cinchona pedunculata*, Karsten. The other I referred, with less certainty, to another of his species, *C. undata*, Krs.

I was informed that neither of these barks, when examined by Dr. Paul, manifested any trace of alkaloid. Is not this a reason (if confirmed) for the limitation of the term *Cinchona* to those plants which, having the capsules dehiscent from the base, also possess the medicinal properties from which the name is derived? To these alone it seems properly to belong.

When we come to the definition of species, the difficulty of discrimination increases so much that some (even of those who are interested in the cultivation) seem inclined to throw up the whole subject in despair, and to believe in unlimited hybridity and change, instead of that exact fixedness of type which, at all events since the researches of the early Spanish botanists, have marked the South American species.

Pavon especially was very careful in his selection of specimens, so that out of forty-one sorts which I possess of his collection, I am able to recognize at least twenty-eight as met with in commerce and as like as if they came off the same trees.

I have thus found amongst the barks of commerce, the bark of most of the species described by Pavon and his associates, and by Mutis and Zea, exactly reproduced with every minute feature. I have had the satisfaction of cultivating many, and of receiving specimens from the native habitats and the adopted countries of many others, and my conclusion is that fixity of type is the rule, and variability the exception. I do not deny that this latter occurs (through hybridity) in India; but I agree with the late Dr. Weddell in thinking that there is not usually much opportunity for this in South America. I can add that Dr. Weddell's specimens are admirably true to type.

Even in India the probability is that many of the variations observed are connected with the following characteristics, observed first by the Spanish botanists, and which I will now briefly explain.

All the different species of Cinchona (so far as observed) exist under different, slightly varying *forms*, of which it seems impossible to say that any one is the original species and the others varieties. For instance, I have now, growing from seeds gathered by the diligent collector, Robert Cross, two forms of the *Cinchona cordifolia*, from two different localities; one of which, from a place called Coralis Inza, possesses the true cordate form of leaf as represented by Karsten in his plate of *Cinchona cordifolia;* the other though equally in its marked characteristics the "hard Carthagena" or "cordifolia" bark of Mutis, does not

* Read before the British Pharmaceutical Conference.

yet show one leaf true to the type. The Coralis Inza form is much richer in quinine, and has consequently (at my recommendation) been transplanted by Mr. Cross to India, where I hope it may prosper, and perhaps be found useful.

Having premised these observations, I now come to the question of "Red Bark," of which the true species is, as defined by Pavon, the *Cinchona succirubra*, so named by this botanist from the peculiarities of the *juice*, which he defines as follows:—

"In arboreum corticumque amputatione succum lacteum primum profluit; postea in colorem intense rubicundum transmutatur, unde *cascarilla colorada* nomen oritur."

That is to say, it is named "Red Bark" (in Spanish as above), from this peculiarity in the juice. True Red Bark is, as I have shown in my 'Illustrations of the Nueva Quinologia,' the product of *Cinchona succirubra* of Pavon. But *C. succirubra*, like other species, exists under somewhat different forms, as will be seen by examination of the specimens I send to illustrate the subject.

One source of variations is connected with the *macho* and *hembra* forms of the same plant; that is to say the preponderence of the male and female elements in the flower, attended, as well shown by Dr. Weddell, with corresponding changes in the rest of the plant. The colour of the flowers, for instance, varies in its intensity. Another contrast between different forms is found in the perfectly glabrous or subpubescent under surface of the leaf. This, as defined by Pavon, and as found generally in India, is perfectly smooth. As defined by Klotsch, it is *foliis subtus peberulis*, judging (as he did) from a specimen of Pavon's in the Berlin Museum.

These differences, apparently trivial, are nevertheless important to the cultivator; the pernicious effects of the rapid oxidation of the cinchotannic acid I have explained in the 'Nueva Quinologia,' so that we may fairly say, the more truly *colorado* or *red** the bark, the less probability there is of good results in the alkaloids. I send for the Museum small specimens—(A) of Pavon's own collection; of the genuine Red Bark (B) in commerce; and of the more resinous sort (C), which I have described in the above work, as they used to be imported from South America; fetching a high price, but useless to the quinine manufacturer, containing in each case about 2 per cent of alkaloids, the most predominant, cinchonine and cinchonidine. The truest Red Bark in India will come to this by age. The state of degeneration which I have described (at p. 14, *sub voce C. succirubra*) was believed, by Mr. Broughton, to have set in during the continuance of his observations, and I have recently had the opportunity of examining specimens, carefully selected by Mr. Cross from the Government Gardens at Ootacamund, which present the much more mature bark as exhibiting the true characteristics of genuine Red Bark, both in physical characteristics and in the nature of the alkaloids it contains.

I have forwarded specimens of these (D), No. 19 and No. 20, as sent by Mr. R. Cross, with the following information:—

Analysis of No. 19.

Quinine ·91 per cent=sulphate of quinine 1·21 per cent.
Cinchonidine 1·43 per cent.
Cinchonine 3·84 per cent.
Amorphous alkaloid 1·14 per cent.

Analysis of No. 20.

Quinine ·86 per cent=sulphate of quinine 1·15 per cent.
Cinchonidine 2·08 per cent.
Cinchonine 3·66 per cent.
Amorphous alkaloid 1·06 per cent.

On these barks I have remarked thus in a recent report to the Marquis of Hartington:—

"Both these are most characteristic specimens of Red Bark, and the produce well illustrates the mistake, which I have constantly pointed out, of the excessive cultivation of this species. The bark of such trees can only be made serviceable by '*renewing*'; otherwise the oxidizing process goes forward to the ultimate destruction in old trees of almost all the alkaloids."

In the same report I have particularly contrasted with the above, Mr. Cross's No. 18 (E) as follows:—

"Under No. 18 I find valuable information. This is called 'Red Bark,' but is indeed, not Red Bark at all, but, as described by the Spanish botanists, 'cinnamon-coloured bark' (*acanelada*). According to these authorities, when the trunk is wounded a clear juice flows out, which changes to a *golden colour*." (See my 'Nueva Quinologia' under head of *C. coccinea, vulgo cascarilla, serrena scanelada y Pata de Gallinazo.*)

Truncis incisis, succum crystallinum exudant, posteaque in aureum colorem convertitur.

"Under similar circumstances the *C. succirubra* yields a milky juice which changes to an intensely red colour...It is rightly named by Cross, *Pata de Gallinazo.*"

I published information on both these barks in 1862, and my work was sent out by the Government to, I suppose, all the stations, but apparently we have these *two* species still united under the designation of *C. succirubra*. I know not to what extent the species prevails in India, but it is satisfactory to believe that it is a much better sort for cultivation than that with which it is confounded, as is shown by the following analysis of (E)*:—

Quinine 2·27=quinine sulphate 3·03 per cent.
Cinchonidine 3·21 per cent.
Cinchonine 3·17 per cent.
Amorphous alkaloid ·93 per cent.

But we have not only *two* but *three* species confounded under the heading of *C. succirubra*, as I have convinced myself by comparing together the specimens which I send, together with information from Mr. R. Spruce, the collector of the seed for India, also from the late Mr. McIvor, and from examination of specimens of bark from India and also quite recently from St. Thomas.

This is the *cuchicara* or "pig's skin sort" of Red Bark, little valued in commerce of old, the appearance being against it, but apparently of greater value than the true Red Bark as regards contents in alkaloid. See specimen (F) and analysis.

Analysis of Bark from St. Thomas.

	Quinine Sulph. Per cent.	Quinine. Per cent.	Chinchonidine. Per cent.	Cinchonine. Per cent.	Amorph. Per cent.
Large quills ...2·86		2·14	3·26	2·49	·89
Medium quills..2·31		1·73	3·16	2·28	·91
Small quills ...1 83		1·37	2·00	1·34	1·00

I will give in an appendix the remarks written by Mr. Spruce himself on inspection of the *C. erythrantha* of Pavon (as represented in my illustrations of the 'Nueva Quinologia'), which he says is probably true cuchicara.

According to Spruce the *C. conglomerata* and *C. umbellulifera* of the 'Nueva Quinologia' are probably allied species.

The propagation of so many millions of trees of what is called *C. succirubra* in India, against all cautions and in neglect of all the information I have been able to reproduce from the careful Spanish botanists, impresses on my mind very strongly the inquiry *cui bono* as to any information I am giving now and might be able to render hereafter.†

* The redder the worse.—ED.

* So that we ought to cultivate that with *cinnamon-coloured bark* and not the deep red.—ED.

† Mr. Howard, as quinine maker, objected to *C. succirubra* altogether.—ED.

I reflect, however, that amongst the private cultivators there are some who gladly avail themselves of the best scientific information they can obtain; and who will find in the end that they have done well to attend to the careful discrimination of the species, and also of the forms of the species, and in giving their attention to the cultivation only of those most adapted to their purpose.

From the observations of Mr. Spruce I do not suppose that it is easy for an unpractised eye to discriminate between these species when not in flower; but Mr. Cross writes to me that he alone saw the tree in its native *habitat* and collected the plants at the foot of a precipice when in company with the son of a cascarillero. It is, at all events, rather late now to attempt any separation. The seed of the different species has been put by the collectors into the same bags, so that all is uncertainty. The Jamaica sort seems to me to represent very perfectly the subpubescent type of a true *C. succirubra*, according to the specimen described by Klotzsch. It is, moreover, richer in alkaloid than the average Red Bark of the East Indies, which for the most part (but not without exception of better qualities) must belong to the glabrous type.

I have, now growing, a plant of a kindred sort, the *var. pubescens* of McIvor, and am not disinclined to think that it may be (after all) one of the cognate species as mentioned above, instead of a hybrid. If I can succeed in getting it to flower, I shall perhaps be able to solve the question.

Professor Trimen, Director of the Royal Botanic Gardens, Ceylon, says in Report for 1880:—

"I have also received from the Government plantation at Nediwuttum, Nilgris, a Wardian case with some young plants of the kind called* *C. officinalis, var. pubescens* by Mr. Howard, but considered a hybrid by the late Mr. McIvor. Owing to the remarkably careless packing these were nearly all dead on arrival, but a few have survived and are doing well. They possess much the appearance of *C. succirubra* at present."

I am informed by a private cultivator in Ceylon that it forms a handsome tree, differing in its mode of growth from *C. succirubra*. (See Appendix.)

Another planter tells me he has of this sort, which he identifies with the tree in my possession, not less than 300,000 plants in various stages, from which he expects great results.

I must now draw to a conclusion this I fear, rather prolonged paper by suggesting as a subject for discussion, what is the difference in therapeutic efficacy between pharmaceutical preparations of *C. succirubra* and *C. officinalis?*

It is probable that in future these will almost exclusively be made from the barks grown in India, and at present the former seems to be the most recommended.

I cannot believe that the medicinal effect will be the same in both cases. I have before stated that the astringent principle shows an entire divergence in the two different barks as tested by various reagents. I am not aware that either in one case or the other any medicinal inquiry has taken place. The same observation may be made as to the remaining constituents of the *C. succirubra* and the *C. officinalis*, in the former case much more complicated than in the latter.

The supply of cultivated bark from South America will probably go entirely into the hands of the quinine manufacturers. This may also be the case with the best of the *C. officinalis*, but much of what is cultivated is of an inferior description.

I will not add anything respecting the relative constituents in alkaloids, but conclude with an observation of Lord Bacon (quoted by Dr. Kentish, one of the early writers (1784) on Peruvian bark), that mankind are far too apt to contemplate nature as if from the top of a tower, without descending to the investigation of details.*

Practically, however, the substitution of theory for scientific investigation is sure to lead to very unsatisfactory results.

In the present instance we have the following confusion:—

When "Red Bark" is spoken or written about, it may be the produce of—

(A). *C. succirubra.*
  α. Glabrous form.
  β. Subpubescent form.

or—

(B). *Coccinea*, Pavon. (?). *Pata de Gallinazo.*

or—

(C). "Pubescent" sort of Howard.

or—

(D). *C. conglomerata*, Pavon., *casc. colorado*, producing, according to Cross, the *morada* sort of Red Bark, of which I send specimen [G].

or—

(E). *C. erythrantha*, Pav. (?) *casc. cuchicara.*

APPENDIX.

[*Remarks written by R. Spruce on my Quinologia.* '*Notulæ ad Quinologiam novam Spectandæ, R.S.*']

Cinchona.

"*C. coccinea*, Pav., *Pato di Gallinazo* (Ecuador).—Plainly the true *Pata di Gallinazo* of the Quitensian Andes, and seen by me in the very same localities (Chillanes, Guaranda), also in valleys of Pallatanza and Alausi. I could not distinguish it by the leaves alone from the *Cuchicara*, growing along with it, but the Indians say they can always tell it. Its bark has some commercial value, that of the *cuchicara* none. The two agree in the very stout leaf veins, the corymbose inflorescence and the *dull scarlet or brick-red colour of the flowers*, quite different from the red or roseate hue of the flowers of most other cinchonæ,

"*C. erythrantha*, Pav., compared with the *Pata di Gallinazo* by Pavon himself, is probably *true cuchicara*. The *acute venation* and the locality (hill forests of Guayaquil and Jaen) seem to confirm this view.

"*C. conglomerata*, Par.—Except for the elongated panicle, this much resembles a pubescent form of the *cuchicara.*"

APPENDIX.

[*Extract from* '*Nueva Quinologia*,' *C. succirubra*, p. 14.]

"In the red bark it is to be remarked that the brick-red colour, which as Ruiz observes, is not found in the growing plant, but in the dried bark, is really an excretory product of vegetation, a part used up and brought by contact with the air into a state in which it can no longer be serviceable to the living plant and from which it degenerates by a still further degradation into *humus*, as we have reason to conclude, both from following out the above experiments on the changes of colours to their last result, and from observing analogous changes in the bark itself as it verges towards its latest stage. The pieces of flat red bark possessing the finest colour are generally remarkable for their specific lightness, having a texture analogous to that of wood that has lost its firmness by incipient decay. Indeed, it is by a process of *eremacausis* that the red bark acquires its colour;

* I simply suggested it being called "*var. pubescens*," looking upon it as a *hybrid*. It is quite unlike *C. officinalis*. It would be better to call it (simply) "Howard's sort."

* Solent autem homines naturam tanquam ex prealta turri et à longe despicere, et circa generalia nimium occupari: quando, si descendere placuit, et ad particularia accidere, resque ipsas attentius et diligentius inspicere, magis vera et utilis foret comprehensio.—L. ii., cap. 1.

the cinchotannic acid in which it abounds having become oxidized and changed into cinchona red, and under these conditions the alkaloids also appear to undergo some corresponding alterations. They are now implicated with resin, which appears to have also become oxidized so as to act the part of an acid, and is with difficulty separated; the chlorophyll has disappeared. Kinovic acid is still present; gum, which contributed to this so-called resinous character and was abundant in the bark of the smaller branches, has undergone a decrease. But the most remarkable feature is the altered conditions of the alkaloids themselves. Quinine, which formed a considerable portion of the whole, is now greatly diminished, cinchonine and cinchonidine remaining much the same. The total percentage has undergone no diminution, and an alkaloid, quinicine (?) which was either entirely absent from the smaller quills, or present in a feeble proportion, now appears in notable quantity.

"This was the result of my observations on South American barks up to 1862, I then thought the total percentage of alkaloids had not diminished with age. The quinicine (?) I found associated with aricine(?) or perhaps the quina (?) of Batka."

The chief part of this troublesome and noxious residuum I now suppose to be paricine (1881.)

Correspondence as to the New Species.

In order to show at once the importance and the difficulty of this investigation, I add the following letters, which complete the history of the subject up to the present time.

I have written to India for more precise botanical details.

Description by a Planter of the Pubescent Species.

"This tree has a very thick stem and the bark also was very thick. The foliage of the tree forms a perfect pyramid; the branches dropping down and then turning up at the ends. The leaves are of a dark green colour, rather round at the ends and very pubescent on the under side."

Analysis of Bark.

Quinine.	Cinchonidine.	Cinchonine.	Quinidine.
3·50	1·19	0.24	0·35

or equal to sulph. quinine 4·67 per cent.

(From Mr. McIvor's Letters.)

"*Ootacamund, Dec.* 10, 1873.

"This bark is taken from a hairy leaved variety of *C. officinalis.* It is a tree of wonderful growth. It produces enormously thick bark and the tree is not injured by wind. The tree from which I now send you the bark is only five years old. It is 26 ft. high and has a stem of 16 in. circumference at the ground, and the bark now sent you is taken in a strip from the stem to the height of about 13 ft. from the ground.

"This tree grows at least twice as fast as the *C. succirubra.* The bark of this variety which I sent to Dr. de Vrij was taken from a tree grown at a high elevation, and from a N. W. exposure. The bark now sent you is taken from a tree growing at a low elevation with a N. E. exposure. Dr. de Vrij found the bark of this species to yield 10·67 of total alkaloids with 4·72 of crystallized sulphate of quinine.

"If under all conditions this bark be found to yield this amount of alkaloids, and especially quinine, it is certainly the best plant we can grow, being hardy and of rapid growth and perfectly free from canker and other diseases to which the *officinalis* and especially the *calisaya* are liable. I therefore sincerely hope that you will be able to confirm Dr. de Vrij's results, and if this occurs in the two barks taken from different positions and elevations it will establish the value of the species beyond doubt. As the matter at present stands, the extraordinary vigorous habit of growth and hairy leaves, leave on my mind the impression that it is a species of rather doubtful quinine-producing qualities. I shall therefore be very glad if you are able to confirm Dr. de Vrij's results."

My analysis was as follows :—

Sulph. Quinine ...	...	6·00 per cent.
Sulph. Cinchonidine	...	5·00 ,,
Cinchonine	...	0·60 ,,
Amorphous Alkaloid	...	0·60 ,,
		12·20

Thus rather beyond Dr. de Vrij's results.

"*Ootacamund, April* 30, 1874.

"Allow me to thank you very much for your letter of the 20th February last, and your kindness in having made the analysis of my hairy leaved variety of *C. officinalis.* This plant is, I believe, a true *officinalis*, but as it had the aspect of a bad quinine producing species, I received with some doubt the several previous analyses I got of this variety, and therefore troubled you to examine its bark. I am now quite confident that this will be one of the most profitable varieties we can grow on the Nilgiris, and our cultivators here will, therefore, be much indebted to you for the information your letter contains.

"There are two strong growing varieties very much alike, the one having a very smooth leaf, the other (your *pubescens*) a hairy leaf. The two plants, a few yards off, look quite identical. They are so in habit and vigorous growth, and it was two years ago [therefore in 1872] that my attention was attracted by the hairy leaved variety, on all occasions on which I tested or got it tested, yielding a much larger amount of quinine and total alkaloid than the other.

"No doubt the specimens sent you, and to which you refer, were of the smooth leaf growing variety. It is to be regretted that your *pubescens* (which I think is very well named), produces so much cinchonidine; but as this alkaloid is rising in the market and in public esteem, in a few years this objection may diminish, but 5·50 of quinine is, I concluded, a bark that will always command the attention of manufacturers.

"Although *C. pubescens* is a mere variety, still, it comes true from seed, and I have not noticed any seedling of the hairy variety produce the smooth leaved variety, so closely allied to it, or *vice versa.*"

"*Ootacamund, June* 27, 1874.

"I had great pleasure to receive your letter of the 29th ult., and will have much pleasure in sending you dried specimens of the *C. pubescens*, and the kindred smooth leaved variety, as soon as I am able to get them. At present the plants are out of the flower and we are in the middle of our rains and enveloped in mists. The *pubescens* is, I think, intermediate between *C. succirubra* and *C. officinalis*, but partakes more of the *officinalis* type. It is a much more robust growth than either, and in all situations far outtops the *succirubra.* I send you a few seeds which, I have no doubt, you will find come up quite true, as it does not vary very much when raised from seed, when the plants from which the seeds are collected are kept separate from other kinds.

"I take the liberty of again sending you some bark of *C. pubescens.* The bark is the narrow strip left on the same tree from which I took the bark sent to you in December last. If not giving you too much trouble, I would very much like to know what this bark yields; the more, as Mr. Broughton and Dr. Bidie have been trying to impress on the Government here, that mossing does not improve the bark on the trees generally, but that the renewing bark drains the alkaloids from the natural bark adjoining, *i.e.*, that the alkaloids in the natural bark are transferred to the renewing bark.

"I do not believe this to be the case; but if it is so, in any degree, the bark now sent you will show ex-

actly to what extent this takes place, as the narrow strips of bark were surrounded on all sides by renewing bark. I send a small specimen of the renewed bark, also taken from the same species as the barksent you."

[The strips, like the original bark, presented the appearance of thick fine bark, and gave even a better result than those gathered seven months before, thus completely dispelling the transference hypothesis.]

The analysis was as follows:—

Sulphate of Quinine	6·94
,, Cinchonidine	4·48
,, Cinchonine	0·20
,, Quinidine	0·14
Amorphous Alkaloid	1·14
	12·90*

Mr. McIvor continues:—

"This theory of the transference of alkaloids has been got up, I believe, to impress on our Government the disadvantage of mossing, but even if the alkaloids are transferred we would not lose anything. But the transference of any material once deposited in one part of a vegetable tissue to that of another part is unknown. A notable example of this is found in the graft. Here two plants differing in their nature are placed in the closest combination, yet in the experience of upwards of two thousand years, and with almost every species of plant, the stock has not been found to communicate to the graft, or the graft to the stock, in the minutest degree, any of those subtle influences on which depend the size and flavour of a fruit, or the colour of a flower, both the stock and graft retaining through their existence their respective qualities; though the stock is built up by the sap elaborated by the leaves of the graft, and the graft supplied with its nourishment through the roots of the stock. Moreover, if the alkaloids are transferred, they are not transferred in the same conditions, especially so in red barks, as we find renewed red bark very rich in quinine, and this on trees where the natural bark contains scarcely any quinine."

"*Ootacamund, August* 16, 1875.

"Of *C. pubescens* we planted on private plantations 20 acres last year, and this year we planted out 60 acres of this plant on the Kartary estate.

"I have another seedling raised with the same batch of hybrids, which promises to be better than *C. pubescens*, at least, so far as I have been able to ascertain, it yields nearly 10 per cent of sulphate of quinine; but I shall send specimens of this variety and of the bark also. We have only a few plants of this kind, and I overlooked it in my investigations of last year. It is not unlike No. 3 of De Vrij's analysis, but has a more oblong leaf."

I did not receive the above-mentioned specimens, and consequently am without the means of identifying the three sorts mentioned above.

The tree which Mr. McIvor sent me proved to be quite different in the bark, and I judge of no value. Some mistake had occurred and this threw me off the scent and led me to give credence to the theory of hybridization which is easily called in (like some other theories) to satisfy minds that do not desire the labour of really fathoming difficult questions.

It will be seen by what follows that the theory of hybridization must be set aside, in this case at least.

I do not find any further reference in letters from Mr. McIvor except in one received after his return from Ceylon, which journey led to his lamented decease. In this letter he speaks of its coming true from seed.

(From Colonel Beddome.)

"*The Nilghiris, June* 24, 1881.

"We have a very valuable species here in what Howard calls *officinalis* var. *pubescens*. There are two varieties, one quite glabrous on the under surface of the leaf, known here as *magnifolia*, and the other very downy, called *pubescens*. They were both supposed to be hybrids of Nilghiri origin; but they are no hybrids. I find them in our oldest plantations. Cross says he recognizes the glabrous one as the "*Pata de Gallinazo*" of the bark collectors on the Chimborazo, and that he found it at a much higher elevation than *succirubra*, and it grows here at a much higher elevation than *succirubra*, growing splendidly at over 7,000 feet, where *succirubra* will not grow at all.

"Two bales of this sold last month in England at a higher price than any *officinalis*. It was the best we have sent home. There is another distinct species that I cannot name. It has its leaves very hairy on both surfaces, like *Pahudiana*, but the flowers differ from that species, and it has an extraordinary bark, very rough and corky. There are only five trees of it in our 1865 plantations. Cross says it is the true *crispa* of the Loxa neighbourhood,* and that *he only* has ever collected it, and that he sent the seed of it here with *officinalis* seed in 1863, but that McIvor said it had never germinated. There are two trees here known as *officinalis* var. *crispa*. One is a very narrow leaved form, which is easily recognized, but not, I think, of any worth. The other is said to be known in Ceylon as "crispa," and is only a smaller-leaved form of ordinary *officinalis* and quite runs into the type.

"I think on the Nilghiris at elevations above 5,000 feet, every species and variety should give way to the Urutusinga var. of *officinalis*, and to the species and varieties we call *magnifolia* and *pubescens*. They are both of splendid growth and both have a very high percentage of quinine. The Calisayas all die out here, and so do the Grey Barks. They certainly require a lower elevation, but even in a warmer climate our long drought may be too trying for them."†

(To be continued.)

WHICH KINDS OF CINCHONA BARK SHOULD BE USED IN PHARMACY?

By E. M. Holmes, F.L.S.‡

The cinchona barks, cultivated in Java, India, Ceylon, and Jamaica, etc., have formed for some years a regular article of commerce, and are now generally acknowledged to be superior in quality to those imported from South America.

These barks are not recognized by the pharmacopœias, and they cannot therefore be legally used in pharmacy. This is the more to be regretted because it is well known, at least to all who are conversant with the cinchona trade, that the South American barks obtainable in retail commerce at the present time, although closely agreeing in appearance, and even in some external characters, with the descriptions given of the official barks, are often comparatively worthless.

Pharmacists are consequently placed in the undesirable predicament of being compelled by law to use inferior bark when better is obtainable. It therefore appears to be a suitable subject to bring before the Pharmaceutical Conference in order to obtain from representative pharmacists as well as from experts in bark analysis, a consensus of opinion and an amount of practical information which should have some weight in leading the framers of future pharmacopœias to remove this anomaly.

The points on which I venture to express an opinion, and on which it appears to me that discussion is necessary, are as follows:—

1. It is desirable that cultivated cinchona barks should replace the uncultivated barks in medicine and pharmacy?
2. What variety can most advantageously be used?

* And yet Mr. Moens got very poor results.—ED.

* Rather the *Crespilla ahumada* which should be Pavon's *C. decurrentifolia*.—J. E. H.

† Why should the grey barks (micrantha), &c., be cultivated?—ED.

‡ Read before the British Pharmaceutical Conference.

3. The advantages of uniformity of strength of preparations of cinchonas.

With regard to these points I have the following remarks to offer for consideration.

It is evident from recent papers in journals devoted to pharmacy in this country, the Continent, and the United States, that it is practically impossible to obtain in retail commerce at the present time, with regularity and certainty, cinchona bark of uniform quality, for the following reasons:—

(*a*). The South American cinchona and allied trees are not wholly known to Europeans, and many worthless kinds exist, which bear so strong a resemblance to official bark as to mislead the purchaser, and possibly even the collector. These inferior barks are known to be mixed, either intentionally or otherwise, with the better kinds, so that it has become necessary to analyse all the South American barks that come into the market.

(*b*). The demand for good cinchona bark, *i.e.*, such as will yield a large percentage of quinine, easily separable in the crystalline state, is so great that the whole of the available material practically passes into the hands of the quinine manufacturers, while the inferior or "druggists'" barks find their way into the hands of the retail purchaser.

(*c*). The wholesale dealer is often compelled by the requirements of his customers to purchase barks of fine appearance and moderate price, rather than of superior quality. On the other hand, the cultivated cinchona barks are not mixed with false barks, but there is at present, and probably will be for some years, difficulty in obtaining good qualities of yellow and pale barks, the supply of these not being as yet equal to the demand for them for the purpose of making quinine, while several hybrid species, yielding inferior bark, are not unfrequently sold with those of good quality, and cannot be distinguished by external characters, except by experts. But one variety of cultivated bark, *Cinchona succirubra*, is easily obtainable in almost unlimited quantity, and of very good quality. This is due to the following facts. The tree grows at a lower elevation, and, being hardy and easily propagated, is cultivated over a much wider area than the others, and is consequently met with in larger quantities in commerce. Owing to the comparatively large amount of red colouring matter it contains, it is less sought after by quinine makers, and the supply of bark is therefore likely to increase instead of decrease.

It would appear therefore desirable that the cultivated cinchona barks should replace those of South America for the following reasons, viz:—

The larger average yield of alkaloids.

Their freedom from false barks.

The increasing supply which tends to render it easy to obtain bark of good quality.

With respect to the variety of cinchona bark which can be most advantageously used in medicine and pharmacy, that of cultivated *C. succirubra* seems to be the most suitable, as already suggested by Professor Flückiger, since it can be procured of good quality, contains all the cinchona alkaloids (except aricine), is less liable to be mixed with hybrids, and is more easily distinguished by its external characters than any other species.

It may further be suggested that as every cinchona bark which comes into the market is analysed before being sold, it would be an additional guarantee if the retail purchaser could be furnished by the wholesale druggist with a statement of the percentage of alkaloids in the label of the packages he purchases. Pharmacopœial preparations made from the renewed bark of *C. succirubra*, thus guaranteed as to the percentage of quinine it contains, would probaby give most satisfaction to the medical profession.

Lastly, with respect to the strength of Pharmacopœia preparations of cinchona. If the red bark were accepted in future pharmacopœias, the fluid extracts, if made according to the British Pharmacopœia, would, in all probability, deposit some of its active constituents, and it might be desirable to ascertain from the experience of those present whether this is the case with the fluid extract made according to the United States Pharmacopœia, which is only one-fourth of the strength, and of which one part represents one of the bark. With respect to the decoction, it is well known that the process of the British Pharmacopœia may be repeated two or three times with the same bark, and that it will not then be exhausted. The Norwegian formula for acid decoction in which sulphuric acid is added may exhaust the bark more completely, but would not be admissible where it was desired to give ammonia with the decoction. Neither the decoction nor the infusion of cinchona possesses any advantage over the fluid extract, as the bark does not contain any volatile oil or aromatic property likely to be driven off by evaporation, and it would be a boon both to the patient and the dispenser if these preparations could be replaced in medical practice by such active preparations as the tincture or fluid extract.

The simple tincture of cinchona in the British, United States, French, and German Pharmacopœias is in the proportion of 1 to 5, and the compound tincture 1 to 10 in the British, and 1 in 8·6 in the German, and 1 to 12·5 in the United States Pharmacopœias. An approach to uniformity in strength of these preparations, therefore, depends in some measure upon the framers of the forthcoming United States Pharmacopœia. The introduction of the metric system into pharmacy is apparently only a matter of time, and it is a subject for congratulation, therefore, that the constituents of some of these preparations, except in the compound tincture of continental pharmacopœias, bear decimal relations to each other. The present meeting offers an opportunity for suggestions being made as to whether a greater uniformity of constituents in the compound tincture is either possible or advantageous. The British formula contains saffron and cochineal, and the German and five others cinnamon and gentian, but these ingredients are not contained in the British and United States formulæ.

CINCHONA BARK FOR THE PHARMACOPŒIA.

*By W. de Neufville.**

In a paper published by Professor Flückiger (*Pharmaceutische Zeitung*, see also *Pharmaceutical Journal*, April 30, 1881, p. 903), he has made several statements with regard to the superiority of East Indian cinchona bark over that of South America for pharmaceutical purposes, and he proposes the substitution of East Indian bark for the calisaya bark, which has been hitherto recognized as official bark.

Whilst appreciating the ability with which Professor Flückiger has treated the subject, I on the other hand cannot but think that much can be said in favour of still maintaining the use of South American for official purposes.

The first statement of Professor Flückiger, that flat calisaya (or the yellow bark of the British Pharmacopœia) is more scantily and less regularly imported than formerly is scarcely in accordance with fact, for the supplies of flat bark have so considerably increased during the last years that the drug trade has not been found capable of absorbing them. Professor Flückiger also points out that in consequence of the geographiaal position and the political situation of Peru and Bolivia, calisaya bark could neither be had uniform nor in sufficient quantity. But just in these two respects calisaya offers advantages compared with most other sorts. For instance, calisaya is shipped pretty regularly during the whole year, and I do not remember any time during the past five years that the supply of calisaya bark in the European markets has not been ample for the demand. Notwithstanding the political difficulties to which Professor Flückiger refers, the shipments of calisaya have pretty regularly taken place during the late Peruvian war, and the northern

* Read before the British Pharmaceutical Conference.

districts of South America which Professor Flückiger regards as been more favourably situated in this respect are, on the contrary, subjected to much greater irregularities, and at times have altogether failed in their supply, owing to the revolutions, and, more important still, to the fact of the frequent drought of the Magdalena and other rivers.

Replying to the statement that it is not likely that the planting and cultivation of cinchonas will be undertaken in Bolivia and Peru, I can only say that the cultivation of the cinchonas has already been commenced in those countries, and the trials which have been made have so far furnished satisfactory results that already for the past two years the produce of these plantations has been sold for high prices in the London market, thus proving the good quality of the bark.

It cannot be denied that of late the importations of flat bark have not at all been rich in quinine, but Professor Flückiger attaches less importance to the contents of quinine so long as there exists a sufficient percentage of other alkaloids, and of these flat barks on an average contained over 2 per cent, as per the analyses made of the last arrivals of flat bark. It is true that most Indian barks are richer in the amount of total alkaloids, but here the question arises, are the druggists capable of extracting the alkaloids out of the Indian bark? and I am inclined to doubt it. It is a known fact that the Indian barks at first offered great difficulties to the manufacturers of quinine, and even at this date there are manufacturers who for this reason will not work Indian bark. As a druggist's bark this objection applies more forcibly. On the other hand no bark works easier and better than the American calisaya, and this fact ought to bear weight to prevent its abandonment as an article of the official materia medica. It is not, however, to be forgotten that India sends us a great many barks very inferior in quality, and it is a very difficult matter for the druggist to discriminate between the poor and rich kinds of bark. Druggists, indeed, are very apt to favour a "showy" bark, which in fact may be very poor in alkaloids. This remark applies very forcibly when Indian barks are concerned. On the other hand the quality of calisaya bark, more especially flat bark, is easily judged from external appearance. In addition to this, druggists have been perfectly acquainted with the character of this kind of bark for many years past.

If, after all, the *flat* American calisaya is to be abandoned on account of its not being sufficiently rich, why not adopt the American calisaya *quill*?

Calisaya *quill* has the advantage over all kinds of Indian barks of being much easier to extract, offering greater facilities for distinguishing the quality, arriving regularly during the whole year, and being better known to the druggist than any other barks, and is to be had in all grades from 2 per cent up to 6 per cent of crystallized quinine sulphate, besides a good proportion of the other alkaloids.

As to the non-applicability of bark from the districts of Colombia for druggists' purposes, I am quite one with Professor Flückiger, and with the opinion that has been expounded by others competent to treat on the subject, so that nothing remains to be said by me on this point.

Votes of thanks having been passed to the respective authors of these papers.

Mr. Wellcome said that it had been clearly shown that the percentages of alkaloid in *Cinchona succirubra* would differ very greatly according to the conditions under which it was grown. This was also true of other valuable varieties of the cinchonas, for when grown at low altitudes, or under other unfavourable conditions, the percentage of quinia was smaller, and the proportion of lower alkaloids was likewise liable to variation. He did not think any one variety of bark could be justly adopted as an officinal standard. The quills which had been referred to last should certainly not, because there was no one variety which was more frequently intermixed with inferior grades, which were very difficult to distinguish except by assay. It would seem that the officinal standard that could be adopted would be any bark yielding upon assay a certain fixed percentage of total alkaloids, of which a certain fixed percentage should be quinia. The value of the lower alkaloids—particularly cinchonidia—had been more fully appreciated in India and America than in England. In reference to the new bark, *Cinchona cuprea*, mentioned at the Conference last year, some light had been thrown upon it by the reports of Dr. Robbins, of New York, who had recently returned from a visit to the Columbian Forests. This *Cinchona cuprea* seems to be an exception to the general rule, not only in its appearance and structure, but also in the fact that although it is grown at low altitudes, it is a valuable quinia bark, yielding about 2 per cent of quinia. It is reported that this yields little or none of the lower alkaloids. With reference to the fluid extract of Cinchona of the United States Pharmacopœia, he might say that in the experience of American pharmacists it had proved very unsatisfactory. It precipitated very freely and was not generally in favour—the compound tincture being the preparation more generally used. With regard to the process suggested by Dr. de Vrij last year, he did not know how far it had been successful, but it would be interesting to have some information upon the subject from those who had given it a practical test.

Mr. Brady called attention to the dried specimens which Mr. Howard had sent to illustrate his paper, and invited those interested to examine them.

Dr. Paul said there could be no doubt that at the present time there was a need for alteration in the selection of bark used for pharmaceutical purposes. He gathered from the paper which had been read, that there was some little difference of opinion as to the direction in which that change should be made. The officinal yellow bark and the flat calisaya bark were almost invariably worthless, so far as the presence of quinine was an element of value. The flat calisaya bark of commerce now really contained nothing more than a little cinchonine—1½ to 2 or 3 per cent, and was not at all equal to the character given in the Pharmacopœia, and it required to be replaced. Dr. de Vrij and Professor Flückiger were very enthusiastic in recommending a total substitution of the Indian barks for the South American, but that was a step of a somewhat extreme character. There were many reasons for approving of the introduction of Indian grown bark, both crown bark and succirubra. They were now very largely imported, and the amount of total alkaloids in them would range from 5 to 10 per cent. In the better kinds of crown barks there was a very large amount of quinine, while in the succirubra the cinchonidine preponderated. They were already finding a large application on the Continent for pharmaceutical purposes, and the greater quantity of Indian bark used pharmaceutically was sent from India. At the same time, as Mr. de Neufville had pointed out, two new kinds of bark came to this country from Bolivia and the northern parts of South America, which were very excellent barks for pharmaceutical uses. They were mostly of the character of quill calisaya, yielding 2½ to 4 per cent of sulphate of quinine. There was an abundant supply of them, and there was no reason why they should not be adopted. He thought the most desirable course to take would be not to exclude the South American bark, but to alter the kind of bark to be used as an officinal bark, and to supplement that with certain kinds of Indian grown bark.

Mr. Groves said there seemed a tendency, in some quarters, to value Peruvian bark almost exclusively according to the proportion of alkaloids it contained. This doubtless was reasonable on the part of the manu-

facturer, but the medical man had often other objects in administering bark than giving the mere alkaloids. These could be obtained in a state of purity from very inferior sources, but the cinchotannic acid and bitter extractives were only yielded in quantity by certain barks of good quality. He therefore thought it desirable to adopt for the natural preparations (liquid extract, tincture, decoction, infusion) of cinchona, a bark such as the Indian succirubra, recommended by Mr. Holmes, which abounded in these non-alkaloidal principles, and which might, according to the desire of the prescriber, be reinforced by the addition of one or more of the cinchona alkaloids derived from ordinary commercial sources.

Dr. Paul did not wish to be understood as suggesting that the value of bark should be judged by the relative amount of alkaloid, but there could be no comparison between flat calisaya, which contained no alkaloid at all, but cinchonine and none of these extractive principles and another bark which would contain both.

Mr. Cleaver remarked that Mr. Howard in his paper invited discussion on the therapeutical value of different kinds of bark; but that seemed a difficult subject, and one they could not go into without medical evidence.

The President said it was not their business.

Mr. Cleaver said with regard to the employment of these barks in pharmacy, the great discrepancy showed that pharmacists ought to require that each bark should be sold with a guarantee. If they would pay a decent price, he had no doubt that they would find wholesale druggists who would supply them with bark containing a fair proportion of alkaloidal matter. Most of the wholesale druggists either had analyses of the barks they bought, or could get them, and would be very pleased to supply intending customers with analyses of the barks they wanted.

POTATO DISEASE EXPERIMENTS IN SCOTLAND.

Mr. James A. Gordon, of Arabella, Easter Ross, N.B., repeated this year again the experiments, which, as noticed in *The Field* at the time, he conducted last year, in order to ascertain the disease resisting and yielding properties of several new varieties of potatoes. The soil was good loam, and the climate of Easter Ross is far above the average of Scotland. Mr. Gordon endeavoured to grow some new varieties from the seedling, but none of them satisfied him except a new sort of Victoria, which is proving remarkably well. It is a capital cropper, resists disease wonderfully, grows a fine uniform kind of a tuber, and is highly appreciated on the table.

The ground for the different trials received the same treatment and manuring in every way, and the sets were deposited in the first week of May. In addition to about 16 tons stable dung per imperial acre, the manures applied consisted of 2½ cwt. each of bone meal, kainit, and mineral superphosphate, 1 cwt. Peruvian guano, and ½ cwt. sulphate of ammonia. The crop was good and comparatively disease-free, as the following results show:—

	Marketable.		Diseased.		Undersized.		Total weight per acre.	
	tons.	cwt.	tons.	cwt.	tons.	cwt.	tons.	cwt.
Champions	9	0	0	13	3	0	12	13
New Seedling Victoria	10	0	trace		1	0	11	0
Magnum Bonum	7	10	trace		0	15	8	5

Last year the different sorts stood in the same relative order as above in regard to weight per acre. The yield this year, though good, and above the average of the country, is slightly under that of 1880.—*Field.*

NEW ZEALAND BOTANIC GARDENS.

The twelfth annual report of the Botanic Garden Board of New Zealand has been issued, from which it appears that the gardens are in a somewhat starved condition, and that the powers that be do not fully appreciate the importance of a botanical garden as a centre for the introduction and diffusion of useful and ornamental plants.

New Zealand has special facilities, in its climate and position, for becoming the head centre for the cultivation and diffusion of the plants of the southern hemisphere; and in the material interests of the colony, as well as for scientific purposes, it is greatly to be wished that more energetic efforts could be made in this direction.

"A further advance has been made in the preparation of the ground for the systematic collection of plants intended for the use of botanical students; but, until the Board can feel justified in spending a sum of about £70 on it, this most desirable addition to the gardens must remain in abeyance.

"From the share of the Californian seeds, imported last year by Government, that was placed at the disposal of the Board, about 2,700 young trees have been raised. From last year's stock 479 trees have been distributed to various public institutions for planting their grounds.

"The keeper of the gardens was sent in April last to the Tararua Mountains, and, with a small expenditure of about £5, succeeded in obtaining a fine collection of live alpine plants from an altitude of 5,000 to 6,000 feet, among which were several novel or rare species.

"A valuable collection of plants, hitherto almost unknown in the live state, has also been obtained for the gardens by the taxidermist to the museum, who accompanied the "Stella" on the annual trip to the Auckland Islands, in March last.

"The Board has been indirectly the means of introducing to the colony a consignment of Japanese fruit and foliage plants, which will, it is expected, prove of great value, as being suitable to the climate. It was represented to Government that Mr. Tiffin, of Napier, was about to visit Japan on a horticultural expedition, and that it would be a good opportunity for getting Japanese plants for distribution selected by a thoroughly competent and enthusiastic collector. The suggestion was cordially entertained, and, as a result, in April last, twelve cases were received, containing 1,800 plants, of which the following is a list:—50 Oranges, 1,000 Persimmons, 300 Kiakie, 100 giant Chestnuts, 150 Maples, 200 Bamboos."—*Gardeners' Chronicle.*

OIL OF ANDA-ASSU.*

(*Pharmaceutical Journal*, 5th Nov. 1881.)

Johannesia princeps, Vell. (*Anda Gomesii*, Juss., *Anda brasiliensis*, Radl., *Andicus pentaphyllus*, Vell.), is a large tree of Brazil, belonging to the natural family Euphorbiaceæ, growing along the coast on sandy soil, but also much cultivated in the interior. It has numerous spreading branches, digitate leaves, with five entire oval-lanceolate leaflets, each with a petiole, and all attached to a common petiole having from two to five glands at the point of insertion of the leaves. The flowers are pale-yellow, in irregular terminal panicles, the male flowers on stalks, the female sessile. The fruit is a nut over three inches in diameter, almost heart-shaped, or indistinctly four cornered. The kernel is oval, somewhat compressed, with two prominent and two rather indistinct corners. Martius states that the shape of the nuts, as they appear in the market, is so different that probably several species are the sources of them. The seeds, of which there are two, seldom three, are about the size of a small plum, somewhat kidney-shaped and covered with a firm, dark-brown epidermis. They have an agreeable almond-like, or hazel-nut-like flavour, and contain a fatty oil.

These seeds are known in Brazil under the following names: *andi-acú; andi-guacú; indaiacú; indayucú; purga de gentio* (in Rio de Janeiro and S. Paulo); *coco de purga; purgo dos Paulistas; fruta de arára* (in Minas). They have been used from ancient times as an effective purgative, and have particularly been found

* From *New Remedies*, September 1881.

useful, even by European practitioners in Brazil, in affections of the liver, jaundice, and dropsy. They have also been found valuable as auxiliary remedies in menstrual disturbances and in scrofulous affections.

The ordinary dose for a male adult is two seeds, which may be increased to three, or even more with caution. They are best administered in form of emulsion, or combined with starch or sugar, and mild aromatics, whereby their effect is rendered less harsh, and the tendency to vomiting which sometimes occurs, is diminished. The oil of the seeds is also used as a purgative, but it is much less effective than the seeds themselves; an ordinary dose is about 40 drops. It is also used for burning in lamps, and has the peculiar property of being a very rapidly drying oil, for which reason it is much sought after by painters and artists. The shell of the fruit is astringent, and is sometimes used for stupefying fish. After being roasted it is held to be a sovereign remedy in diarrhœa brought on by cold and exposure.

Dr. Jorves,* of Rio de Janeiro, obtained very satisfactory results with the oil, in 1860, having used it in a case of cirrhosis with dropsy, in the dose of two teaspoonfuls in a cup of coffee. Dr. Fazenda also obtained very good results.

SUGAR-PLANTING IN THE MALAYAN PENINSULA.

A few particulars as to the administration of a sugar estate in Province Wellesley. The one consisted of 695¼ orlongs (an orlong being equivalent to 240 ft. square, or 1⅓ acres), and 523½ orlongs were then under cultivation. This area was divided in forty-nine fields, all of which were divided and surrounded by a continuous series of narrow canals, along which punts conveyed the canes from the fields to the mill, brought firewood for the furnace, carried manure to the young plants, and sugar and rum to the landing place for shipment to Penang in transit to England. The rum, however, requires no punt, the puncheons floating and being pushed through the water by wading coolies. Drains traverse the fields longitudinally; and when unproductive, cultivation is frequently suspended in some fields, and these in a few years become covered with jungle, but they are often cleared and tried again. I found that the cost of one year's working of this estate was calculated in dollars and cents as follows:—Salaries, &c., $2,593·19; wages, $21,525·15; manure, $8,317·25; firewood, $2,192·58; freight, $76·10; brick lime, $435·18; timber planks, $361·45; attaps and attap buildings, $383·68; oil and grease, $263·35; coppersmith, $290·72; tools, $142·40; small stores, sundries, &c., $395·01—total, $36,276·06.

The Kling is a drudge, who does not object to be driven; the Javanese will know what they are expected to do, and have a task set them; but the Chinaman contracts. One with a knowledge of agricultural work, a little capital, and some assistance that way from the planter, engages a number of men to work on the estate, he paying their wages, and receiving a contract price for all work done. The prices paid were then, for first banking, $2½ or $3 per orlong; for second banking, $6; cutting canes, $6; weeding, $1; breaking banks, $4; trashing, $1; and breaking new land, $10 per orlong. They are very industrious, useful, and cheerful, but still remain "heathen Chinee"—they will cheat if possible. These men use the big toe as an opposable thumb; and where a British carpenter, when planing a small piece of wood, would hold it steady with his hand, these men effect the same purpose with the toes. I found that the wages of these carpenters on the estate averaged one month, 40, 33, and 25 cents per day. As woodcutters they live in the jungle, and then numbered about thirty. They split the wood into logs some three feet long, and stack it five Chinese feet high, and were paid at the rate of $1 for every Chinese foot in lenght, the stack measured. How these men exist in the dreary dismal swamp in which their work is carried on, or how they resist the malaria, is difficult to imagine. Some fall victims to crocodiles, one being taken from his shallow canoe while I stayed there, and the skull of that identical crocodile now hangs above me as I write.—*Field.*

* *Monit. de la Pharm.*, 1881, 26.

TROPICAL FRUITS.

(*Field*, 17th December, 1881.)

Amongst the tropical fruits exposed for sale in London, I have often wondered at never having seen that prince of fruit, the mango. It is grown extensively in the West Indies, but whether it arrives at the same perfection there as it does in the East, I know not; but as the fruit, if plucked when it has arrived at maturity and packed carefully in cotton-wool, will take ten days to ripen, I am astonished it is not imported, for it would arrive just fit to eat. Col. Hastings Fraser, a few years ago, brought some home from Secunderabad, a journey of twenty-one days, and they were in such perfect order, that he was enabled to present some to Her Majesty the Queen. Now, of all the fruits I know, I consider none equal to a first-class mango. There are, of course, mangoes and mangoes. There are some fifty varieties, and none but those which have been grafted are fit for the table. Those from Goa, Malwa, Bombay, and Bangalore are the most esteemed, and plants can be procured in any quantity at Bombay, and could be easily transported to England and grown in a hothouse; indeed, if I mistake not, I saw in the *Illustrated London News* or some other paper, a few years ago, that a mango tree at Chatsworth, the Duke of Devonshire's palatial residence, was then in fruit; but whether it came to perfection, or has borne since, I do not know. But I should think it could be easily reared in a suitable house, and grafted trees seldom exceed 10 ft. to 12 ft. in height. In Burmah and Assam the trees are not grafted; a few are in the latter country, but none in the former; but in both countries the fruit is scarcely eatable, owing to a beetle being found inside almost every mango. Although the Burmese do not graft, they improve the fruit by stripping off the greater part of the bark, leaving only sufficient to keep the tree alive: thus the sap is retarded, and the mango loses that turpentine smell and flavour, which renders the ungrafted fruit barely eatable. The latter, too, is very stringy, but a graft mango can be scooped out with a spoon, and should be destitute of a single fibre.

Mangoes, like most fruits to be perfect, should be allowed to ripen on the tree; but this in India is almost impossible, owing to almost every creature, whether two or four legged, or winged, preying upon it. Moreover, as it arrives at maturity the fruit requires support, as from its weight, with the slightest wind, it is very apt to fall. Thus very often the best description of fruit is supported by tiny openwork bamboo baskets. The tree covered over with netting, and watched day and night; but it is well worth all the trouble, for, as I have said, a good mango is certainly the best fruit I ever ate.

Many other Eastern fruits might with advantage be introduced into England; for instance, the custard apple. It grows in any soil, and the jungle round Secunderabad is composed almost solely of it. It grows wild; yet when picked ripe off a bush at early dawn it is delicious. When cultivated it grows to a large size and has fewer stones. The very best are obtainable at Bombay. It will grow readily from the stones; whether it is ever grafted I do not know.

Another curiosity, and a fruit much talked about, is the Durian. Europeans who have got accustomed to it declare there is no fruit like it. I agree with them, but not in their sense; for, whilst they mean it in a complimentary sense, I mean just the contrary—for a more

fætid smell and taste I never came across. The common jack fruit is bad enough, but a Durian is the quintessence of all the rotten jacks in the East. They say it should be eaten out in the open air, sitting in a tubful of water; yet, for all that, those who have overcome their first dislike prefer it to all other fruit, and in Rangoon and Moulmein, where it is scarce, it fetches large prices. I should think it could be grown under glass in England very easily. It requires a damp heat, and takes five years before bearing fruit. The mango (grafted) will bear in its third year, but should not be allowed to do so until the fifth or sixth, as the fruit is then much finer.

The Tipparie, or Cape gooseberry, is a hardy bush, bearing a small fruit encased in an outer skin, which dries and shrivels up when the fruit is ripe. This shrub grows wild over the Neilgherry Hills—indeed anywhere where the seed is thrown down. It is subject to considerable cold during the winter at Ootacamund, and I believe it would live through an English winter in the southern counties, certainly it should in Jersey. Conserve made of it is delicious, far better than from any English fruits of the same class, whilst the fruit itself is not only exceedingly nice, but very wholesome.

F. T. P.

OLIVE CULTIVATION IN ITALY.

(*Journal of the Society of Arts*, 25th Nov. 1881.)

Mr. Schuyler Crosby, the United States Consul at Florence, states that the greatest care and attention has been for years bestowed on the olive tree, and great efforts made to make it yield, when young, the expenses of its cultivation, and every known means to effect this result have been tried without success. Calculations, from year to year, of the cost of planting, value of land, expenses of cultivation, gathering the berry, &c., made by the most experienced and enthusiastic of farmers in Italy, show conclusively that, even under the most auspicious circumstances of climate and weather, the tree does not yield a profit to the grower, under thirty and sometimes forty years. In Tuscany, an old proverb runs thus: "The chestnut trees of my grandfather, my father's olives, and my own vines." Hill sides, with a southern exposure, are almost always chosen for planting, either from the seed, branches, or the roots. Along the Mediterranean the olive tree does not thrive well when planted on the plain, and at a certain distance from the sea suffers much from a saline deposit on its leaves, which, if not washed off, by a timely shower, renders the tree for a long time unproductive. The tree is an evergreen, retaining its foliage at all seasons of the year. It dreads damp air, and thrives best in fresh earth, which retains a certain amount of humidity, and does not become arid; for this reason, calcareous soil, which does not undergo either extreme of climate, is the best adapted to its cultivation; it flourishes even in the cavities of the stoniest hills and mountains, and its roots will thread the smallest crevices of a rocky hill-side. To this quality of earth or soil is attributed the wonderful prosperity of the olive tree in certain parts of the Pisan and Lucchese territories, where it is absolutely planted in the calcareous rock, which being cavernous and spongy, retains just sufficient humidity to nourish, and not injure the roots. It is said that the olive tree never dies, and that the most neglected and withered plants, with no earth to be seen round its roots, and showing no signs of vitality, may, by means of abundant manuring, by filling in earth round the roots, or by transplanting the roots into new ground, be reclaimed, and again made productive. The berries are generally gathered in November, just before they become ripe, and when a grape-coloured tint appears upon the surface; though some growers insist upon the advantage of permitting the crop to remain on the tree until January or February; the objection to this delay, however, is that the fruit gathered so late in the season, not only produces an inferior quality of oil, but also seriously damages the prospects of the next year's crop. The berries are gathered as far as possible by hand, the peasants using ladders which will reach the highest points of the tree, great care being taken not to strike or even shake the limbs —shocks being hurtful to the tree, and are apt to seriously injure the young and tender branches, which are precisely those which will bear the next year's fruit. After the olives are gathered, they are carefully placed on wooden racks in order to let them lose a certain amount of humidity, and constantly moved about to keep them well ventilated and prevent fermentation. In extracting the oil, great care must be exercised in the pressing of the olive, which must be gradual and slow; for, if done with too much haste, as is often the case when steam is employed, the oil is sensibly deteriorated. If an oil of a very superior quality is required, great care is always taken not to crush the stone, or even to bruise it. The process of extraction varies according to the quality sought to be obtained, whether for the table, for burning, or for industrial purposes. The oil expressed from the fruity portion of the olive, when obtained by gentle pressure, and without the agency of heat, is called virgin oil; it is an exceedingly thin liquid, translucent, unctuous to the touch, and of a colour that varies between a faintly greenish and amber tint; its taste is sweet and pleasant, and it has a slight olive odour; when of only recent preparation, it is somewhat turbid, but after a short repose it becomes transparent, and deposits a blackish sort of dreg, composed of the fatty principle of oil, mucilage, and azote. Next, after virgin oil, the result of cold and gentle pressure, and which always retains the taste of the fruit from which it is expressed, and which serves as a condiment for food, and as a preservative of comestibles, such as the olive itself, the tunny fish, sardines, &c., come other qualities known as ordinary oil, lamp oil, and, lastly, "olio d'inferno," used for machinery and industrial purposes, and probably so-called from the amount of heat and torture it has been subjected to in the process of manufacture. The ordinary oil is made from the second application of the screw, when the pressure is brought to bear upon stones, kernel, and every part of the berry; even boiling water being used as an agent to assist in the increase of the yield of oil. When the mass of paste refuses to yield any more oily matter to the press, it is placed in large troughs of clean water, and kept moving as long as it furnishes a single drop of oil. This pasty mass, called "sanza," is then moulded into blocks, and set apart to dry, when it is much sought after for fuel for manufacturing purposes. Thus, from the moment the fruit is consigned to the press-room to the end of the process of extracting the oil—even to the feeding of the furnaces of the workshops—not a single particle of the olive has been allowed to go to waste. The process of clarification of the oil is effected naturally, by letting it stand for a certain time, during which the substances held in suspense are gradually deposited at the bottom of the receptacle. The oil is first placed in wide, low vases of earthenware, thickly glazed, and allowed to remain four or five days, after which the contents are drawn off, leaving the deposit behind. The more frequently the oil is separated from the deposit, the finer will be the quality. The oil, however, frequently holds these substances for a long time in suspension, when it becomes necessary to have recourse to filtration, in order to accelerate the depuration and clarification. The filters used in Italy and also in France are formed of heavy vats, with a double bottom, which is perforated with conical-shaped holes, forming so many funnels, into which pieces of clean-carded cotton are lightly placed. For the first few days the oil passes perfectly limpid through the cotton, and then, on account of the choking of the funnel ceases to flow. Several layers of clean straw are then laid at the bottom of the

vat, and these are sprinkled with well-washed animal charcoal, in rather coarse grains; in this case the charcoal deprives the oil during the passage of a certain amount of impurity, while the renewed clean cotton in the funnels does its work so well, that the oil reassumes its wonted clearness. It is then put up in kegs and barrels, and is ready for home consumption or exportation.

EFFECT OF MANURES ON CROPS.

(*Field*, 3rd December 1881.)

In a former article (*The Field*, 19th November,) having stated that the effect of manures on crops in various localities was not always the same, as the conditions were certain to be different, we then merely alluded to those conditions, but now propose to call attention to some of them at least.

It is true that but little is as yet known concerning the full effect which they are likely to exert, and we do not propose to enter fully into all details as far as they are known, for that would be impossible in the space at our disposal; but our intention is rather to point out the principal influences at work, so that those who take an interest in the subject of experimental manuring may be the better enabled to draw conclusions from such results as they may obtain practically, after allowance has been made for the effect of the locality. The extent to which allowances should be made is at present unknown; and it will only be by repeated trials that the necessary corrections will be discovered. First, all the constituents for plant life must be present in the soil. This we may consider as an axiom concerning which there can be no dispute; but more than this is requisite, the plant food must be in such a condition that it can be with ease absorbed or assimilated. This latter condition does not always obtain; it is quite possible for two soils to be almost identical in chemical composition, in so far that each constituent is present in the two soils in the same quantity; but still one of the soils may be fertile, the other not so. This difference is due to a want of similarity in the arrangement of the constituent parts. In one case they are combined, so as to be readily dissolved by water, and thus rendered accessible to the plant, whereas in the other the arrangement is otherwise.

A fertile soil will not require manuring to any great extent, and it is doubtful whether the addition of much manure would be productive of any corresponding gain. The time when a great gain by manuring occurs is, as is well known, after the soil has been exhausted by a former crop, when certain of its constituents which were soluble have been removed, and then either a fresh portion must be rendered soluble, or manures must be added. In the latter case the same end is attained, and in a shorter time. The improvement of the soil is therefore due to cultivation and manuring; but the extent to which this occurs is largely dependent upon properties inherent in the soil, and also upon external influences. Granted that the soil of the locality is normal in composition, whether it be a clay or a sandy loam, that it is not absolutely deficient in any one constituent, there are then three distinct physical properties of the soil which most probably have a definite though indirect influence on the action of manures, and these properties are—porosity, colour, and character of the surface. We have said "indirect influence" as being in opposition to the direct influence of the constituents of the soil upon the manures. The time which elapses after the land has been thoroughly wetted before it becomes fit for working is largely dependent upon porosity, which, so long as it is not possessed in too high a degree, is of great value. A soil which is too porous is said in common parlance to be "hungry;" then the manure, instead of being retained, is readily washed down and out of the reach of the plant; on the other hand, want of porosity causes a soil to be wet, and then aeration cannot take place, the very substances which compose the soil do not become altered and rendered soluble, and the excess of vegetable matter is not decomposed. However, a wet soil has one redeeming feature—when once warm, it retains its heat much longer than if it were dry.

The colour and character of the surface are, as a rule, of great effect, dark coloured soils being warmed by the heat of the sun quicker than those lighter coloured, and the presence of vegetable matter, which produces the dark tint, appears to retard the cooling; hence the changes in the composition of the soil, which require a moderate temperature, will proceed more rapidly in a dark soil, and the presence of small stones on the surface is likewise useful, as it prevents the soil below from cooling too rapidly at night.

From what we have just said, it is evident that the lay of a field is of great importance, as the amount of heat received from the sun on a southern slope is not only greater than that received by the same area on the level, but the above physical conditions to which we have cursorily referred, make themselves felt, which would not be the case were the field on a northern slope.

We must not omit the influence exerted by the shelter of trees, whether for good or evil. In many parts of England, more especially in the north, trees and hedgerows have been reduced to a minimum, under the supposition that the land in the neighbourhood will become drier. Such a supposition is no doubt true, as under the lea of large hedges the land has not much opportunity of getting rid of superfluous moisture, and the precipitation of the rain by trees, if a fact, is reduced in quantity. But, on the other hand, trees and hedges contribute a considerable amount of shelter from the wind, reducing the evaporation of water from the surface, and consequently the temperature of the earth. However, it becomes a question to be decided by experience, whether dryness probably accompanied by a lower temperature of the soil is or is not preferable to a moister condition, but with less movement of the air, accompanied by a slightly higher temperature. This last state of affairs has been tried for some time, and it remains but to hear the opinions of those who are working under the new system; for our own part, we are inclined to think that the old method, with better drainage, would be preferable.

Such, then, are some of the various physical conditions of a soil which can be judged of by the eye, and which will tend to produce a variation in the results obtained by manuring different soils with the same quantities of manure.

We can hardly conclude this article without mentioning one or two chemical conditions which are only indicated by analyses of the soil. Superphosphate added to a soil deficient in lime is but of small value, as, instead of being fixed by the lime which ought to be there, and retained for the plant's use, it passes away too readily in the drainage. A highly ferruginous soil is likewise unsuited for the application of a superphosphate, because the iron present fixes the superphosphate in such a form that it becomes of no use to the plant.

It is almost needless to state that the proportions of those manures which are already well represented in the soil might be reduced, were our knowledge in a more advanced state. At present we are only in possession of a few facts, which tend to show that the addition of manure to soil already well supplied is unaccompanied by a corresponding increase in the yield.

GINSENG ROOT, AND ITS DIGGERS.

BY GUY LA TOURETTE.

(*Oil and Drug News.*)

The American ginseng (*Aralia quinquefolia*) is one of the most graceful and beautiful plants that adorn the

United States' forests. It has a fleshy perennial root, varying according to age, from an inch to eight or nine inches in length. From this root springs a straight stalk, terminating in three and sometimes four petioled leaves, each with three divisions. From the point of divergence of the petioles rises an umbel, covered with minute whitish flowers that develope into large green berries, containing seeds, turning a rich glossy scarlet when fully ripe. The root, the only part of the plant of commercial value, is of a faint salmon colour without, nearly white within. It has numerous fibrous rootlets that serve to attach it firmly to the soil, and also to diminish its value, for there is a fashion even in ginseng, and just now a large smooth root without fibre commands a higher price than any other, and as that dug in Minnesota, and in certain counties of the State of Pennsylvania, fulfils these requiremeuts, it is eagerly sought after by dealers.

About the middle of May, or earlier in favourable localities, the tender green stalk of the ginseng (popularly called "sang") shows itself above the ground, and the "sangers," as the diggers are called, who have been impatiently awaiting its appearance, begin operations. Whole families, generally the lowest of the poor whites, migrate to the forests and mountains for the season, that, commencing then, ends about the middle of October, when, the berries having ripened and fallen, the plant turns yellow, withers away, and is indistinguishable from the other undergrowth. These sang-diggers are such a peculiar race that they deserve more than the brief notice I can here bestow upon them. It is true that many respectable people dig ginseng *en amateur* but "sanging" as a profession is not considered the thing at all. Sangers are the most "ornary" sort of people, and anyone familiar with the byways of southern phraseology will understand the force of that deformed adjective.

In West Virginia a curious tribe of them, unable to read or write, moving about like gypsies, have apportioned out the State among themselves, and although closely akin, and bearing identical names, resent an intrusion upon their respective territories in the most vigorous manner. Their wants are simple: bread, meat, coffee, tobacco, and some cheap articles of clothing suffice for them, for they live from hand to mouth. It has been suggested that these "sangers" are hibernating animals in winter, and it would be well for their immediate neighbours if they were so; for reduced as these "almost" gypsies are to the greatest straits for the barest necessities of life during the cold weather, it inevitably follows that other people's granaries and smokehouses undergo a mysterious depletion at times, for your true sanger dislikes work, and will evade it as sedulously as a tramp, but when the ginseng period arrives behold a change! The much-despised sanger emerges from his obscurity, and, sack slung from the shoulder, and sang-hoe in hand (an implement not unlike a small coal-pick), betakes himself to the mountains. The country storekeeper, who has frowned upon his efforts to obtain credit during the winter, is now anxious to be considered one of his best friends, and spreads infinite webs of flattery to secure his custom. The sang-digger is called lazy and shiftless; but I confess that, wandering among the mazes of the wild hills and mountains, by the side of rocky, foaming trout streams, and through the cool wind-swept forests in pursuit of one's livelihood is far more agreeable to one's senses and feelings than hoeing corn on a blistering hillside during the dog days, and even for those who do not have to dig ginseng for a living there is a strange fascination in the search for the plant that cannot be fully understood except by those who have experienced it.

Ginseng root is sold green to the country stores, which offer prizes for the heaviest root brought in, and for the greatest number of pounds dug by any one person during the season. The price paid varies with the season, all calculations being made upon the basis of dry "sang." Thus in May and June the root is light, taking between four and five pounds of green to make one of dry, in July and August between three and four, and in September and October, when the root is matured, two to three. As the great exporters will only buy it when flint dry, and perfectly free from all other roots, care must be taken to prevent fraud on the part of the sangers, whose consciences do not apparently trouble them when they mix poke, angelica and other roots with the ginseng. A more innocent way of practising imposition is to soak the green porous roots well in water before selling, and sometimes (but not often) to insert fine shot in the larger roots. It is quite needless, I suppose, to say that the storekeepers, who pay in goods for all they buy, are able by a judicious making up of their wares to avoid any positive loss in these transactions.

As soon as the root is bought it is dried, either in the sun or in kilns built for that purpose, or steamed, and then quickly evaporated—a process that renders it beautifully clear like amber. When prepared in this way it is known to the trade as clarified ginseng and brings a higher price, but owing to the risk attending this method of preparation, it is generally dried in the state in which it is dug, and the faster this can be done the better it is for the merchant, for ginseng dried rapidly does not lose so much in weight as when allowed to dry slowly. All attemps at the artificial cultivation of ginseng on a large scale have hitherto been without success; the growth of the plant from the seed is slow and uncertain, and the spontaneous supply has until recently been great enough to meet all demands, so that no very determined efforts have yet been made to grow it by the inhabitants of the States where it flourishes. The East India Company sent a party of scientific men to the United States some years ago, who, after making a series of experiments with the plant for a period of six years, declared it an impossibility to rear ginseng in a state of artificial cultivation. Many old diggers and merchants also say so, but one old digger with whom the writer has an acquaintance does raise annually quite a quantity for the market, and therefore what he had accomplished on a small scale, with care and patience, could be done on a larger under like condition; and as the demand is now in excess of the supply, and China is depending more and more every year upon the United States for the root, it naturally follows that those who shall first successfully grow ginseng will find it a very remunerative business, until the secret of its culture shall become wide spread, when the price must necessarily decline.

And so by the superstition of a semi-civilized race an otherwise inconsidered weed becomes an article of great commercial value, gives occupation and a livelihood to numbers of people, and adds materially to the wealth of the United States.

ROYAL AGRICULTURAL SOCIETY'S JOURNAL.

FLAX FARMING—NARROW-GAUGE LINES FOR PLANTATIONS—LINSEED AND COTTON CAKE—DRAINAGE WATER.

(*Field*, 17th December 1881.)

The second part of vol. 17, second series, recently issued, contains much interesting and valuable matter, including three articles on Continental farming by Mr. H. M. Jenkins, the editor, reprinted from his able report on the agriculture of the Netherlands to the Royal Commission on Agriculture. The first is on flax farming in the Netherlands, which follows a long and important article on the modes of culture and preparation of flax as practised in Ireland and on the Continent, by Michael Andrews, Secretary of the Flax Supply Association for the Improvement of the Culture of Flax in Ireland. This writer describes the result of his own experiments as to an improved mode of watering, viz., by securing a uniform temperature. This is effected by

placing the steep vats in chambers heated by steam pipes, the water being introduced into the vats at the required temperature, and this maintained by heating the surrounding atmosphere of the chamber—in other words, simply by creating an artificial climate. This process has been very successful; the fermentation is in full vigour in twenty-four hours after the commencement of the process, and continues uniformly for some days, when it gradually subsides as the operation approaches completion.

It may not be generally known that the artificial processes for separating the fibre from the woody matter of the stem have not hitherto proved successful. The use of chemicals has proved injurious to the quality of the fibre, and this has also been the result of both Schench's and Watt's processes. The former introduce steam into the water and the vats; the latter into close chambers in which the flax was placed. It is satisfactory to learn that the cultivation of flax has been attended with considerable success in Ulster, and it is quite certain that the linen manufactured at Belfast has of late years been largely developed. In the Netherlands the principal centre of flax farming is the Island of Ijsselmonde, immediately opposite Rotterdam. The island itself has long since been *flaxed out*, but some of the inhabitants, who are known as flax farmers, either hire land for the purpose of growing the crop, or else buy the crop at harvest time; the former plan is most popular, and from £8 to £11 an acre is paid for land ready for sowing, all further expenses being borne by the flax farmer. The crop in a good season is estimated at from £18 to £20 an acre. Nearly 50,000 tons are grown annually.

The report of the judges on the Derby Prize Farm Competition, which we conclude to have been written by Mr. Clare Sewell Read, is a masterly production, and will bear comparison with even Mr. Little's very able and eloquent report of last year. The utility of these competitions is two-fold. The occupiers in the district are stimulated to increased exertions, and the brushing up does them good; and the reading public have an opportunity of becoming acquainted with farm practice in different localities. Such papers as those which have recently appeared not only describe the particulars of each competitor's practice, but give a general account of the leading features and special characteristics of each district traversed, which is most interesting. Milk is the sustaining product; corn and meat growing, though ever so well done, realises a miserable percentage, but those farmers who produce milk can show a solid profit that is highly satisfactory. As regards statistical facts, grass is increasing, corn land diminishing. There are now 11,000 head more horned stock than in 1871; but, alas! 40,000 less sheep, attributable almost entirely to the ravages of disease. The milk trade is of comparatively recent growth, but it has latterly made such progress that over-production is to be dreaded. The Midland Railway, which carried 1,000,000 gallons in 1872, now convey four times as much, and it is thought that not half as much cheese is now made round Derby as formerly. With such excellent management as was found on the competing farms, there is no fear of damage to the land from milk sold; but of course there is always the possibility of an equivalent not being returned, and then pastures would speedily suffer. Decorticated cotton cake is generally given, and an outlay of from 50s. to 60s. per acre in purchased food is not uncommon. The farmers are very attentive to their business; hence one great secret of success. Rents are high, and in some cases either outlay must be made or a reduction given. The judges were much impressed with the energetic, enterprising, and successful management of the late Mr. Carrington, who had laid down large areas of land to grass and drained, and at his own expense. Mr. Carrington had complete confidence, and laid out his money without any security whatever, further than the custom—not even having an agreement. The judges say:—

Little did we dream, when we first inspected these farms, that a tenancy which had endured for centuries would be so sadly and suddenly terminated in a few days. There was no son old enough to carry on the work, and the dying man directed his executors to relinquish all his farms. A large share of the tenant's capital must be left in the land, and the chief part of the tenant right must be left to the justice and generosity of the landlord. We trust that an amicable settlement may be arrived at, and that those splendid new pastures may not be ploughed up as the executors' last resource.

The judges remark upon the terribly neglected condition of arterial drainage, which has greatly aggravated recent flood visitations, which, especially along the course of the Trent, has proved so disastrous. Shallow drainage on clear soils at near intervals has proved more successful than deep drainage. This is now universal experience.

The paper by W. H. Delano, C.E., on "Secondary or Narrow Gauge Railways for Agricultural Purposes," embracing a description of the Duke of Buckingham's line made in 1871, which appears to be very successful, will attract attention, inasmuch as the subject is one of considerable importance. As such roads are to be feeders for the line of railways, it seems very desirable that, whilst carrying special locomotives lighter than railway engines, the gauge should be the same, so that reloading would be avoided. In many parts of the country the sides of the highways have vacant space sufficient for a single line of rails. If such land could be utilized, one great cause of expense—viz., the cost of land—would be obviated. Mr. Delano describes various foreign enterprises of this nature, nature of the concessions, regulations, &c.

Dr. Vœlcker's report on "Further Experiments on the Comparative Value of Linseed Cake and a Mixture of Cotton Cake and Maize Meal for Fattening Bullocks," confirms the experience of the previous season's work, viz., that the mixed food is the more economical. These facts should certainly lead to a modification of ordinary practice. In one case two lots of three beasts, the results were very remarkable. "In the cotton cake and maize meal lot the increase, amounting to 49, lb., was obtained at an expense of £10 9s. 8¼d. in purchased food, or at a cost in purchased food of 5½d. per pound increase in live weight; whilst in the case of the three bullocks fed on oil cake, the increase of 40 lb. was obtained at a cost of £14 2s. 9¾d. in purchased cake, or at the rate of 8¾d. per pound."

Messrs. Lawes, Gilbert and Warrington contribute a most valuable paper on rainfall and composition of drainage water, collected at Rothamsted, in which the injurious influence of wet seasons in washing nitrates from the soil is clearly proved. On this occasion attention is confined to the amount and composition of drainage water from unmanured fallow land. We are promised a further paper as to the influence of cropping on the loss of nitrates.

CINCHONA CULTIVATION IN JAMAICA.

The Government of Jamaica appear to be very desirous of encouraging the cultivation of cinchona, and they have made arrangements for the grant, under certain conditions, of a limited extent of land, at a nominal price, to any person who may be prepared to embark in the undertaking. Further particulars of the progress of cultivation have been received since those already printed in this *Journal* (vol. xxix, 240, 455). The demand for seeds and plants is said to continue to increase largely, as the new industry brings into productiveness regions which in many cases were unsuited for coffee or provisions, and which were a burden on

the owner. Mr. D. Morris, the Director of Public Gardens, writes in his last report:—"As indicating the value of cinchona planting in the Blue Mountains—taking 379 trees which occupied an area of less than 120 square yards—it was estimated that if they yielded on the average one pound of dry bark per tree (young trees at the Government Plantations yielded 1½ pounds per tree), each tree would be worth at least 5s; this would give £94 15s as the value of 379 trees on an area of 120 square yards, one-fortieth of an acre. Under ordinary conditions it would not, however, be advisable to plant the trees so closely as this, but the value of an acre of land planted with trees even at one-half the above rate, would amount to more than £1,890. Large as this sum may seem, it appears that with the precious Ledgeriana bark, grown by the Dutch in Java (a few plants of which have just been introduced to Jamaica), the yield per acre, as quoted by Mr. J. E. Howard, F.R.S., is estimated, from actual sales, at £2,000 per acre."

Three kinds of cinchona are now well-established in Jamaica, viz., *C. officinalis*, *C succirubra*, and a variety called *C. calisaya*, which is supposed to be a hybrid between the other two. The *ledgeriana* is a variety of *calisaya*. Seeds of the *C. officinalis* for cultivation at elevations above 4,000, are supplied by the Government at 5s. per ounce, of *C. succirubra* at elevations between 2,500 and 4,000, feet at 3s. per ounce. An ounce is sufficient to produce 20,000 seedlings, which will plant five acres. Boxes of seedlings may be obtained at a guinea per box, and plants are obtainable at from 40s. to 60s. per 1,000.—*Journal of the Society of Arts.*

GRAFTING.

Some time since we directed attention to autumn grafting of all kinds of trees. Whether practical effect has been given to the suggestion in this colony, we know not. Probably not, for it is a matter of great difficulty to get people out of their old grooves. We notice in the *Gardeners' Chronicle* that at Iowa the system of winter grafting is advocated and acted upon; and the remarks are so very sensible and to the point, and so peculiarly applicable to the circumstances of this colony, that, with additions to suit, we deem it advisable to give a brief *résumé*. The peculiarities of our climate during the early spring months are such as, unless in very favourable situations, to make grafting a mere matter of speculation. It may be either too wet or too dry. The wind may be hot, or the weather may be, as of late, alternately hot and very cold, all combining to materially affect the union between scion and stock. The method adopted by the Iowa college is to graft early in the winter, store the grafted plants in sand, placed in a humid cellar or other close house; leave them till the following spring, and plant out into the proper positions. The covering of sand and the humid atmosphere will have caused the union to be perfectly complete, and then all the plant will have to do is to grow when planted out in the open ground. In the covering of the incised parts, our Iowa friends somewhat alter the usual method. They advocate first placing the clay compound on the scion, and then covering with a grafting wax compound, spread on some fine muslin. The material they use is white resin, linseed oil, and wheaten flour,—a composition that does not harden, and therefore may be applied without warming. In consideration of our short winters, which generally are not very severe, even in the coldest parts of the colony, these etceteras might be dispensed with. That is, presuming the ties perfectly cover the incised parts, and are then planted in sand, the exclusion of air will be quite sufficient to allow the granules from both scion and stock to form and unite. We recommend both amateurs and gardeners to try the method next season, and we firmly believe that it will be found a perfect success. The process should be extended not only to fruit trees, but to other classes of plants. Thus the camellia, with which we so often hear of failures, might be tried. In fact, all plants that are propagated by this method might be experimented on.

VINES.

It appears that Baron von Mueller has been applying for seeds of American grapes, with the view of getting stocks phylloxera proof, and that the species sought after are the vulpina, æstivalis, cordifolia, and labrusca. If these, as is stated, are more or less liable to the attacks of the phylloxera, they will prove but of little use for grafting purposes, as it should be borne in mind that the severe winters in America must act in a measure as a check; but in this colony or in Victoria, where the frosts are so slight as to scarcely cake the surface of the ground, they will be as equally prone to phylloxera as the varieties already attacked. Again, as most species of American grapes are very prolific in growth, and may be multiplied by the hundreds of thousands either by cuttings or layers, plenty of stocks, without troubling the seedling process, could be obtained in one season wherewith to try experiments. In the matter of training vines, we noticed specially one idea; that was, to let the rods attain a sufficient height, and then gather the tops in and tie up in a bunch. This system certainly would do away with expensive stakes, but could only be adopted in situations that are not exposed to puffs of hostile wind. Another question presents itself: Do vines require stakes at all? We grow them on what is known as the currant-bush system, and if this plan were carried out in its integrity the vines should be self-supporting. Thus the shoot should be nipped off one eye above the bunch, and by a series of nippings the present allowance of useless rods might be entirely dispensed with, and the plant present what it is intended to form—simply a dwarf bush.—*Australasian.*

COST OF COCONUT AND CINNAMON CULTIVATION IN CEYLON.

I suggested to my Colombo friend that if he were an American, instead of a Sinhalese, by birth, and had some capital to invest, he would probably look about and find twenty more fathers of boys or girls, of his own nationality, religion, and social status, and pool say £500 each. This would give a joint capital of £10,000, with no interest to pay. They would then find a thoroughly competent native manager; and by giving him besides his salary, a certain share in the profits, identify his interests with their own. They would buy of Government a block of 2,000 acres, of which 750 would be planted with coconuts, 750 with cinnamon, and the other 500 held as a reserve. Roads would be opened, and the estate either marked into twenty plots, one for each shareholder, or if it were to be managed as one estate, then twenty good building plots would be laid out at the centre of the property, and a village formed. Some time ago I got the native manager of just such an estate to sit down with me and make the calculation I am now going to lay before you. It was an estate that had failed in the hands of an European capitalist. He was an absentee, his manager cooked the accounts, the kanganies cheated the manager, the coolies stole products from under the noses of both, and so it at last came under the hammer and into native hands. There were several partners and a good practical man to manage under their personal supervision. The result was that within five years the estate paid for itself, and now the owners can

meet the market, whatever it may be, and still make money. The manager's figures may be faulty—I cannot vouch for them—but at least I have had them endorsed by several native estate owners of my acquaintance, whose signatures are known at the Madras Bank and the O. B. C. Here they are:—

Investment of a capital of £10,000, *contributed by* 20 *proprietors in sums of* £500 *each.*

Dr.	£	s.	d.
To purchase of 2,000 acres of coconut and cinnamon land, at R15	3,000	0	0
,, Surveying	75	0	0
,, Making roads (which require 20 acres)	200	0	0
,, House for superintendent	50	0	0
,, Clearing 1,500 acres at R5 (net, exclusive of timber sold off)	750	0	0
,, Plants for 750 acres coconuts (75 per acre)	281	5	0
,, Plants for 750 acres of cinnamon (3,000 per acre at R2)	225	0	0
,, Setting 56,250 coconut plants at 3 cents	168	1	6
,, Planting 750 acres cinnamon at R1·25	93	1	6
,, Holing and covering do.	131	0	6
,, Weeding 1,500 acres, 1st year, at £1	1,500	0	0
,, 10 watchers at £1 per month	120	0	0
,, Superintendent's salary at £3 per month	36	0	0
Total cost at end of the 1st year	£6,629	8	6
Weeding, watchers and superintendence, 2nd year	1,656	0	0
	£8,285	8	6
Same for 3rd year, £1,656	3,312	0	0
,, ,, 4th year, 1,656	£11,597	8	6

Cr.			
By crop of cinnamon in the 4th year 562½ bales at R37·50 per bale...£21,075			
Deduct cost of peeling at R16 ... 9,000			
	1,207	10	0
,, Crop 5th year at 1 bale per acre, 750 bales, at same price	1,612	10	0
,, Crop 6th year the same	1,612	10	0
,, ,, 7th year, an increase of 25 per cent	2,015	10	0
,, ,, 8th year, same rate of increase	2,418	10	0
,, ,, 9th year, do.	2,821	10	0
,, ,, 10th year, at 3 bales per acre	3,225	0	0
,, First yield of coconuts on 750 acres at R24 nett	1,800	0	0
	£16,713	0	0

In the 15th year the income will be

For Cinnamon	£3,225	0	0
,, Coconuts	3,600	0	0
—Cor. of Ceylon *Times.*]	£6,825	0	0

[The figures look too good to be true. The market for cinnamon is not very promising, while coconuts were never cheaper than now. No allowance is made for part of the land turning out unsuitable for cinnamon or coconuts after planting, as in the case of the Horrekelly estate: 2,000 full-grown coconuts per acre is, we suspect, a good average yield for a property of 750 acres, and therefore we would put £2,500 instead of £3,600 as the full income from this source. So with cinnamon, £1,000 off the above income would be a safer estimate, but even then the investment offers a very encouraging return.—ED. *T. A.*]

CAWNPORE EXPERIMENTAL FARM.

The report on the operations at the Kanhpur experimental farm during the past year records the results of some very interesting experiments with manures and agricultural implements and machinery.

Of the manures employed five belonged to the nitrogenous class, *viz.*, indigo plant; hemp plant; cattle-dung; cattle-dung in combination with gypsum, and poudrette; and three, *viz.*, bone-superphosphate, bone-dust and ashes of cattle-dung, were non-nitrogenous. The crops to which the manures were applied were wheat and barley and sugarcane.

In the case of the wheat and barley the result was to show the immense superiority of the nitrogenous over the non-nitrogenous manures, the former producing in every case a marked increase in the yield, and in every case but one, that of cattle-dung in combination with gypsum, an increase of the net profit, while the latter either increased the yield in so slight a degree as to lead to a diminished profit, or actually diminished the yield.

Among the nitrogenous manures, again, the greatest increase in the yield was produced by poudrette; but green soiling, which came very near it in this respect, produced a slightly better pecuniary result. Next to green soiling and poudrette, came cattle-dung as regards increase both of yield and net profit. Among the non-nitrogenous manures the best results were obtained from ashes of cattle-dung, with an increase of grain of 56 per cent, but a slight decrease in net profit per acre; while bone-superphosphate gave an increase of yield of 39 per cent, with a net pecuniary loss on the cultivation, and bone-dust gave a small increase in yield of grain with a decrease of straw and a diminution of net profits to the extent of R2-2-4 per acre.

Hemp was found equally efficacious with indigo as a green manure, and in one case, in which two areas, each 200 square yards, the one green soiled and the other fallow, were put under wheat, the manured plot gave a better outturn, by 73 per cent as regards grain, and 24 per cent as regards straw, than the fallow. Experiments were also made with gypsum alone; but the results were conflicting, 360 lb. per acre in one case increasing the yield by 45 per cent; and 100 lb. and 200 lb. per acre actually diminishing the yield in two other cases.

The experiments on sugarcane were made with cattle-dung, guano, and guano followed after an interval of 12 months by bone-superphosphates. The best result was obtained with the last named, the outturn per acre with 6 maunds 24 seers superphosphate being 2,584 lb. of sugar, and the net profit R94-4-3, and with 3 maunds 32 seers superphophates, 1,591 lb. of sugar, with a net profit of R44-11. The next best result was obtained with cattle-dung, 260 mds. per acre, producing a yield of sugar of 1,964 lb. with a profit of R56-10-3, and 130 mds. per acre, producing a yield of sugar of 1,542 lb. with a profit of R39-8-5. Guano alone, in the proportion of 12 mds. 35 seers to the acre, gave a yield of 2,554 lb. of sugar, with a loss of R23-0-9, and in the proportion of 3 mds. 18 seers per acre a yield of 1,848 lb. of sugar, with a profit of R10-12-10.

Some inter-sting experiments were carred out with different forms of winnowers, an English instrument (by Dell), a farm-made instrument and the ordinary native method being tried in competition. With a high wind the results as regards both time and economy was in favour of the English winnower, which winnowed 100 mds. of grain in 18h. 58m. at a cost of 15·4 as., the native method coming next, and doing the work in 28h. 37m. at a cost 18·7 as, while the arm-made winnower took 32h. 16m. to do the work, at a cost of 21·1 as. In a calm, on the other, while the English winnower did almost equally

well, the time being 20h. 50m. and the cost 16·9 as. the native method was altogether out of the race, the work occupying 51h. 41m. and costing R4-3-8, and the farm-made instrument did the work in about twice the time and at 50 per cent greater cost than the English.

The experiments with the windmill, one of the American Kewanee pattern, show conclusively that it cannot compete with the common native *dhenkoli* worked by hand. In the first place the minimum velocity of wind necessary to work the windmill with any efficiency is four miles an hour, and the number of months during which the average wind velocity in the North-West Provinces comes up to this is small. In the second place the efficiency of the windmill, with even a four mile breeze, is less than that of a *dhenkoli* worked by two men, while its daily cost is greater. It should be noted, however, that the windmill was a very small one, its efficiency with a 6 mile breeze being only about ·026 H. P. Possibly, a larger mill would give a better comparative result. —*Englishman.*

INDIAN PLOUGHING EXHIBITIONS, CUDDAPAH AND KURNOOL.

From L. R. Burrows, Esq., Acting Collector of Cuddapah, to the Secretary to the Board of Revenue, dated 12th September 1881.

I have the honor to forward, for the orders of the Board, copy of a letter from Superintendent of Government Farms, proposing to send some men and ploughs under the direction of an Agricultural Instructor for exhibition in this district. I shall be very glad to arrange a series of exhibitions in different parts of the district and to invite the principal agriculturists to inspect the ploughs and their work. The exhibitions might easily be made very interesting by putting the best proughs of local make in competition with the Madras ploughs. Cultivation in the neighbourhood of Cuddapah is of a very high class, and I feel sure that if there is any real advantage to be gained by using Madras ploughs or any implements of a different kind from those now in use, the cultivators about here will not be slow to make the change. I understood from Mr. Robertson, with whom I consulted personally, that funds were available under the Board's orders for the purpose in view.

From W. R. Robertson, Esq., M.R.A.C., Superintendent, Government Farms. I have estimated the salary of the Instructor at R45 per mensem, which with R15 batta will bring up the allowance to that sanctioned for an Agricultural Instructor. We cannot offer less emoluments, for the work is only temporary and the districts remote and not specially favored as regards climate, &c. I have entered in the estimate a sum for the hire of cattle; probably only a portion will be required. If the same cattle are used throughout each district, the owners will, of course, expect payment when the land of other cultivators is being ploughed by means of the cattle.

Resolution—The Board observe that the experiments in Trichinopoly were unsuccessful, but that those in Bellary, at the cusbah at any rate, were of an encouraging nature. The proposed expenditure is sanctioned on the understanding that the Collectors will stop the experiments if not satisfied with their progress.

FEEDING PROPERTIES OF THE "REANA LUXURIANS."

Read—the following letter from W. R. Robertson, Esq., M.R.A.C., Superintendent, Government Farms, to the Secretary to the Board of Revenue, dated Saidápet, 19th August 1881.

In continuation of my letter, No. 481, of the 14th of May last, embodied in the Board's Proceedings, No. 966, dated the 2nd June 1881, I regret to have to report unfavorably of the seed of the *Reana luxurians* as a food for stock, not because of the grain being innutritious, for this is a point on which I can offer no decided opinion, the grain not yet having been analysed, but because of the difficulties experienced in preparing the grain ss food, and the unwillingness of stock to eat the grain when prepared. The latter perhaps is not an unsurmountable difficulty, for stock generally refuse a new kind of food when first offered. But the difficulties experienced in preparing the grain for use as food are, I fear, fatal to the prospects of the grain being used as such.

2. I have tried various processes in preparing the grain—

(1.) A quantity of the grain was placed in cold water and allowed to soak for 56 hours. At the end of this time the grain was almost as hard as when first placed in water, while it had increased only about 10 per cent in volume.

(2.) Half a measure of the grain was boiled for 6½ hours. At the end of this time the shell was perfectly hard, though the inner portion was soft; still it was quite impossible that the grain could be masticated by any animal. After boiling the grain measured 6½ ollocks, which was an increase of 62 per cent. It appeared to be useless to continue the boiling process longer. The boiled grain, when cold, was offered to several sheep, all of which refused to eat it.

(3.) Half a measure of the grain was placed in a stone mortar and was beaten for two hours with a heavy pestle, but none of the grain was crushed.

(4.) Half a measure of the grain was placed in a powerful corn-crushing mill. The grain in passing through the mill was partly crushed, but only very imperfectly, and it was necessary to pass it seven times through the mill to get the grain powdered; and this was only a rough coarse powder. This powdered grain was offered to a number of sheep, but again it was refused.

3. Under these circumstances, it is not, I think, necessary to go to the expense of analysing the grain. I enclose a sample, should the Board deem it necessary that further trials should be made with the grain.

4. I fear, however, the grain has but little to recommend it as a food for stock. Its hard, flinty husk forms fully 30 per cent of the entire grain, while the inner portion is tough and waxy, and, I should think, very indigestible. Maize has many more claims, and those of a much stronger character, on those who are desirous of introducing a better food-grain into this country either as food for man or beast; and maize could be successfully cultivated wherever the *Reana luxurians* could profitably be grown.

Resolution—Submitted to Government with a file of the previous printed correspondence. The Board fear that there is little prospect of utilizing the grass or the seed derived from this plant.

MR. ESPEUT, F.L.S., ON CULTIVATION IN JAMAICA.

(*Field*, 31st December 1881.)

If any one will contrast the data I have given in previous letters, which experience is every day proving to be inside the results actually obtained in fruit cultivation here, with the figures given on page 489 of your issue of the 1st of October (No. 1,501) of orange

planting in Oregon, he can scarcely fail to see the great advantages Jamaica offers over that belauded portion of the United States—not a British possession, be it observed.

The letters recently published in the *Times*, though rather *couleur de rose* in some respects, give a very good idea of Jamaica as it now is.

If ever there was a time when this beautiful colony should attract the attention of capitalists and enterprising young men from the mother country, it is now. When the Panama Canal is accomplished, the position of Jamaica will be materially benefited, and opportunities which now offer will not be offering then of obtaining land cheap.

As you were so good as to allow me to allude to the plans I have adopted for aiding the intending colonists with small capital, will you kindly let me say that experience has proved the wisdom of altering the previously stated terms? At first I proposed to give the land, and materials for a cottage, free of rent for five years, on the condition the land was planted in chocolate for my benefit, I finding the seed and paying taxes and rates. Now it is found mutually more satisfactory and agreeable that I should plant the chocolate myself, and instead, receive one-third of the annual nett profits of the banana cultivation, after the capital is wholly repaid, as rent for the land and house, &c.

One gentleman who took up 100 acres of land and commenced planting it in bananas in July, 1880, expects to get back the entire capital expended before next April, and thereafter to hand me £500 a year, or £5 an acre, as my one-third of the profits. Of course, I do not wish to make people believe this result will always follow in *any* part of Jamaica; but I certainly do believe that in this district, and especially on lands near any tramway or shipping place, the capital will be repaid in two years, and the return from bananas will give a nett profit for three years of 50 cent per annum on the outlay. I have 400 acres in cultivation on these terms on this estate, and have dozens of enquiries, local and from outside Jamaica, for lots from the 2,000 acres of suitable land which I am prepared to devote to this system. It may be said, if the thing is so good, why do I not keep it all in my own hands? The reply to this is, that my hands are full, and that I have still other and sufficient land for all the capital I can devote to this particular cultivation, having regard to the heavy outlay for up-keep of over seven miles of tram lines, a large sugar estate, and a daily increasing chocolate cultivation.

I thank you very much for the space you have so kindly given me on this and previous occasions, and once more advise those who think of settling abroad to look at Jamaica before they decide on going elsewhere.

W. BANCROFT ESPEUT.

Spring Garden, Buff Bay, Jamaica, Nov. 10, 1881.

OSTRICH FARMING IN SOUTH AFRICA.*

At a time when industries are languishing at home, and hands are idle for lack of employment, many might do worse than turn their attention to the new and thriving industry which has sprung up at the Cape, in the domestication of ostriches, which are farmed for the sake of their plumage. Mr. Arthur Douglass is the author of a very interesting work which describes the rise and progress of the new enterprise, which dates no farther back than 1867. Already, in the Cape Colony a capital of not less than £8,000,000 is employed in this new method of farming, while the export of feathers during the past year amounted to 163,065 lb. weight, valued at £883,632, or £5 8s 4d per lb.; most of this product having been derived from tame birds. The value of a really good ostrich feather had long been known in the market, but not until within very recent years was the idea carried out of taming and rearing birds, whose half-yearly crop of feathers might be made to yield almost their weight in gold.

Ordinary farming knowledge avails nothing in the rearing of the ostrich. On the Cape Coast cattle, unless they are native, are subject to fatal attacks of liver complaint, and only a small percentage of the calves can be reared. Horses fall off in condition, and the insects of the district blister and destroy the teats of cows. Farther inland it is not so bad, and on the more congenial grassy lands some fairly extensive stocks of sheep are kept. Yet here also they are liable to diseases of divers kinds, and heavy mortality has been experienced in raising them. Mr. Douglass ascribes much of this to overstocking, and allowing old, sickly, and inferior sheep to breed. With the ostrich also great care is required to avoid over-stocking, and so give the herb-seed a chance of reproduction. He favours for this purpose letting half the farm lie idle six months. The man who is able to own land should, he says, always have two large camps for each troop of birds, if he would keep an eye to the future; whilst the needy man on hired land can move to another farm on the expiry of his lease, and thereby avoid the inevitable consequences of over-stocking.

What capital is required? In the course of an interesting chapter on this head, Mr. Douglass states that with a few hundreds of pounds an excellent start may be made on the 'halves' or partnership system. But, above all, he advises the would-be ostrich farmer to obtain, as a preliminary to business, at least two years' experience of the colony. Otherwise the emigrant is almost sure to invest his money foolishly. Far better is it, in the opinion of the author, to obtain, if possible, letters of introduction from the relatives of well-to-do people who may be living at the Cape, and pay a premium of £100 to cover cost of board and lodging during the first year, and be prepared at the same time to engage in any kind of work.—*Australasian.*

* *Ostrich Farming in South Africa.* By Arthur Douglass. London: Cassell, Petter, Galpin, & Co.; and S. W. Silver & Co.

PROPOSED CURE FOR THE PHYLLOXERA.

Many years ago the important silk-producing industry of the valley of the Rhone was threatened with ruin. A mysterious disease seized upon the silkworms, and resisted all the efforts at its cure, until at length M. Pasteur, who was even then engaged on those studies upon fungi and fermentation which have since rendered him so famous, demonstrated that the pest was caused by a living parasite, and devised means of stamping it out effectually. Few modern researches have been more suggestive or more fruitful in practical results than these of Pasteur. Our knowledge of the vast amount of mischief to health and industry caused by the lower fungi, and particularly by bacteria, has been rapidly increasing, while, happily, the power of successfully destroying these has increased in scarcely less rapid proportion; witness the improvements in wine-making, the still greater advance in the art of brewing, and, best of all, that revolution in surgery effected by the introduction of antiseptic methods. Of late years the vine-growing districts of France have been steadily invaded by a serious pest of a widely different kind, the *Phylloxera vastatrix*, an insect belonging to the same family as the common green aphis of the rose, and endowed with the same power of rapid sexual multiplication. In spite of all remedial measures, the insect is still spreading, and thus constitutes a serious danger to the wine supply of Europe. Soon after the establishment of the Phylloxera Commission of the Academy of Sciences, M. Pasteur threw out an ingenious suggestion, clearly derived from his early experience of

the silk-worm disease, to destroy the invader by innoculating it with a parasitic fungus; thus reversing the principle of all the previous applications of our knowledge of these organisms by treating them as allies instead of enemies. Unfortunately no experiments were made, and the subject was forgotten until last year, when Professor Hagen, of Harvard, published an account of his experiments on the destruction of obnoxious insects by the application of the yeast fungus. He concluded that the yeast cells entered the body of the insect, there giving rise to fatal disease, and accordingly recommended the application of yeast to the phylloxera. Colorado beetle, &c. Such results as these, on the one hand confirming the old belief in the efficacy of yeast as a means of destroying greenhouse pests, and on the other at variance with all experience as to its mode of life, could not but stimulate inquiry. The subject was soon undertaken by a distinguished Russian biologist, Elias Metschnikoff, who has shown that the disease-producing fungus of Hagen was not the yeast itself, but was merely associated with it as an impurity. He has succeeded in cultivating several species of fungi parasitic upon insects, notably one which he terms "green muscardine" (*Isaria destructor*) and in tracing their entire life-history. By cultivating the green muscardine apart from insects upon a suitable nutritive fluid, he has been able to obtain a considerable quantity of spores, and thus feels justified in recommending the cultivation of such fungi on a large scale, and the dissemination of the germs in places infested by insects. The subject is at present engaging considerable attention in France, and experiments are being made, of which we shall doubtless know the results in the course of next season. In the meantime it is impossible not to await with interest and hope this application of a new method.—*From an article on "Recent Science" in the November number of the "Nineteenth Century."*

SUGAR GROWING IN MACKAY, NORTHERN QUEENSLAND.

After careful inquiry and comparison of results, I am justified in setting down 1 ton 12 cwt. of sugar per acre as a fair average yield per acre from the canes all around. With advantages such as exist, especially in the climate of Mackay, this yield, though favourable as compared with other Queensland sugar districts, and highly profitable in itself, is below what might reasonably be expected, and probably much under what better cultivation and appliances will make it in course of time. Only in two instances have I observed manure to be applied. At Foulden, Mr. Walker uses superphosphate of lime manufactured on the premises; while Messrs. Hewitt and Co. apply stable manure on a part of their Pleystowe plantation.

The crushing season begins in June and finishes about the middle of December, and during this time not more rain falls than is sufficient for nourishing the young canes—on an average about 17 inches. In some of the plantations these are put in the ground almost as soon as the old canes are cut down and the ground ploughed up. The cuttings are taken off near the top of the cane, and placed in a slanting position in the ground, in a way which leaves only a joint exposed above the surface, but in very dry weather even this is covered up—a work in which the kanakas have become expert. There is another way in which the young canes are allowed to grow—that is, by rattoons, as it is called, the cane stumps being left in the ground, from which the next crop springs up, the earth being ploughed up so as to leave the stumps just covered. In general this process is permitted to go on for three years before the stumps are ploughed up for re-planting; it saves a great deal of labour, and though the canes are not so vigorous as those which grow from plants, yet the stumps continue for three years to give a tolerably fair crop. In some cases they will yield a profitable crop for a longer period—even for five or six years; but it is considered safer not to let the time exceed three years.

It is remarkable to what a height the canes grow in well-cultivated and well-drained land. I have seen a crop standing in some places as high as 12 and even 15 feet above the ground; and once, on the ridges of the Pioneer, witnessed the singular spectacle of two men on horseback becoming invisible to each other at a short distance whilst riding among the canes. When the cultivation is good there appears to be no difference in this respect between the rich level alluvial soil of the Pioneer and the dark soil on the hillsides; both at the present time are equally prolific, but in a very wet season the hills would probably have the advantage.

It is said that 11,000 tons of sugar will be the probable yield for the present year, but in comparison with the land unoccupied the district has barely been scratched, and it has been estimated on a fair calculation, what may seem at the present stage an exaggeration, that no less than 250,000 tons of sugar per annum will be produced in the district when all the land is tilled with skill and care. Be that as it may, there is an immense tract of land yet open to the selector, but unfortunately, just as people are becoming anxious to take up land, the Government have withdrawn it from sale. When it is thrown open again, the rush for it will be enormous, judging by the number of inquiries which are made at the Mackay land office. The conditions are similar to those of New South Wales, and it is probable that in the Mackay district every selection will be contested for at auction.

Cane-growing seems very catching; nearly all who can embark in the enterprise; sugar-growing and cane-planting are the principal topics of conversation in the town and in the country, and all the small farmers, of whom over 200 are said to have settled down, who formerly grew maize and tried their hand at cotton, have abandoned those industries for the more lucrative one of growing sugar-cane, which they dispose of to the millowners for about 11s. per ton. —*Australasian.*

THE CULTIVATION OF CASUARINAS.

TO THE EDITOR OF THE MADRAS MAIL.

SIR,—I must crave a small space in your paper to enable me to make a few remarks on the estimate framed by "B." for planting six acres of land with casuarina trees, as published in the *Eurasian and Anglo-Indian Advocate*, and reproduced in your issue of the 20th July last.

"B." does not provide for the expense of forming a fence or hedge for the plantation to protect it from the ravages of cattle, &c. No plantation can thrive without a proper fence, and this should be the first thing attended to. The American aloe or corkopilly plant, is well adapted for this purpose, but will require watering the first year, especially the latter plant. Both will repay their cost in the third or fourth year, and be a source of revenue as long as the fence is kept up; the only thing to be taken into consideration is, the first outlay. "B." also omits in his estimate the assessment of the land, and the interest on the capital to be laid out; but I may mention here, that Government grant waste land free of assessment for twenty years for the planting of topes.

The soil should be of a loose sandy nature. These plants thrive best on such soils, on the sea coast, on re-claimed salt marshes, and on the slopes of the banks

of rivers. The items for ploughing and manuring are superfluous, but the forming of furrows and ridges with the aid of a plough, will facilitate the planting in straight lines, and expedite the work. The plants will require watering at least two years, and not one year only, or rather for nine months in the first year, and seven in the second year. By transplanting early in August, the plants will, if well watered, take firm root, and spring up quickly during the cold months of October, November and December, without being watered. The loss of 630 trees to every acre of land should not have been dreamed of. Such a mode of cultivation must be condemned as a very slovenly one. Spare plants are always retained in a bed ar two to replace those that die away, so that the full complement of 3,680 plants may be calculated upon. It would be more accurate to say that the plants will take five years to come to maturity, not four. An acre of the best description of dry land in this district is assessed at a little below Rs.2-8. The cost under his head need not therefore have been doubled to Rs.20 per acre. The assessment of land suited for casuarina plants never exceeds Rs.2 per acre. I have no means of framing an estimate for planting a fence for six acres of land, but as I have said that it will pay for itself, any inaccuracy under this head will be immaterial.

The suggestion to plant castor oil beans on the ridges between the casuarina plants must commend itself, as it will afford shade to the young plants, and prevent the moisture being absorbed by the sun. A common, or butter bean may, with advantage be set at the foot of the castor oil plant, for its beans. The return from these two latter sources is not brought to account in the following estimate.

Following the estimate of "B." as close as possible, for planting six acres of land, mine would be as follows:—

24,000 plants at Rs.5 per 1,000	Rs.	120
Planting and first watering at 12 As. per 100	,,	18
Forming ridges with the aid of a plough ...	,,	9
Assessment at Rs.2 per acre for 5 years ...	,,	60
Watering for 1st year	,,	600
Watering 2nd year	,,	300
Cost of fence or hedge	,,	100
Cost of watching and sundries	,,	444
		1,651
Interest on Rs.1,651 at 12 per cent. for 5 years	,,	1,580
Total cost ...	,,	3,231
Sale of 21,780 (plants 3,630 plants per acre) at 8 Annas each	,,	10,890
To be realized from fence in the shape of fuel or fibre	,,	100
		10,990
Deduct gross expenditure	,,	3,231
Net profit	,,	7,759

"B." having omitted three very important items in his estimate, namely, the assessment, cost for fencing, and interest on the capital, his estimate for the cost of raising the plantation is insufficient. As the want of funds will hamper any undertaking, it is essential that an estimate of the probable costs should be as accurate as possible.

Yours &c.,
Nellore. W.

TROPICAL FRUITS.

(*Field*, 24th December 1881.)

SIR,—In last Saturday's *Field* F. T. P. expresses his wonderment at never having seen the mango exposed for sale in London. Let his surprise now cease, for I saw some only a fortnight since at a fruiterer's in Oxford-street, at the corner of Holles-street. Judging from the view I got of them through the window, I should say they were the "pucka" Bombay article, and in by no means bad condition. I have eaten several kinds of mango in Java, and the best is still inferior to the Bombay fruit. The fruit sold in Singapore and Penang, and known as the Manila mango, is simply consolidated turpentine in taste.

The flavour of the Durian is a matter of—not taste, but habit. I have eaten a good many, and cannot really say I like it. Those Europeans who really long for the fruit are such as have lived a long time in the country, among the natives. I always understood that the Malays value the fruit for its supposed aphrodisiacal qualities; but I met with a direct practical argument against this in the fact that the Europeans who praised the fruit most were some Roman Catholic missionaries, one of whom had been thirty years in Malacca.

F. T. P. has evidently never tasted the mangosteen.

E. T. S.

(*Field*, 31st December 1881.)

SIR,—I have to thank E. T. S. for his notes on tropical fruit. But how came mangoes in Oxford-street at this time of the year? for the fruit ripens in India in May and June. There is a variety which sometimes bears fruit in September and October, but it is scarcely fit to eat, and I must avow, if I was astonished before at not having seen mangoes for sale in London, I am doubly astonished to hear that they were exposed for sale a fortnight ago.

I know the mangosteen well, but it is a fruit which will not keep any length of time. To get it in perfection it must be taken ripe off the tree and eaten there and then. The fruit has been introduced into India. I saw numbers of trees in a garden between Vizianagram and Rajahmundry. The trees bore fruit plentifully, but it was quite different from the mangosteen of the Straits, and not fit to eat; I see no reason why it should be introduced into England. The lichie is also a delicious fruit, which might with advantage be introduced into our hothouses. The loquat, if I mistake not, has either been grown in England, or can at times be procured there; but it is a fruit I care little about. Good fruits in India, except in the hills, Cashmere, and Afghan, are very scarce. In the Straits and China there are many varieties, but I do not think much of them with the exception of the lichie and mangosteen.

The grapes at Aurungabad, near Jaulwah, were, some thirty-three years ago, when I first went to India as a "griff," the finest I ever ate, and as cheap as dirt; but since the railway they are sent to Bombay, and the same care in their growth is not now taken as in days gone by. I have eaten as fine peaches grown in the open air in Assam, as the very best hothouse ones in England.

Perhaps the vendor of the mangoes in Oxford-street would explain where he got his fruit at this time of the year, and what is their price?

F. T. P.

SIR,—I venture to think that F. T. P.'s surprise will, so far from ceasing, be greatly increased by E. T. S.'s letter, in which he says that he saw some mangoes for sale "only a fortnight ago at a fruiterer's in Oxford-street, at the corner of Holles-street." I have lived for upwards of sixteen years in various parts of the Bombay Presidency, of which four were spent in Bombay itself, and I can assure E. T. S. that the good folks of that city would be extremely surprised to find mangoes growing there in November. The mango tree flowers from January to the end of February; the mango showers, which are popularly supposed to knock off the superfluous stock of fruit, and to usher in the hot weather, usually occur about March 10, and the fruit is in season, as a rule, throughout May and the first few days of June. A few are to be found in the market towards the end

of April, but they are not of the best quality, and it is generally considered that the first shower of the S. W. monsoon is the end of the mango season, as it is believed that a mango on which rain has fallen when ripe or ripening is ruined. Certainly they rot and spoil very quickly immediately after the monsoon begins.

The real difficulty about getting mangoes home, is—apart from the fact that first-class Afoos mangoes usually cost in Bombay two annas (or threepence each)—that, once they are plucked, they ripen very rapidly, and have to be eaten to save their lives. They are occasionally sent home, and the most successful experiment of the sort I know was made by a gentleman closely connected with one of the lines of steamers trading between Bombay and Liverpool. He entrusted five dozen to the captain, who, after a voyage of twenty-seven days, delivered the crate containing the precious fruit the day after arrival in port. It was found that only twenty or so were fit to put on the table, and this though they had been gathered hard and green, packed each fruit separately in a distinct compartment of the case, which itself was kept in the ice room of the steamer. Under these circumstances, it is hardly surprising that the Bombay mango at least should not be frequently found in the London market. It seems a pity that E. T. S. did not ask the Oxford-street fruiterer where he had got his mango from. They assuredly could not have been Bombay fruit. T. D. M.

Cheltenham, Dec. 25.

OSTRICH FARMING.

Having lately arrived from the Cape Colony, I think it would not be out of place to give as briefly as I can my personal knowledge and experience of its progress in the Cape Colony. My first experience in ostriches and ostrich feathers was in 1869, and from that year to June, 1881, I have never been out of that business. During 1869 to 1872 the feather market, sales weekly, averaged £2,500 to £3,000. In 1871 ostrich farming created a great sensation in the colony, and a great many people who can afford to buy birds did so, price being no object so long as they could be obtained, £350 to £450 was paid for a pair of birds—that was the time when the pioneers of the enterprise made such rapid fortunes. The feather market was increasing in quantity month by month, and in 1874 to 1875 the sales realised £7,000 to £8,000 weekly. It was thought then that the feather trade was getting overstocked, but that prognostication was not to be realized, for in 1876 prices began to advance; in 1877 to 1878 (prices you will find at foot of my letter). From 1879 to June, 1881, the average weekly sales on the Port Elizabeth market amounted to £18,000, leaving out the large number of parcels which changed hands privately. I have myself sorted feathers in four months to the weight of 3 tons. It is very tedious work, and most difficult, especially when you have to sort so many different farmers' produce in classes for shipment. There are also large ostrich auction sales in the colony. I have seen myself as many as 150 pair sold in one day, and on an average including young birds, they realised £70 per pair. In fact, ostrich-farming for the last eight years has been, and still is, paying better than any other farming enterprise known. I often think the more feathers are grown the more are wanted. I know personally many men who have cleared all live stock off their farms on purpose to raise money to buy ostriches, the interest upon their outlay being so great. There are also large Ostrich-farming Companies whose shares are at a good premium. The shares were taken up by all classes, and a great number of mechanics invested part of their savings, knowing the profits of the enterprise. It was said some years back that ostriches would not live here or there, but I have bought feathers from farmers where it was said they could not thrive, and good ones too, but I must say that where what we call in the Cape Colony prickly pear and aloes grow is generally a good place, as they generally grow in low-shelt red lands where the soil is very light. In farming the birds if you want full flesh on your feathers and bright colour you must be near the vegetable growth. If you don't give your birds vegetable food with other food when you pluck them you will find the fleshy part of your feather thin and wiry, your coloured one, especially the cock bird's rusty-looking which depreciates their value. That is the reason the wild feathers are so uneven of late years. The country they are now running in is far up, and the hunters don't care about following them. The country has and does suffer much with droughts, and when they are tempted down their feathers are then in flesh, poor butted, and overgrown, but if they could get a good supply of green food their feathers would be full, fleshy, and everything you could wish for. About three years ago I sorted a large lot of wild feathers, about 1,600 lb. in weight, which was forwarded to my late employer from one of his stations in the interior; and out of all that quantity I could not get more than 60 lb. of prime feathers, all the others were more or less wiry, overgrown, and faulty. Mr. A. Douglas's farm is in the heart of a splendid farming district, with sheep, goats, and cattle on it, and towards the Kowie there are some splendid agricultural lands. I have the pleasure of knowing his farm, and have been upon it three or four times. He has on his farm prickly pears and aloes. There is another large ostrich-farmer at Adelaide, about seventy miles from Grahamstown. He also farms Angora goats, and produces some of the finest hair exported from the colony. As I have repeatedly said, the secret in ostrich-farming is practical knowledge and care of your birds. I have travelled part of the west and almost the whole of the eastern province amongst ostrich-farming, and always got the best feathers from a care-taking farmer and where they have had green food. A feather-sorter can tell as soon as he looks at a feather whether the birds have been cared for or neglected in some way or other, even if he has never seen the bird.

Notwithstanding the short time I have been in Victoria, I feel confident that ostrich-farming must prove a successful enterprise under practical management. I will give you as a guide what profits can be obtained from one pair of birds in twelve months. I buy a pair of birds, for which I give £300. If they are good, and the feathers up to the mark, their plumage at the very lowest would fetch £50. The hen begins to lay; she lays, we will say, thirty eggs, but often many more, you hatch per incubator. Say we get only twenty-five chicks, they are worth £6 10s. a month old, and every month they increase in value. You won't sell, but keep them until they are twelve months old, they will be worth £20 each. Twelve months' return—1 pair birds, £300, 12 months' feathers, £60, 25 birds, at £20 each, £500=£560. On the same scale in five years they realised £2,800, less original value £300, or £2,500 in all. You must also bear in mind there are all the chickens' feathers to be reckoned on, and the first, second, and third brood are laying and producing, and also being plucked, and their feathers sold. Many men in the Cape have in that small time fortunes out of one pair of birds. If a made Company should form for ostrich-farming, the public would see profits accuring from the enterprise. Birds would be in demand, which would fetch high prices here in consideration of saving expense and risk of shipping. On that ground a Company would soon recoup itself for all expenses and increase greatly the value of the shares.

PRICES OF FEATHERS.

	1869-72.	1877-79.	Advance prices June, 1881.
Primes (white)	£32	£40 to £50	£35
1st and 2nd ...	In proportion.	In proportion.	In proportion.
Byocks	£9	£10 10s.	£14 to £16
Long blacks ...	£4	£12 to £13	£12 to £14
Shorthorns ...	£1 6s.	£2 10s.	£2 10s.
Male tails ...	£5 10s.	£10 to £12	£10 to £15
Femina.			
White	£20 to £23	£26 to £28	£22 to £25
Tipped	£15 to £16	£22 to £24	£18 to £20
Light long ...	£12 to £14	£16 to £18	£12 to £16
Dark do. ...	£6 to £7	£6 to £9	£9
Tails	£2 10s to £3	£3 10s.	£3 10s to £5

In 1873 to 1876 the market steadily increased and in face of great supply, prices were unchanged.—*Australian Paper.*

HORTICULTURE IN LOWER BENGAL.

(Asian.)

THE PEA (*Pisum sativum*).

Probably to the cultivation and improvement of no other vegetable has so much attention been given as to the Pea. This is fully demonstrated by the immense number of varieties now in cultivation. Take, for instance, the catalogue of any first-class English seedsman, and we shall probably find upwards of a hundred kinds enumerated, and even this total would not embrace half the number of varieties grown in England. It must however, be admitted that an immense number of these are but synonyms of others; as an example it may be mentioned that some of the oldest and best varieties, such as Veitch's Perfection, or Langster's No. 1, which are the kinds principally grown by market gardeners at home, are known under ten or twelve different names. In England these are divided into three sections, that is, early medium, and late varieties, the sowing of which extend over a period of about six months, that is from December to May. Here, however, where our season for sowing is limited to about six weeks or two months, it is certainly unnecessary to grow a large number of varieties even for a large garden; a selection of four or six good sorts will be amply sufficient. I append a description of a few of the many new sorts, and also a list of the most popular of the older kinds; a selection from this may be made with every confidence of a good return, they being all well-known and tried varieties.

The Pea delights in a rich, deep, light soil, one that has been well-manured, for the previous season's crops suits it best. Should however the soil be poor, it may be enriched with a good dressing of very old cow manure, or leaf mould, which, when possible, should be applied a month or two before sowing. On no account use fresh or half-rotted manure; this being too stimulating in its action, causes an unnatural production of stem, to the detriment of the crop, and frequently also causes the plants to become infested with mildew.

The first sowing may be made about the middle of September on raised beds, commencing with the dwarf early varieties, and, where space is available, this should be followed by successional sowings at intervals of a week or ten days up to the end of November. Before sowing, the seed should be steeped in water for three or four hours, and then allowed to dry for about the same time before being planted. The dwarf kinds may be sown in rows about eighteen inches apart, and the seeds about one inch apart, covering them with about an inch of soil. The taller growing sorts require a space of at least three feet between the rows, and should be planted two inches deep. As soon as they are about six inches high they should be staked, planting the sticks so that they cross each other at about six inches from the top, where they should be firmly tied together. The situation best adapted for the Pea is one where it receives the full morning sun, but partially shaded during the remainder of the day.

THE RADISH (*Raphanus sativus.*)

The Radish requires a free, open, soil, well enriched with manure. In fact, to grow them to perfection, it is nearly impossible to make the soil too rich. Sowings may be commenced early in September, and continued at intervals of about ten days up to January, though the produce of sowings made during October will invariably be found the best. The seed is best sown in drills about five inches apart, and after lightly covering with soil, the beds should be well beaten down. This insures the roots forming of a good shape As soon as the plants are large enough, they should be thinned out to a distance of four inches apart in the rows. If the soil is fairly rich, and the plants kept liberally supplied with water, they should be ready for drawing in about three weeks from the time of sowing. Care must also be taken to keep the soil well stirred about the plants. There are now a large number of varieties, but these differ more in form and colour than in quality, for, when well grown under the same conditions, but little difference can be discerned in their flavour. There are also two indigenous varieties which grow to an enormous size, and are much eaten by the natives. These are, however, so coarse and inferior in quality to the English varieties that they are not worth cultivating in the garden.

SAGE (*Salvia officinalis.*)

This can only be grown as an annual in this country, and then with but a moderate amount of success. The seed should be sown in pans or boxes in October, and kept in a cool, sheltered place till the plants are ready to be put out. They should then be transplanted into a bed of light, rich, soil, a shady situation being selected for them, the plants will then continue growing freely till April, when, as the heat becomes more intense, the plants will gradually dwindle off, and those that survive this trying ordeal invariably succumb to the first heavy rains. If grown in pots a few plants may occasionally be kept through the year but with extreme difficulty. The plant known as Bengal Sage (*Meriandra bengalensis*) is entirely distinct from the preceding, especially in flavour, although it is used as a substitute for it; this is propagated by division of the roots.

SALSIFY (*Trapogon porrifolium.*)
SCORZONERA (*Scorzonera hispanica.*)

Neither of the above can be cultivated with any degree of success in Bengal, owing to the shortness of our cold season, both of the plants requiring a long time to mature their roots which is the part used.

SPINACH (*Spinacea oleracea.*)

Although there are two distinct varieties of Spinach which in Europe are cultivated at different seasons in this country, they must be grown at the same time; and, as their produce so closely resemble each other, it is hardly necessary to grow more than one of them. Preference should be given to the round-seeded variety, being quicker in growth and more tender than the other.

Sowings may be commenced in October in drills about twelve inches apart, in any good garden soil which has been previously well manured. Sowings should be made at short intervals up to December to keep up a continuous supply. The plants must be kept well supplied with water, and an occasional dose of liquid manure will also have a beneficial effect.

SAVOY CABBAGE.

This, like all of its class, delights in a deep, rich, well-manured soil. It should be cultivated in the same manner as recommended for the Cabbage. The dwarf varieties, such as "Little Pixie" and "Tom Thumb" are decidedly the best. These should be planted out in rows about fifteen inches apart with the same distance dividing the plants in each row. They should be liberally supplied with water through the whole period of their growth.

THE TOMATO.

Probably there is no part of the world with a climate better adapted to the cultivation of the Tomato than that of Bengal from October to March, and yet it is a plant that has been much neglected here. Only two kinds are seen in our bazaars, namely, the Small Red varieties, which in this age of vast improvements should long ago have been consigned to oblivion, especially when we might have in the place such fruit as "The Trophy," "Acme," "Carter's Greengage" or "Nisbet's Victoria." The cultivation of the Tomato here is extremely simple. Seed should be sown at the end of August in a seed-bed sheltered from heavy rain. The plants will be ready for putting out early in October; they should be planted in well-manured soil in rows three feet apart, with the same distance between the plants. When practicable a bamboo trellis should be placed along each row, about three feet high, to which the plants may be trained. In England it is customary to pinch out the point out of each shoot to induce them to set their fruit. Here, however, this is quite unnecessary, and require no care beyond an occasional watering and tying up.

TURNIP *(Brassica rapa.)*

A rich deep, mellow soil, with a fair amount of moisture, is the most favorable for the Turnip, although any good soil, well dug and manured, will grow them well. Sowings should be commenced in September, and continued at intervals of a few days up to the end of November. They should be sown in drills about twelve inches apart, and as soon as the plants are large enough should be thinned out to the same distance in the rows. The plants must be kept free from weeds, and the soil frequently loosened around them. They must also be kept free supplied with water and occasionally drenched with liquid manure.

THE SILK INDUSTRY.—The prospects of the newly established silk industry in the Dun appear to be highly satisfactory. Messrs. Lister & Co., of Bradford, who have been connected with this work for some time, took over the business from Government in February last, and from that time all direct connexion of Government with it ceased. This in itself is a good sign. A piece of waste land has also been granted the firm for the cultivation of mulberry trees, and some 20 acres have been planted. The agent of the firm, Mr. Lepper, also has done much to encourage the ryots to take to the rearing of silk worms; and it is said the operation is becoming very popular. It furnishes employment to women and children when there is little else to be done, and the prices to be obtained leave an ample margin of profit for the expenses incurred. A maund of cocoons are estimated to cost the cultivator R12 all told; whereas the firm reaps a profit after giving even R30 for the same quantity. The industry is encouraged further by the distribution of medals and rewards, though these inducements will probably not be needed much longer. As Messrs Lister have announced their intention of buying up all the cocoons that are offered, the ryots of the Dun have happy prospect before them. The difficulty at present appears to lie in obtaining a sufficiency of mulberry trees.—Calcutta *Englishman.*

BARKING CINCHONA.—As to the desirability of covering the interval left after the removing of bark, I wrote to the *Times* in October, and I still maintain what I said then, that a great deal of money and bother might be saved by leaving the intervals exposed. Of course, a proper time must be chosen to bark in, that is during cool, cloudy weather, when there is neither too much sun or rain. The plan has been tried already to a small extent and with tolerable success. Some of the trees died from exposure, but the greater part renewed their bark splendidly, with no dimension in their percentage of alkaloids.—OFFICINALIS. —Cor. of *Ceylon Times.*

THE EFFECT OF LIGHT is shown by a reference to the alpine flora of Switzerland, in which the larger proportion of red, pink, and blue flowers in spring is remarkable. H. Muller attributes this to the greater transparency of the mountain air, and consequently more intense light. On this account and because of the spring being a month later than in this country, the alpine spring flowers are brightly coloured. This explanation is confirmed by Siemens's experiments with the electric light (*Nature*, 1881, vol. xxi, No. 535). Mr. Buchan, however, who bases his results on the whole of the British flora, considers that on the average the blue flowers blossom considerably the earliest (*Proceedings Edinburgh Botanical Society*, 1876).—*Pharmaceutical Journal.*

TONIC.—In the *American Journal of Pharmacy* for October, Mr. F. B. Meyer contributes an inaugural essay on *Parthenium integrifolium*, Lin., a plant of which the tops have been used for several years in some sections of Indiana, with good results in the cure of fever and ague. The herb yielded to petroleum benzene a dark green, waxy, slightly bitter substance, which treated with ether and water gave very bitter crystals, soluble in both liquids, and which gave a beautiful deep red colour with ferric chloride and did not reduce Fehling's solution. The infusion of the drug, with the addition of a little spirit to preserve it, is the form in which it is used in medicine. The liquid preparations of the drug have an agreeable orange-like odour.—*Ibid.*

LANTANAS.—Thanks to the industry of Continental raisers, the garden varieties of this useful plant have greatly increased of late. Doubtless the old Lantana Camara was the type from which the first departure was made, and now as a result we have varieties of spreading and compact growth, tall and dwarf, large flowered and small flowered, and of many varying tints of colours. A large number of these are of great value for decorative purposes, and there are indications that the Lantana is rising in public favour. Objection has been taken to them on account of their strongly secented foliage, the peculiar tone of which is not grateful to most people, and hence, as. Mr. B. S. Williams observes, they have been much neglected. But they have qualities of a high order which more than counterbalance this defect, if it can be termed so. For three or four summers past Mr. Barron has successfully demonstrated their great usefulness for bedding and pot purposes; indeed, for the former use they are attractive, durable, and particularly pleasing. The dwarf varieties are best adapted for bedding, but they are also most useful for pot purposes. As specimen plants for exhibition they are very effecitve, and it is not unusual at some country shows to see in August fine specimens of the rich-coloured Lantanas, such as Le Grenadier, grown into large plants, covered with healthy foliage, from amid which rise numbers of large trusses of bloom. Fine fresh specimens of Lantanas are far preferable to the stale Allamandas, Dipladenias, Ixoras, &c., one too often sees at shows at the end of the season. The Lantana can be had in bloom for the space of some eight months in the year, and the plants are rarely, if ever, attacked by insects—recommendations of no mean order.—*Gardeners' Chronicle.*

THE SWEET POTATO.—Specimens of this (obtained in Convent-garden) seem to be very much more watery and soft than those we have had in America. It is strange our American friends do not send some mealy and good samples of it, for it is an excellent vegetable in its best state properly cooked. We believe it is only in the warmer soils in the States, where it is in its best condition as regards texture, but know very little of the vegetable which cannot be successfully grown in our own country.—Ex.—*Field.*

A NEW SANDAL-WOOD.—M. Pierre describes in the *Bulletin de la Société Linnéenne de Paris*, 1881, p. 290, two species of Sandal-wood growing in Cochin-China, and forming large trees, the timber of which is used for ornamental uses, while the oil derived from it is used for medicinal purposes. When rubbed or burnt it emits an odour of Sandal-wood, on which account it is employed as incense in the temples. The two species are called respectively Epicharis Loureiri and E. Bailloni. —*Gardeners' Chronicle.*

FRUIT IN COLOMBO: MANGOSTEENS AND RAMBUTANS.—A correspondent gives the following hints for the growth of these fruit-trees:—"I send 4 mangosteens and 5 rambutan plants. You ought to have holes of about 24 inches diameter and 6 or 8 inches deep for them, at about 18 or 20 feet apart. Cattle manure is the best you can give them. I need not tell you that you ought to keep the plants covered during sunny weather and during the heat of the day only. They are both slow-growing plants; more especially the former, but after the third or fourth year, when they are, or rather will be, about a foot and a half high, they get on rapidly. I suspect that the growth in Colombo will be even slower than it is here (Kalutara).

CULTIVATION OF USEFUL PLANTS IN COSTA RICA.—In a report from San José, Costa Rica, it is stated that besides Coffee, which will always be the principal article of export from the country in consequence of the soil being so well suited for its cultivation, Beans, Corn, Rice, Sugar, and Cocoa are also grown for home consumption and but for the costly conveyance to the port would be more largely cultivated for export. The only new features to be observed under this head is the cultivation on the coast of Bananas and Cocoa-nuts on each side of the railway between the river Sucio and Limon which in time promise to be articles of considerable export, the want of a railroad hitherto for conveying the fruits to Limon having to a large extent prevented their cultivation.—*Gardeners' Chronicle.*

WYNAAD AND ITS GOLD MINES.—Devalah, Feb. 6th — Since my last communication, I have gathered some information respecting certain Mining Companies here, which may not be uninteresting. It is apparent that, when crushing does begin, it will be continued steadily, and by more than one Company. The South East Wynaad Company will soon commence the work of getting out the gold. Some trial crushings were, I believe, made at Richmond the other day, by Mr. Cooper. One hundred and eighty-two tons of quartz were crushed, and the yield is said to have been an ounce of gold per ton. This Company is about erecting a second mill, which speaks well, as Mr. Cooper would not surely have incurred the expense of this additional machinery, unless he had some very tangible reason for doing so. The "Phœnix" is attracting more than ordinary attention. The Australian machinery and mill, which Mr. D. Grove has imported, is now being erected, and is generally admitted to be the best in the Wynaad. The "Phœnix" will employ water (of which there is an abundance), as the motive power. Of quartz, the shareholders of this Company need have no fear, as there is no limit to it, and the character of the stone is considered very good. Mr. Grove appears sanguine of success, which is encouraging.—*Madras Mail*, Feb. 9th.

HARVESTING CINCHONA BARK.—An experienced cinnamon planter writes *in re* rubbing cinchona bark to facilitate peeling:—"Among the instruments that go to the outfit of every cinnamon peeler is a stick about six inches long, and one inch more or less in diameter, of the hardest wood he can obtain. This is used for rubbing the cinnamon sticks, to free the bark from the wood, as only the finest sticks, cut in the nick of the time, can be peeled without rubbing more or less."

SOUTH WYNAAD, 29th Jan.—I have been listening to some spirited discussions lately on the subject of pruning. The good old school, we know, recommends the use of the knife with great severity at this time of the year. "Cutting up his Tote into hat pegs" was the expression used as descriptive of the system in all its ancient rigour. Later experience teaches some of us that severe pruning is a mistake, that the trees are shaken by it, and weakened rather than strengthened by the immediate and entire cutting off of all the old wood from which crop has lately been removed. Indeed, enthusiastic disciples of the new school eschew the knife altogether. Leave on all the wood they cry; don't worry the trees just when they most need rest; wait till the monsoon, and let all handling out be done then at once—done with sufficiency and without the exaggeration of the hat peg system. In thinking the matter over, it seems that the new theory is a sensible one. Several planters are trying it; whether with good or bad results we must wait for the future to shew us. The cry, *in re* miners, is: "Still they come." What with miners and railways, and telegraphs, a new era is dawning for Wynaad. I know the European influx is already raising bazaar prices; and, before long, we must have domestics kidnapped, for at present they are as hard to catch and to keep as eels. They regard the unsophisticated miner as lawful and undisputable prey, and they scorn the very idea of going into the service of old residents, who, (as a cook naively remarked to me) "know too much, therefore poor man nothing can make in their service." Any decent servant could get almost instant employment at high wages in Wynaad now a days.—*Madras Mail.*

JAMAICA.—We have received from Mr. D. Morris, the well-known Director of the Botanic Gardens in Jamaica, a valuable contribution to the controversy respecting the labour question in Jamaica. Mr. Morris, who is one of the largest employers of labour in the Blue Mountain district of Jamaica, and whose opinion is the more valuable having regard to his experience in Ceylon, says that, compared with India and Ceylon, there is practically no labour difficulty with regard to coffee and cinchona cultivation, and that with an increase in population during the last ten years equal in proportion to that of the United Kingdom, the labour difficulty is likely to be felt less year by year. Mr. Morris has no object to serve in describing things otherwise than as he finds them. The truth about Jamaica will gradually make itself known amid the conflicting statements which her friends and her detractors make concerning her. All that the colony wants is a fair field and no favour. It is no use to try and shirk difficulties; but at the same time the advantages of the colony ought to be better known than they are. If a number of energetic and practical men with capital could be induced to take up their residence in the island, and do for it, under its present condition, what the old planting aristocracy did under its former circumstances, the colony would soon emerge from its present backward condition. Even the climate is not generally understood. In the hills life is most enjoyable, and the climate most salubrious. During the last two years only two cases of yellow fever have occurred in the island, and those were among sailors at Kingston Harbour. This simple fact should remove a thick cloud of misapprehension.—*Colonies and India.*

THE "BEARS" AND COCONUT OIL.

A merchant writes with a copy of the Annual Report of of Messrs. Rose, Wilson & Rose, dated January 2nd, as follows :—"See the enclosed report :—

COCONUT OIL.—The position of the market during the past year was most unsatisfactory, as will be seen by prices, which declined to an extent never before experienced, and most ruinous to importation. The few fluctuations that did take place were maintained for no length of time and were generally followed by greater depression. The import was 10,645 tons against 12,307 tons same time last year, far in excess of our requirements. The deliveries notwithstanding the extremely low value show a decline. This is owing to the large importation of Copra, the greater portion of which is taken for abroad, where it is admitted free of duty, whilst oil is liable to a duty of from one to six pounds per ton. In January the market opened at £31 10s for Ceylon, and in March had declined to £27 10s. A slight improvement then took place but only lasted for a short time, as in August as low as £26 was accepted. This stimulated the demand, and speculators stepping in, there was a rapid rise until £29 was touched in September, from which there was a gradual decline to the present quotation. In July, large "bear" sales were made for shipment during the last four or five months at as low as £26 15s to £27, which could only be covered afterwards at a loss, and with a rising market in Colombo, as high as £29 to £29 10s, was freely paid here in August for these shipments. Cochin did not vary so much. Opening at £33, it steadily declined to £29 15s in August. In September the price had risen to £31 5s, at which it remained steady for some little while but again declined to £29. Mauritius.—The stock being held off the market until within the last month or so, little business was done in this description. The opening quotations are—Ceylon spot £25 10s in pipes and puncheons, January-February delivery £26; Cochin £29 Mauritius £26 to £26 5s in hogsheads. Copra oil £25.

	Jan.	Feb.	March.	April.
Average price of Cochin(fine)	£33	£32 5s	£31 10s	£31
do Ceylon..	£30 15s	£30	£28	£28

	May.	June.	July.	Aug.
Average price of Cochin (fine)...	£31	£30 10s	£30 5s	£30 5s
do Ceylon ..	£28	£27 15s	£27	£27 s

	Sept.	Oct.	Nov.	Dec.
Average price of Cochin(fine)..	£31	£31 5s	£30 10s	£29 10s
do Ceylon ..	£28	£28 5s	£27 5s	£25 15s

	1882 Tons net	1881 Tons net	1880 Tons net	1879 Tons not	1878 Tons net
Afloat from Cochin & Ceylon by last advices ...2,128	4,250	4,012	3,091	1,248	
Imported from 1st Jan. to 31st Dec. —	10,645	12,307	7,764	4,103	
Delivered „ „ ... —	8,132	8,556	6,263	4,679	
Stock, 1st Jan. (Foreign) ...8,851	6,360	2,580	1,070	2,205	
Price of Cochin....£29	£33to£33 10/	£40to£40 10/	£47 10s.	£43 10s.	
Price of Ceylon. £25 10s.	£31 10/	£36 10/	£45 10/to£46	£38 10/to£38 15/	

	1877 Tons net	1876 Tons net	1875 Tons net	1874 Tons net	1873 Tons net
Afloat from Cochin & Ceylon by last advices ...3,183	1,121	1,908	1,105	3,263	
Imported from 1st Jan. to 31st Dec. 7,466	7,883	8,552	5,590	12,535	
Delivered „ „ ... 7,775	8,706	10,366	11,212	10,537	
Stock, 1st Jan. (Foreign) ... 2,331	2,988	4,802	10,424	8,428	
Price of Cochin... £40 to £41	£41 to £42	£40 to £44	£37 to £40	£36 to £39	
Price of Cochin £37 15s to £38	£38 10s to £39	£38	£36	£34 15s	

"Is not this what I told you long ago, and it appears it has been recognized at home. Is it not a shame that an article in which, perhaps, only second to coffee, the island is most interested in, should be depreciated in value to such an *unprecedented* extent, mainly through 'bear' sales by people who worked for a fall. This should be fully exposed for the benefit of merchants at home? It is now pretty well certain that we shall have no larger supplies for another three months at least, and yet the makers or dealers have only been getting prices such as might have ruled with the largest supplies of nuts."

The case is certainly one deserving of all publicity, and very probably we shall by-and-bye find that coffee has been worked on by 'bears' just as coconut oil is now shewn to have been.

FARMING IN DAKOTA, UNITED STATES.

(By an ex Ceylon Colonist.)

We have been favoured with permission to publish the following extracts from the letter of a gentleman formerly resident for some years in Ceylon:—

Ontario, Dec. 18th, 1881.

I went up to Dakota in the spring to have a look around and help with the seeding.

So I have been here in Canada, doing the watch-dog during the summer. Before I forget it, I will at once ask you to find out, if you can, from Mr. Sumps, about the rattans he uses in his work. A firm here in Woodstock wants to get them out direct, instead of dealing, as they do at present, with firms in New York, who, they say, take advantage of them. They would like to find out about the different qualities, where they are procurable, how they are generally sold, by weight or length or what, and anything else about it you can find out. I wanted them to give you a run up to Madras, if you thought it necessary, to find out there, but they did not think it worth while till they heard more definitely. This, I thought, would have made a nice holiday trip for you, but it may come yet.

I think I must tell you some of my ideas of Dakota.

Dakota, I may tell you, is about 400 miles from E. to W. and between 800 and 900 miles from N. to S.: quite a respectable little bit of country. This is all divided into counties, at least so much of it as is surveyed, but there is still lots of it wild. These counties are generally about square or oblong, varying from 25 to 50 miles in either direction. These again are divided into townships (corresponding to parishes) of 6 miles square, and contain 36 sections of land, each one mile square. Thus, you will see, that the country is all divided off like a draught board, with roads crossing one another every mile. So much for the divisions. Now for the land.

The Red River is the eastern boundary of the territory and the town of Fargo is on the Dakota side of the river. It does not look much of a place in the woodcut, but it is growing amazingly, and now numbers between 4,000 and 5,000 inhabitants. The land of the Red River valley is considered to be the finest out, for grain-growing. It is just about as flat as can be, all up the valley for about 8 or 9 miles on each side of the river, and then it rises a little, and for 20 or 30 miles further west it is very similar; only higher and drier. In the summer, this does not make any difference, but in spring it is an advantage to get grain sown as early as one can. This last spring was an exceptionally late one, and many of the farmers near the river did not get any crop. When I was there, I saw some miles with the water one to two feet deep, and the seeding was then almost over at our farm. What made the spring so late was that there was an unusually heavy fall of snow during the winter, and it did not thaw out till near the end of April. Every other year that my brother has been there,

they have commenced seeding about the beginning of April. Farther west again than the land I have described, there is flat land and bluffs; all good for farming. I can hardly describe to you what the bluff land is like, but will try. Can you imagine as if some mammoth moles had been at work, and gone over the ground so that their molehills were all over, and these molehills, from ten to thirty feet high, and many of them running into one another, and you have about as good an idea as I can give you, till you see it for yourself. West of that again the land is varied, both bluff and flat interspersed.

Now, as to soil, it is something different from any I have seen elsewhere. In colour, it is a nice chocolate brown; in depth from ten or twenty feet near the Red River to about a foot less or more some forty miles west. Below that, the subsoil is mostly clay; some places stiffer than others. The ground dries wonderfully quickly after a soaking, and, in the spring, when the frost is coming out of it, the seed can be sown whenever the frost is out deep enough to harrow. I found the seed drill often scraping through the upper surface of loose soil on the frozen place below. The frost usually penetrates four or five feet, and this thawing out gradually keeps the land just moist for the young grain, and ensures the good start it gets. When I was seeding, the dust was blowing on the surface, and it was frozen land six or seven inches below; it dries off so quickly.

As to the weather, in summer it is much the same as we have it in Ontario, but not quite so variable. Usually the autumn is very dry and favourable for harvesting work. This was an exceptional season, as there was a good deal of rain just after the grain was cut and bothered farmers in their threshing. They just cart it to the threshing machine from the stook, and shift the machine to various parts of the field usually twice a day.

The winter comes on a little earlier than in Ontario; usually about the beginning to the middle of November, when frost sets in and ploughing ceases. It continues till the end of March, or the middle of the month, when the snow which lies all winter quickly melts, and the seeding begins in a few days after. The winter weather is rather colder than we have it in Ontario, but is not so variable. Indeed, the whole season the thermometer is seldom above freezing point, but the atmosphere is so dry that the cold is not much felt. Ten degrees of frost in Scotland is more felt, owing to the moisture in the air, than fifty degrees is in Dakota. It is even better in that respect than we are here, and strange to say, when the cold gets so intense as that the air is as still usually as in a house. Sometimes they have what they call "blizzards" that is (blows hards) when the wind sweeps across the prairie in a gale, and generally accompanied with snow, when it is not always safe to go any distance. There being no fences to guide one, and the snow falling preventing one from seeing many yards around, people have wandered for miles, often passing within a hundred yards of a house and not knowing it, and sometimes perishing. That is one of the drawbacks to the otherwise "paradise"; the other, and I think the only one, is the water. All the ground is impregnated with alkali which gives the water a peculiar flavour, which those who taste it first seldom like, but most folk get very fond of it. During the month I was there I got to enjoy it. Now the wells are usually dug 50 to 80 feet deep, and kept well pumped out, and then the peculiar flavour is hardly perceptible. It then has just a slightly sweetish flavour. At the depth I mention an abundant and never-failing supply of water can always be had. Then there is this to be said in favour of it, that it is very wholesome. My father always enjoys much better health up there and for sometime after his return than at any other time, and attributes it to the water. Now, that, I think, is all about the place, as a place. I will next try and tell you what is done there, and how it is done. Well, it is a grain-growing place, almost no stock being kept so far, but, as the country gets settled, mixed farming, of both stock and grain, will be adopted. Wheat is the chief product; next oats and flax seed. There are no fences or very few, so that owners of stock are responsible for any damage they may commit on any other property. What fences there are are made of wire with wooden posts, and they are the most suitable, as the snow does not drift behind them, as any other fence.

Farms are mostly about 320 acres in extent, though many are much larger. Four and five thousand acre farms are common, and our next neighbour, who is the largest wheat grower in this continent, or may be in any, had this season about forty thousand acres in crop.

In the spring, whenever it is possible for the frost seeding wheat begins, and in about a fortnight it is usually all in. Next comes sowing oats, which may be done anytime in the next month, but the sooner the better. Generally the oatland is plowed after the wheat is sown. When these are done, the hurry of the spring is over, and other general work on the farm goes on till haying, when the winter's supply is made, and generally stocked in the place it is cut. This hay is cut off the prairie, the natural grass, which is very sweet when cut green. To get a good crop of hay, the first time on the prairie, it is burnt over in the spring, which takes away all the hard wiry grass of the previous season. It is no trouble to burn it off, as throwing down a lighted match is all that is needed, before the new grass has started. In a week after, it is as beautiful as a braird of wheat, and grows very fast. As the country gets settled, of course, farmers will have to sow grasses on their own farms, but, at present, there are many sections uncultivated, held by speculators in the eastern states, and anybody who likes cuts hay on them. The way they do it is this. A man starts and cuts round with the mowing machine as much as he thinks will suffice him, and all within the cut he makes is considered by others to be his hay. This prevents any disputes, and, of course, the early bird usually picks out the biggest and fattest worm. In the fall, to protect the stocks from fires, they plough round them, about forty or fifty feet from them, two or three furrows, and ten or fifteen feet further two or three furrows more, and, on a still day, they set fire to the grass in the belt between them. This forms an impassable barrier to the fires, either in fall or spring. The same thing is done round houses that are out on the prairie. Flax is sown any time before the beginning of June, but there is not very much grown. If the farmer has any more prairie land than he wants to crop, it is broken up, that is, plowed for the first time before the middle of June, and plowed again in August for a crop the following year. The first plowing is usually about 3 inches deep, cut off and kill the sod; the second is about 5 inches deep. The plows are quite different, but I will tell of them again. Next comes harvest. The grain is all cut and bound with machines that do it in one operation; the band is either of thin wire or twine. Each machine is able to do from 150 to 200 acres a season, and is drawn by three horses. A gang of men to stook follows the machines, and the grain is cut all before threshing begins. This is begun as soon as possible, and is done by portable machines, driven by a portable steam-engine of 6 to 8 horse power. A gang of 24 to 30 men is needed to run the threshing machine, and a day's work is from 800 to 1,400 bushels of wheat, more of oats.

Threshing is done in the fields, and the grain is taken off at once to the railway station and put into

the warehouse, or, elevator, as it is called, and sent off as soon as possible.

In winter nothing is done but feeding the stock of horses, and cleaning the seed grain for the following season.

A windmill is generally on every farm, and is used for grinding up the horse-feed, and pumping water. They are made self-regulating, so that if the wind blows very strongly they go more slowly, or even stop altogether. The only trees are along the sides of rivers, in a strip of half-a-mile or so on each side, and that is all the wood there is for fuel; but there is lots of coal in the west and north-west of the State, which is being made available for the market by means of railways. There are no lack of railways, or will soon not be, as several competing lines are stretching all over just like a spider's web, and all of them have far more traffic than they can manage at times.

Land is procured in various ways. If a foreigner wants to get a farm, and yet *not* to become an American citizen, he must buy from another man or a corporation, such as a Railway Company, such as the Northern Pacific R.R. To enable this railway to build their track through what was then a wilderness, the Government granted them the half of the land on each side of the line twenty miles wide, that is forty miles in all. That was through the *territory*, which has not yet been incorporated into a State. Through a State, the grant was only half that width. That strip is all surveyed and marked off into sections of a square mile each, just like a draught board, and the black squares are granted to the Railway Company, while the white ones remain the property of the State. This is to prevent speculators buying up large blocks in one piece, to the disadvantage of the country being settled. Lands of that class before mentioned can be purchased from $4 an acre upwards to $12, if unbroken by the plow, according to location and quality. Eight to ten dollars is a common price anywhere within a few miles of a station for first-class land; cheaper further back. If improvements have been made, the price may go as high as twenty-five dollars an acre, but fifteen to eighteen is an average price near railways. Of course, it is only within ten to fifteen miles of a railway that the land is being largely cultivated. Lands of the foregoing class can be bought by a man in any quantity, according to his purse, but, as for the lands belonging to Government, one man can only get at most 320 acres, and then on certain conditions.

First the purchaser must become an American citizen. There are three ways of getting this land: by taking up land as a homesteader, by pre-empting land, and by taking up a tree claim. One man can choose two of these three methods, and take up 160 acres or less on each of the two ways, or he can take one only at 160 acres. Homesteading is the cheapest. A man takes a quarter section 160 acres of Government land goes to the registry office and files a claim to it, paying only a fee of three or four dollars. He must live on this land four years out of the next six, and, at the end of the six years, if he has done so, it becomes his, and he can get the title deeds made out, costing about $15 to $20; that is all he pays. Pre-empting the man gives notice the same way for another quarter section; paying the fee, he has to live on it for six months of the next year, and then can buy it from Government for two dollars and a half an acre. In taking up a tree claim the quarter section is selected, and notice given in the same way, and the man requires to plant one-sixteenth of it, ten acres in forest trees, keep this in order for eight years, so as to form a small plantation of trees, and if he does so, he, at the end of that time, can get the title deeds by paying the fee of $15 to $20. So that, you see, a man with comparatively little capital can take up 160 acres as a homesteader, 160 more on a tree claim, and, if he can struggle through the first three years, at the end of eight years, he is the possessor of 320 acres, and an American citizen, or he can homestead and pre-empt, or pre-empt and take a tree claim. Even if forced to sell sooner, his claim to the land brings a fair price, though he has not got his title-deeds.

I think that is about all I can say about the country, except that like all newly peopled districts life is much rougher than in the older districts, but a very short time serves to shake down the different atoms to their bearings, and even at first they are quite as law-abiding as further east. No one thinks of carrying weapons there any more than where I am at present.

Farming there has been made a science of quite as much as anywhere else, and economy is looked to as a first item. If it is economical to buy a machine, it is got, or the reverse, and credit can always be had till after harvest.

Now, as to whether you would like it as a place to settle or not, I would not take it on me to say. I think you would. And there is one thing of which I am certain that money can be made at it. Taking the experience of my father for the last eight years, I can say that any one investing in a farm can have the money he put in all out again in that time (eight years) if fortunate in good crops and good prices every season, even in five or six years and would also be the owner of the farm, stock and buildings, which would be worth 50 % to 100 % what he invested. In the Company my father is in there was a sale of a portion of the property, which realized more than the original investment, which was divided among the shareholders, and what remains is so increased in value that the original shares of $100 each are worth $200, and giving a dividend this year of 8 per cent, besides paying off a lot of borrowed cash. Now they were very unfortunate the second year, losing all their stock implements and buildings, which were insured only to a small extent, and that crippled them for two years very much.

For several reasons I could not wait there this season, but I am going to make a start next spring, if all's well, on 3,200 acres, which I hope to make a good thing of. Here is a calculation, based on my father's experience, shewing how a man with £2,000 capital could buy a section 640 acre one time, paying it by annual instalments of $1,250 a year, interest at 7 per cent, and clear himself in 6 years, casualties excepted, and have all paid for:—

		$
First year, no crop.		
Contract to break and replough 160 acres		720
Erect buildings &c. - -		2,000
Interest 450 taxes 30 - -		480
		3,200
Second year, first crop.		
Stock and implements and granary -	3,270	
Wages, harvest expenses &c. (700) -	1,680	
1st instalment and interest -	1,700	
Taxes -	50	
		6,700
		9,900
Crop 150 ac. wheat=3,000 bushels @ 80 c.		2,400
		7,500
Third year, second crop.		
Stock and implements. - -		2,960
Wages and harvest expenses &c. -		3.095
		13,555
2nd instalment and interest - -		1,615
Taxes - -		70
		15,240

Crop 450 ac. wheat=900 at 80 c.			7,200
			8,040
Fourth year, third crop.			
Implements		400	
Wages and harvest expenses &c.		4,200	
			4,600
1,250	365	70	1,595
3rd instalment, and interest and taxes			
			14,235
Crop 600 ac. wheat 12,000 bus. at 80 c.			9,600
			4,635
Fifth year, fourth crop.			
Wages, harvest expenses &c.		4,200	
1,250	185	70	
4th instalment, interest and taxes		1,505	5,705
			10,340
Crop as last year			9,600
			740
Sixth year, fifth crop.			
Wages harvest expenses &c.			4,900
Last instalment 1,400 int. 100 taxes 70			1,570
			6,510
Crop 600 ac. as last year			9,600
		Profit	3,000

Recapitulation.

At the end of fifth crop (casualties excepted) you have 640 acres of land which originally cost you ...	6400
Buildings cost	2700
Implements and stock cost	5,660
	14,760
Also the original capital of £2,000 which has not been taken at all into the calculation, but used as working capital, say equal to	9,000
Profits at end of last year	3,000
	26,760

Shewing how £2,000 may in six years be increased to $26,000. The property would readily sell at the valuation I have put on it, viz. $14,000.

Now you see what a man may do buying the farm at $10 per acre. You can see what a settler on Government land may do, getting 320 acres for next to nothing, if he has only a little capital. I do not think I need say any more, as figures shew better than any explanation I can give you.

There is a great exodus from the Eastern States and Canada, both to Dakota and to Manitoba. The land in the latter place is just as good, and chances would be equally good there but for the fact that the railways there have fallen into the hands of a monopoly that take the thick of the cream off, and a Tory Government we have in power here do all they can to help them. But for that I should have gone to Manitoba, which is under the British flag.

This winter in Canada promises to be a very mild one. Here we are within a week of Christmas, and not a particle of snow on the ground. We had a few days sleighing a month ago, but it has been mild weather ever since, and ploughing was going on till a week ago, when we had just frost enough to stop it. I feel such a difference this winter in being able to stand the cold. Last winter I felt it very much, but that was in being run down so before I came.

THE POSITION OF THE COFFEE TRADE AND ITS PROSPECTS.

Amongst a perfect avalanche of Price Currents which last mail has brought us, are Patry & Pasteur's, Rucker & Bencraft's, and von Glehn & Sons' annual reviews of the trade in colonial (perhaps we should say tropical) produce, in which coffee takes a prominent place. The figures confirm what has already reached us as to accumulated stocks in European markets, and the enormous increase in the quantity of coffee Brazil is able to send into the markets of the world. The latter, however, is the great factor in the severe depression which is likely to affect us so seriously. Whether we take the actual figures for the calendar year 1881, or those estimated for the season which began with 1st July 1881 and will end with 30th June 1882, the result is much the same: an export of seven millions of hundredweights, besides the local consumption of, say, 600,000 cwt., the latter being equal to the total of our estimated crop. The exports in 1881, in round numbers, were:—

From Rio	5,200,000 cwt.
,, Santos	1,660,000 ,,
Together	6,860,000 cwt.

Ceará and other places making up the round seven millions. The estimate for season 1881-82 is even worse, in consequence of Santos being expected to export two million cwt. of coffee, much of which competes with our Ceylon plantation. We scarcely see why Rio, which exported 254,000 tons last season, should be estimated at only 235,000 for the present, but, even so, the figures are:—

Rio	4,700,000 cwt.
Santos	2,000,000 ,,
	6,700,000 cwt.

Other ports would make up the 7 millions. But Rucker & Bencraft, whose estimate the above is, adds:—

At the present time the 1882/1883 crops in Rio and Santos promise to be enormous, some saying that Santos alone will give 2,000,000 bags. It is estimated that the crops together will total not less than 6,000,000 bags, or say 353,000 tons.

The equivalent in cwt. of 353,000 tons is 7,060,000. Messrs. Robert von Glehn & Sons, who have recently had a passage-at-arms with Kern, Hayn & Co. of Rio, take a more hopeful view of the prospects of the coffee trade, because they doubt the capability of Brazil to export the large quantities estimated in other quarters. We quote as follows:—

The stocks of Coffee in Europe have increased during the past month about 11,000 tons, and prices have still further declined:—middling Plantation Ceylon Coffee, which we then quoted 77s to 82s, is now barely worth 72s to 77s; and good average Santos, which was then worth 60 fr. in Havre, is now quoted 56 fr. per 50 Ko. It cannot be denied that some failures in Bordeaux, of firms but slightly interested in coffee, have contributed largely to accentuate the decline in prices. Our opinion is that the alarm which appears to be felt as to the financial position in Havre is excessively exaggerated, if not entirely unfounded, as, owing to the admirable system for advances on produce carried out by the Bank of France, no large losses are likely to remain long unpaid, and no large quantities of coffee are likely to be forced for sale at one time, the future course of the article must therefore be studied on its own merits. On the other hand we hear that two gentlemen who recently visited Ceylon *en route* from Rotterdam to Java stated that dealers in Havre had speculated for a rise and had stocks of Brazil coffee equal to 1,300,000 cwt. The Dutch gentlemen added, as their *opinion*, that coffee would not again touch 70s. for three years to come. Our readers can judge for themselves. Messrs. von Glehn make a long statement

to support their shorter estimates of coffee from Rio. They do not believe that 1,500,000 bags *could* be kept upcountry, and add:—

We are by no means convinced that the quantity of old coffee remaining upcountry is so large, and we venture to maintain our opinion that the receipts will be smaller, and may even fall to such a point as will revive the lifeless markets of Europe and America.

We wish we could share this hopeful view. Regarding Santos, the price current we are noticing states:—

The Santos crop of 1881-82 is variously estimated from 1,500,000 to 1,800,000 bags, but taking it at the average of these two figures, viz., 1,650,000 bags, and deducting the shipments of the first six months of the season, viz., 758,000 bags, we find available, for the six months from 1st January to 30th June, 1882, 892,000 bags.

It looks, therefore, at present as if the shipments from Santos during the next six months were likely to be largely in excess of those during the same period of last year.

If the present Santos crop does not, however, much exceed 1,500,000 bags, which is the estimate of our own Santos correspondents, and if the Santos planters hold back rather more coffee than usual, the quantity that will be shipped to Europe during the next six months may after all not be so large.

It must, however, be remembered that Messrs. Bradshaw and other eminent authorities estimate the 1882-83 or following crop at 2,000,000 bags. Santos coffee is not likely, therefore, to be less plentiful for some time to come than it is now, and we doubt the wisdom of paying a premium for future and distant delivery of this kind of coffee, as is at present being done in the Havre market.

The stocks of Brazil coffee in the United States were 15,000 tons in excess of last year,* while in the United Kingdom, Holland, Hambnrg, Trieste, Havre, Antwerp and Marseilles, we get an excess of 36,000: together 51,000 tons over the stocks at the end of 1880. To this has to be added the large stocks in the two Brazil ports, and then we can understand the heavy fall which has taken place in prices. Amongst hopeful facts we note that the deliveries of coffee at Havre rose from 43,459 tons in 1880 to 54,877, or more than 11,000 tons excess, in 1881. But it is in the United States that the great increase of consumption is shewn which has prevented worse consequences and at an earlier date than have occurred. The increase in five years has been from 134,000 tons to 195,000, an excess of 51,000 tons, or in cwt. 1,020,000; the actual consumption last year by the forty-five (?) millions of people being 3,900,000 cwt. The deliveries for the past two years have in fact exceeded the imports as in the case of Indian tea in Britain. Here are the figures for advancing consumption in the United States:—

1877	...	134,500 tons
1878	...	144,000 ,,
1879	...	180,000 ,,
1880	...	174,000 ,,
1881	...	195,700 ,,

The contrast, in the case of the United Kingdom, is deplorable. Our population has increased to about thirty-four millions, but the consumption of coffee has gone down from 15.000 in 1879 to 14,300 tons in 1881. We are in truth now 100 tons below the figure for 1873. Those who place faith in the impudent fallacy that the mixing of chicory with coffee helps instead of hindering the sale and use of the latter will do well to listen to what Messrs Patry & Pasteur have to say upon the subject. They represent the use of coffee as being abandoned, because those who wished to drink the gennine article despaired of obtaining it:—

From the above figures, it will be seen that the trade in this article in the United Kingdom has been smaller than in any of the previous ten years, both as regards import, export, and we may even say cousumption, if we bear in mind the increase of population which has taken place in the last eight years: and even the consumption of chicory in 1881 shows a slight decrease on that of 1880; but no one in the trade will be surprised at this, as it is the natural result of the unchecked and unprincipled adulteration going on under Government sanction and protection; and the impossibility which exists in many places for consumers to procure anything but a vile mixture under the name of coffee, is probably driving many of them to give up the use of the article altogether.

The gentlemen who were responsible for "burking" the "Adulteration Memorial" in the Planters Association may well take shame to themselves after this.—Continuing their review, Messrs. Patry & Pasteur write:—

Prices have declined considerably during the past year. and they are now lower for Ceylon and East India, both plantation and native, than at any time since 1871, As compared with this time last year, the decline upon plantation coffee is 10s per cwt., on Rio 11s per cwt., on Santos 14s per cwt., and 4 cents on Jaua in Holland.

The deliveries for consumption in the principal European ports are estimated at 369,600 tons in 1881, against 348,800 tons in 1880, and 375,500 tons in 1879, and in the United States at 194,000 tons, against 174,000 in 1880 and 180,000 in 1879.

Taking these figures as reliable, the total consumption of Europe and the United States in 1881 amounted to:—

Europe ...	370,000 tons	=7,400,000 cwt.
United States	194.000 ,,	= 3,880,000 ,,
Together ...	564,000 ,,	=11,280,000 ,,

The consumption in Australasia, &c., and in coffee-producing countries will raise this figure to over 700,000 tons=14,00),000 cwt. We had received a letter from a planter questioning the figures quoted ftom the *Statist* with reference to Java crops. But we see no reason to doubt their correc ness. In the 11 years 1871 to 1881, the exports from Java have fluctuated greatly. In 1871 the total was only 32,000 tons, of which 446,000 bags were government and 60,000 private growers' produce. The very next year the export rose to 68,000 tons, made up of 986,00) bags government and 99 000 private,—the proportion of the latter being very little over 10 per cent of the whole. This proportion was largely increased when the big crop of 1876 came. Of the 96,000 tons exported that year, 240,000 bags were private against 1,286,000 government. Each bag, no doubt, contains about a pikul, for the total number of bags was 1,526,000, while the equivalent of 96,000 tons in cwt. is 1,920,000. Java, therefore, has never come closer to the round two millions than within 80.000 cwt.; while Ceylon did not, in her best year, 1869, go quite 70.000 cwt. beyond the round million. In 18:0 the Java export went down to 49,000 tons from 94,000 in 1879, a fall of more than one-half. Last year, however, there was a recovery to 82,500 tons, the proportion of private (notwithstanding the policy of the Dutch Government, in opening estates on the best mountain ranges and forbidding the presence of

* Patry & Pasteur, on the contrary, shew 17,700 tons nly of stocks against 19,000, or 1,300 tons decrease!

private planters on the same range with a government estate, lest the produce of the latter should be appropriated!*) had risen to 325,000 bags against 1,051.000. Private growers are, evidently, at length, making head way in the Dutch colony. But while Java in the 11 years has not appreciably increased her production, if we take the averages of the first six years and the concluding five, and while Ceylon has gone down from 46,000 tons in 1871 to only 22,700 in 1881, the progress of Santos has been steadily onwards. When Java gave her great crop of 96,000 tons in 1876, Santos gave only half the quantity; but in 1881 Santos had risen to 71,000 tons against Java's 82,500; while in 1882 the port of the district of São Paulo is likely to export 2,000,000 cwt. (bags of 17 to the ton rather!), or probably equal to the aggregate exports of Java and Ceylon. We expect only 600,000 cwt., and, judging by the past, Java is not likely to greatly exceed 1,400,000. If the English and Dutch colonies thus compare with one port in Brazil, what is the contrast with the whole empire? Its *exports* are equal to half the whole produce of the world, besides the 60,000 tons retained for home consumption. In every sense Java and Ceylon, but expecially Ceylon, have been exposed to unfair competition. Java, no doubt, grows coffee by compulsory labor, but there is a wide difference between feudal serfdom, qualified by benevolent laws, and the inhuman slavery which has enabled Brazil, temporarily, to win by so many lengths in the race. To continue our extracts from Patry & Pasteur's review:—

Stocks in the European ports on 1st January are 36,000 tons in excess of what they were a year ago, and in the United States 2,000 tons less.

The new Ceylon crop is expected to exceed the previous very short one, and estimates point to a total of 33 to 35,000 tons. British India will probably send rather more than the previous season. Costa Rica and Central America have generally good crops. The Java crop of 1881, which will form the bulk of the supply for 1882, is a good crop; but the growing one, which has been suffering from drought, will probably be smaller. The all important crops, however, are Rio and Santos, and from those countries, full supplies must again be looked for. It is estimated that the shipments from Rio, from 1st January to 30th June next, may amount to 110,000 tons, and from Santos to 35,000 tons. The growing crops, so far, promise well from both countries, especially from Santos.

With the heavy stocks now held in Europe, it appears, therefore, that we shall have abundant supplies of coffee during 1882, and it would seem as if the lowest point had not been reached yet.

In the period under review the fall in prices has been in sympathy with the enormous production of Brazil. Ceylon plantation has gone down from 125s in 1873 to 75s at end of 1881, and our readers are aware of the further fall to 67s; since partially recovered. Native Ceylon has fallen from 110s to 50s (now 44s!); Java has fallen from 66 cents in 1873 to 33½ at end of 1881; Rio afloat from 83s in 1869 to 42s at end of 1881, and Santos from 84s a float in 1874 to 44s.

We must take comfort in the certainty of enlarge consumption and in the proverb that when things are at their worst they are sure to mend.

* A curious reversal of the position of the planter in Ceylon, at which, when in Java, we could not help feeling amused.

PRODUCTION OF CINCHONA BARK.

The following paragraphs occur in James Cook & Co.'s cinchona bark report, dated 8th December:—

According to the returns just published, there were under cultivation near Darjeeling in 1879 on Government account 2,174 acres cinchona, containing about five million plants, also in the Nilgiris about 1,100,000 plants, and in Burma nearly 100,000 more. On private account there were about 1,800 acres planted in the Darjeeling district, as well as a considerable extent of land in the Nilgiris, of which the produce is sent to England for sale. That of the Darjeeling Government estates is all used for consumption in India, but in spite of this the importation of quinine was for the years ending 31st March:—

	1875-76	1876-77	1877-78	1878-79	1879-80
Lbs	3,925	4,648	5,025	5,940	7,409

The export of bark was:—

Lbs	26,992	72,452	286,944	227,179	459,286

In Ceylon, cultivation is extending, but on some estates the progress made is not so satisfactory as could be wished, the plants dying out. In Java the crop for 1880 is said to have been fully 100,000 lb.

Board of Trade returns of bark, 1st January to 30th November:—

	1879.	1880.	1881.
Imports (Peruvian) Tons	2,680	3,598	5,782
Exports do. ,,	1,877	2,246	2,881

French official returns of quinquina bark, to the 31st October:—

	1879.	1880.	1881.
Imports ... .. Tons	1,407	1,825	3,222
Consumption ... ,,	1,013	1,006	1,683
Exports ... .. ,,	643	1,080	2,047

COFFEE LEAF-DISEASE:—MR. SCHROTTKY'S EXPERIMENTS.

We are told that a good many proprietors are now preparing to give a trial to Mr. Schrottky's mixture. When Gangapitiya estate was last visited by Mr. Schrottky, accompanied by several gentlemen, interested in the experiments, the opinion was expressed that the immunity from leaf-disease, which that estate had enjoyed during June-December, might probably to some extent be due to an exceptionally dry South-west monsoon, while adjoining estates, that had greatly suffered during the larger part of that time from the disease, might have had more rain. It was stated at the time that with regard to immediately adjoining estates, there had been no difference of rainfall. It was however, so easy to attribute the successful results of the treatment to some such natural cause, that, without careful enquiry, this mere probability of difference in rainfall has, we hear, been spoken of as an ascertained fact, and Dr. Shipton, for instance, writes of it as being a great qualification of the results obtained. The following details supplied by Mr. Schrottky seem to dispose of the argument in that direction:—

"SUMMARY OF DAILY WEATHER REPORTS: GANGAPITIYA ESTATE, AGAINST AMBACOTTA AND GANGAWATTE ESTATES.

	June 1881.		
9	days showery	9	days drizzle and showery.
1	,, rain	1	,, rain.
20	,, fine	20	,, fine.
	July.		
4	days showery	5	days drizzle.
27	,, fine	26	,, fine.
	August.		
10	days showery	6	days leaf drizzle.
		5	,, showery.
21	,, fine	20	,, fine.
	September.		
6	days showery	5	days drizzle and showery.
24	,, fine	25	,, fine.

October.

13	days rain and wet	6 days	showery.
		7 „	rain.
18	„ fine	18 „	fine,

Ambacotte and Gangawatte are two immediately adjoining estates, where leaf-disease, as usual and in common with the bulk of estates in Dumbara, had been showing up since July, being particularly bad in October and again at the end of December, during all which time Gangapitiya was almost absolutely free. The estates nearer Kandy, Pallekelly for instance, get a little more rain during the S. W. monsoon than the estates above referred to, but so far from the greater rainfall having resulted in a greater show of leaf-disease, there was on the contrary in October last less at Pallekelly than further up the valley. We would again draw the attention of planters to the facts established by Mr. Schrottky's experiments, viz. that leaf-disease can be successfully checked during all the seasons of a year, and that given the commencement of the treatment at a favourable time of the year and systematic continuance, the disease can practically be kept out of an estate as long as the treatment is continued, though surrounding estates may keep up a continual supply of spores.

The treatment being compared by Mr. Schrottky, at an early stage of his experiments to a weeding the reapparance to some extent of leaf-disease at Gangapitiya, after the discontinuance of the treatment, affects its merits as much or as little as the reapparance of ordinary weeds affects the merits of weeding. Gangapitiya has again been visited by Mr. Schrottky a couple of days ago, and, though leaf-disease has been found prevalent, the estate maintains its superiority over adjoining estates; there has been no leaf-fall and no dying-back of wood has taken place. Mr. Schrottky says that leaf-disease throughout the valley, rainy weather notwithstanding, is passing away.

Since the above was written, we learn that the weather reports from Henegahawella have been examined. This was one of the estates at the end of the Dumbera district, the immunity of which from leaf disease in December was supposed to qualify the results obtained at Gangapitiya during the last South-west monson. Counting from the beginning of June to the beginning of October, we learn that the days on which rainfall is reported from Gangapitiya aree double those reported from Henegahawella!

THE TEA-PLANTING ENTERPRISE OF CEYLON.

Out of a very apparent and tangible evil, good has undoubtedly resulted in the case of Ceylon as a planting colony. Had it not been for the persistent ravages of leaf-disease, we very much doubt if our planters would ever, as a body, have been persuaded to turn their attention to the cultivation of any other product save the one staple, coffee, and a country dependent for its prosperity on any one product would always have been in a very hazardous position. The persistency of the fungus has changed all that, and, though we are far from concealing the overshadowing importance of coffee even now, yet there is, we suppose, no district and no planter today without an interest in "new products" which interest will steadily increase season by season, if not month by month. Leaf-disease may be said to have done its work, and if any faith is to to placed in "cycles," it ought now to leave us; but, even if it does, the low prices for coffee bid fair to accelerate and intensify the process of substituting new products for the old staple. Among the former—cinchona, cardamoms, cocoa, Indiarubber, Liberian coffee, wax-plant—few are as promising as tea. We have frequently remarked that the western and the greater portion of the central divisions of Ceylon were evidently intended by nature for a tea-growing country. "Leafage" is the predominant characteristic of the vegetation, and the constant humidity and the almost uninterrupted monthly rainfall—often so adverse to blossom and fruit-formation—are just the conditions in which the tea-plant ought to rejoice and bring forth flushes more abundantly. The fact is being generally recognized, but the scarcity and comparative dearness of seed have hitherto prevented that "rush" into tea-planting, which under more favourable circumstances we should probably have witnessed. Nevertheless, that a great deal more has been done than is generally understood may be inferred from two facts mentioned to us the other day "at the kraal" by Mr. Elphinstone:—the tea seed sold from Horagala estate alone last year realized R16,000, and the area planted with tea on this gentleman's group of properties now aggregates 1,500 acres. Of course a great portion is young, not yet in bearing, but the shipments from this quarter alone in 1882 ought to equal 100,000 lb. For the current season we shall be disappointed if the total exports fall short of 500,000 lb., no great quantity when compared with the millions from India or the hundreds of millions from China, but nevertheless a quantity which affords good promise of the greater things to follow.

The planting of tea—even if there be no special "rush"—is sure to go on rapidly in Ceylon. Every Indian planter of experience who has seen our plantations, convenience of transport, and mode of working labour, has acknowledged the great advantages we possess. The latest testimony has come from Mr. Cameron—an old Assam planter and proprietor, who is for a time watching the tea production and preparation on Windsor Forest estate. This gentleman has had to do, in days gone by, with the establishment of several Assam Tea Campanies, and, he speaks in terms of unqualified approval of the prospects of our local enterprise. He is prepared to do all in his power to convince English capitalists and authorities on tea that Ceylon is destined to be a tea-producing country of very considerable importance. Both in the lowcountry and far up on the Adam's Peak range, there is virgin forest land well adaptrd for the cultivation, while a good deal of cleared land that ought never to have been opened with coffee, is still capable of being profitably utilised for the sister plant.

We need not refer to the fair prospect of increasing demand and remunerative prices for Indian and Ceylon teas the only condition in our case being improved preparation, for which machinery no less than close and skiful attention is required. The latest evidence of this fact is contained in a communication from a Ceylon resident now in England, who is well qualified to look into the matter, and the results of whose investigation are deserving of the careful consideration of our tea planters. He writes:—

"Since my arrival in England, I have taken advantage of every opportunity to ascertain the opinion

held regarding Ceylon tea, and find that those who have used it object to its peculiar herby flavour. Some of it, which I procured in Glasgow, had that flavour very strongly, and was not nearly equal in quality to that which I used in Ceylon. For some little time past I have been attending at the Customs here and have had an opportunity of learning the opinions held about it by practical men. While all speak highly of its purity and strength, they seem all to be of opinion that it is not nearly so well cured and prepared as China tea.

"Mr. Exall, the tea analyst at the Customs, is of opinion that, in curing Ceylon tea, the process of fermentation is not properly and sufficiently carried out, the leaf not being sufficiently exhausted and the essential oils, which he considers unpleasant to the taste and unwholesome, not being sufficiently destroyed and removed. The official tea examiner at the St. Catherine Dock Warehouses holds very much the same opinion, but attributes the objectionable flavour partly to a supposed difference between the variety of tea grown in Ceylon and that grown in China, or to a difference in climate and soil. So far as I can ascertain, Ceylon teas seem to realize in the market here a considerably higher average price than China teas, but they are hardly known under their own name, and appear to be used almost entirely for mixing with and bringing up the strength of weaker China teas. Would it not be to the advantage of Ceylon, if its tea took a higher place in the market and became known under its own name. It is quite evident that it is not liked by consumers, because of its herby flavour, but it is equally evident that it is valued by dealers for its strength and purity. If the opinions I have quoted are correct—and they are, I think, those of men thoroughly well able to judge—the Ceylon planters can work out the matter for themselves by making careful experiments in fermenting, noting the time occupied in the process, the temperature in which it is carried on, and the colour of the leaves. My own knowledge of the subject is imperfect, but, perhaps, the suggestions I make may be of some use."

Recalling the process through which the "curing" of coffee in Ceylon was brought—in the course of a score of years, by the combined application of planters and engineers—to a pitch as near prefection as is possible, we feel confident that in a much shorter time the same experience will be realized in the case of the sister staple. and that, as far as "preparation" is concerned, Ceylon tea will yet be at the top of the market.

THE CINCHONA PLANTATIONS OF SIKKIM.

Colonel R. H. Beddome, late Conservator of Forests, Madras, has reported to the Madras Government, that he has paid a visit to the Darjeeling Cinchona Plantations. He met Dr. King, the Superintendent, at Sureil, on a spur of Senchal, about 14 miles from Darjeeling, and about 1,200 feet above the plantations, where the Doctor resides whilst on duty in Sikkim, and he spent six days in going over all the different plantings and the factory with the Doctor and Mr. Gammie, the officer in charge. The Colonel states :—

The planting hitherto has all been carried on in the valleys of the Rungjo and Ryang rivers, tributaries of the Teesta, at elevations between 2,000 and 3,800 feet. All virgin forest at these elevations had been cleared for hill cultivation (called here joom-chena) prior to the commencement of the cinchona plantations, so they have all been opened out on what we call secondary forest, or kumeri land ; and I was rather disappointed to find that there had nowhere been any attempt at the high cultivation pursued on the Nilgiris, and that weeding was only attended to for the first two or three years. The planting, with the exception of some 200 acres of young "Ledgeriana" lately put down, is in patches over a considerable area (about 2,400 acres); the number of trees is as follows :—

Succirubra	4,320,000
Officinalis	25,000
Magnifolia (of Naduvatam) ...	200.000
Calisaya and Ledgeriana ..	400,000
Carthagena	150
Micrantha	500

The soil where planted is in all cases a friable surface soil with a gritty subsoil of either gneiss or mica-schist, and the planting is in patches, because clay like subsoils have been avoided ; also localities where the mica-schist crops up to the surface, and places where a certain rank grass (*Saccharum cylindricum*) grows which have by experience been found quite unadapted to cinchonas.

The growth of the succirubra is certainly more rapid than with us at Naduvatam on the Nilgiris, and is quite similar to that on the Tinnevelly hills at 3,000 feet elevation. In one portion of the planted area—the slopes below Rungbee bungalow—I saw many trees about 50 feet in height, and one was measured 55 feet high and 29 inches in circumference breast high. They, however, are deficient in leaf and branches and want the fine heads that our Nilgiri trees possess, besides being of less girth and will probably be short-lived in comparison. The system of harvesting the bark is almost entirely that of uprooting ; and, as this is generally carried out by thinnings in the different areas, not a clean sweep; most of the older plantations have a thin bare appearance which would be ruination in our wind-blown localities, but in these protected valleys in Sikkim there is little or no wind. Coppicing has been carried out over some 50 acres, and the trees in all cases seem to have reproduced splendidly. Mr. Melvor's system of stripping has, however, been a complete failure, not, Dr. King informs me, from the trees not being able to renew their bark, but owing to the ravages of ants, who eat off all the young growth directly it begins to renew ; this system is therefore never now attempted. The Java scraping method has been tried on a few succirubra trees and with success.

The most interesting feature of my visit was the discovery that Dr. King's "Sp. ignota," called "hybrid" in some of the reports and generally known by this latter appellation to the subordinates, is exactly the same as the Magnifolia of Naduvatam (Mr. Cross's pātā de gallinazo). It grows here with a strong healthy habit and its value has been* fully recognized, and it is now intended to discontinue growing "Succirubra," and plant only this "Pata" and "Ledgeriana," the former at the higher elevations, the latter at the lower. This Pata is being grown almost entirely from cuttings, as it not supposed to come true from seed. I saw many seed-beds of it in which about half the plants appeared to be this broad-leaved form and the other half were said to be "Officinalis" ; the typical "Officinalis," however, in these Sikhim plantations is of very poor growth and very spindly in habit and it has been acknowledged that the climate does not suit it and it is scarcely at all propagated now, whereas the narrow-leaved forms like "Officinalis" from "Pata" seed appear to be of much stronger and better growth as they

*Dr. King and Mr. Gammie recognizing it as a very distinct form some 8 years ago, and it has been largely propagated since.

mature; I suspect therefore that there is some mistake and that analysis and further experience will prove them to be varieties of the "Pātā" and not really "crown barks." Mr. Gammie recognizes two different forms among the broad-leaved glabrous "Pātā" trees; these, to me, were quite undistinguishable. There is also a sprinkling of the downy variety which we call "pubescens." I would again urge upon your Government the importance of a most careful investigation into the chemical value of this species, both as to the glabrous and the downy varieties ("Magnifolia" and "Pubescens" of the Nilgiris); many individual trees of each should be analyzed to find its largest and smallest percentage of quinine, and both natural and renewed bark should be analyzed. In my first report on the Nilgiri plantations, I have stated that it will be far more profitable in every way than "Succirubra," and I have since found that this is the opinion of nearly every one in Ceylon and in Sikkim, and it will probably in time oust succirubra entirely from all localities except very low elevations, but it is necessary to be cautious and have very complete analyses. It will probably be best to grow it entirely from cuttings, when we have ascertained our best individuals or varieties by analysis, but I should recommend also very careful experiments with seed.

Dr. King has been most successful with "Ledgeriana;" his original trees were all from a pinch of Nilgiri seed, sent by Mr. Badcock from the packet which Mr. McIvor received from Mr. Money. Last year and this year a continuous block of 200 acres with a southern aspect has been planted out with the seedlings from some of the original trees and the plants appear the picture of health. There are four well-marked varieties, the best of which called by Dr. King, No. I, is not, I think, now represented on the Nilgiris. Dr. King has promised to send seed of all to our plantations, and I trust that we may succeed with them better than hitherto, if ground is opened out at a lower elevation, as contemplated and sanctioned.

Ledgeriana is grown from seed, as cuttings are not found to root well; but bottom heat has not been tried.

The uprooting system may be all very well in Sikkim as there is a very large area available for planting and fresh land can be taken up each year, and uprooted areas lie fallow for a good many years before they are replanted; it should never be advocated for our limited areas, as I am convinced any attempt to replant the same ground just after uprooting would always be more or less a failure.

None of the Sikkim bark is sent to England; it is all made into a febrifuge in a factory on the estates. This febrifuge appears quite similar to what is now sent out by Whiffen as Quinetum, and is said to be quite as efficacious as quinine, and it is much cheaper and very easily made. It is prepared entirely from "Succirubra." The bark is first dried in sheds open at the sides, then by artificial heat, after which it is ground in a bark-mill or pounded, and then steeped in Commissariat barrels for three weeks, three supplies of water being given acidulated with muriatic acid, and run off into tubs where it is precipitated by the addition of caustic soda, then filtered, the liquor running to waste, and the precipitate remaining on the filter: this is then dried in a drying house (heat about 100°) and pounded, again dissolved in water with sulphuric acid, animal charcoal being added for decoloration, then again filtered, and to this solution a dilute solution of caustic soda is added, the precipitate being collected as before in a filter and again dried and pounded when it is ready for use, and costs R9-3-10½ per pound, which calculates for the cost of the bark and the establishment, &c. The whole process appears to be very easy and simple and does not really require any special knowledge of chemistry, so that if there is the objection, I believe, to our red barks being thrown into the English market, I think Government should consider whether a similar febrifuge should not be made on our plantations. Mr. Gammie has also made very pure quinine from "officinalis," "Pātā" and "Ledgeriana" barks, and there appears also to be no difficulty or secret about this, though it is only an experiment as yet; it costs much more and the bark has to be boiled, but it cannot cost more than R30 per pound. It is now to be made on a large scale.

The annual rainfall at the Sikkim Cinchona Plantation is about 120 inches.

The Madras Government remark in an Order of the 6th January:—"This interesting account of his visit to the Cinchona Plantations at Darjeeling completes Colonel Beddome's inspection reports on the Cinchona enterprize as carried out in this Presidency, in Ceylon and in Bengal, and the paper will be forwarded to the Secretary of State and communicated to the Government of India, the Ceylon and Bengal Governments, and to the public, in continuation of the previous reports. Colonel Beddome's renewed proposal for a special analysis of the "Magnifolia" and "Pubescens" varieties, formerly dealt with on 29th August 1881, will now be attended to by the Conservator under the terms of G. O., 13th December 1881, passed upon the despatch from the Secretary of State replying to the first-quoted proceedings. The suggestion regarding local manufacture was negatived on the Cinchona Committee's report (24th February 1879), and is not compatible with the new arrangements made by the Secretary of State for manufacture at home. The Government take this opportunity on Colonel Beddome's resignation of his office to thank him for the very valuable services he has rendered for many years both to the Forest Department and to Botanical science generally."

DISAFFORESTMENT IN SIKKIM.

In connection with the Cinchona Plantations at Darjeeling, Colonel Beddome remarks:—

"It is very sad to see how all these grand Sikkim valleys have been denuded of all virgin forest between an elevation of about 1,000 feet from the foot up to nearly 6,000 feet. In 1848, when this portion of Sikkim became British territory, these valleys were nearly all one continuous forest. The Nepalese then were allowed in and they cleared in every direction for maize, murwah (ragi) and other hill cultivation; they stopped their destruction at about 6,000 feet in elevation as the climate there is too cold and bleak, and a belt at the foot of the mountains was left as unhealthy and too hot. Reserves are now formed by Government in the forests above 6,000 feet, very cold situations, where the growth is very slow, and also in the unhealthy forests at the foot; but Government did not recognize the necessity of reserves until it was too late to form them where they were of greatest value and most required. All the country now between 1,200 feet and 6,000 feet has been turned into poor secondary forest with such trees as Mallotus, Macaranga and Eurya (the same genera which appear with us in similar places although different species) or poor scrub, or in many places grass lands with very rank large species of grass. Similar destruction has gone on in British Bhootan until within the last year or two, that country having been one sheet of splendid virgin forests about eight years ago. There was no grass land proper on these hills prior to the clearings for hill cultivation; the country was all one continuous forest. No one could now possibly visit any of the valleys in British Sikkim without at once acknowledging how important it is that the State should form Forest Reserves."—*Madras Mail.*

CEYLON "COCOA" AND ITS PREPARATION.

Kurunegala, 11th Feb. 1882.

DEAR SIR,—To many planters and proprietors resident in lowcountry districts where cocoa is "king," it is, perhaps, time that the process of cocoa curing should be ventilated.

The planters in this district now beginning to cure their first samples, not knowing whether the process they follow is right or wrong, hope to call forth some criticism by explaining the method pursued, which is as follows :—

Having taken the beans out of the pods, they are heaped up on some matting, placed over wire netting raised off the floor; the beans are then covered over with plantain leaves (the ribs of which have been previously removed), and above this earth and sacks are heaped. The heap is then left to ferment for four days, after which the coverings are taken off and the beans well stirred. Then the heap is covered up, as before, for four days longer; the beans are then washed lightly by hand and dried in the sun.

We beg to forward for your inspection a sample cured after the above method, and should be greatly obliged by your ascertaining whether the sample is of any appreciable value in the market.—Yours faithfully,

COCOA CURER.

The above letter comes from a planter in an out-of-the-way district, and he accompanies it by a sample of "cocoa" beans which we at once submitted to competent authority for an opinion. The result is very gratifying. Our mercantile friend, who was not told the name of the planter, his estate or district, writes :—

"The sample of cocoa which you have just sent me is, I think, the finest I have yet seen of Ceylon growth. The majority of the beans are bold, well filled out, have a thin fragile husk and the contents are of the rose-brown colour which appears to be so much liked by chocolate-makers. I do not consider it quite dried enough for shipping, and I should, of course, have the few unripe beans, also the broken beans picked out; the result would then be a sample finer than the Amba, Raja, and Palli marks hitherto shipped. With regard to value it is impossible to say what it would fetch in the London market, but if previous sales of abovementioned marks are any guide, I should say a fancy price of over 110s. for a small parcel. The market has never yet been tried with a large shipment of Ceylon growth."

No doubt our planting correspondent has something to learn yet in reference to preparation, but he is on the right track. Mr. J. Holm in his little pamphlet on "Cocoa and its Manufacture" (which every planter ought to have) writes :—

The seeds have to undergo a peculiar progress, called "curing," before they are fit for use by the manufacturer. This process is one of great delicacy, and requires much experience and skill to conduct it successfully. Upon it depends in a very great degree not merely the preservation of the cocoa, but the development in it of a fine flavour. There are two modes of conducting it. The simpler one is merely to place the cocoa seeds, when taken from the pods, in heaps in the sun, and these are stirred at intervals. A sufficient quantity of the pulp in which the seeds are imbedded adheres to them to supply enough moisture to give rise to a moderate amount of fermentation, which ceases when the nuts are sufficiently dry to be packed. The other mode is by "claying," that is, the nuts are placed in holes or trenches dug in the ground, and covered with clay or sand; they are stirred at intervals, and great care is taken to prevent the fermentation which arises from proceeding too violently. When it has reached its proper point, the nuts are spread upon a platform or upon mats until perfectly free from moisture, when they are placed in bags.

THE CHEAPENING OF QUININE.

The decline, by about 25 per cent., in the wholesale price in London, of sulphate of quinine, during the year 1881, was chiefly attributable to the large increase in the output of Nilgiri bark. The Government undertook to cultivate cinchona in the hope of thereby making quinine abundant and cheap, and their success has stimulated private persons to plant cinchona on a large scale. From 1860-61, when the Nilgiri plantations were commenced, up to the end of 1879-80, the outlay of the Madras Government was, inclusive of interest, R18,61,476, and their receipts were R15,99,626 leaving a balance of capital due of R2,67,850. The Government had to pay heavily at the outset for their experience, and if they had to go over the same ground again, with the knowledge they now possess, they would probably be able to effect a considerable saving in their outlay. But the money spent on tentative operations has not been lost and the public have been freely admitted to the benefit of the information the Government have obtained ot the best methods of cultivation. So recently as the end of 1875-76 the outlay of the Government amounted to about 13 lakhs, and their receipts to less than 2 lakhs. But since then there have been the following gratifying comparisons between expenditure and revenue :—

Year.	*Expenditure.*	*Revenue.*	*Profit.*
1876-77 ...	R 1,18,742	1,18,960	218
1877-78 ...	,, 1,34,228	3,71,071	1,36,843
1878-79 ...	,, 1,44,179	4,30,908	2,86,729
1879-80 ...	,, 1,56,708	4,89,731	3,33,023

If the receipts were as good in 1880-81 as in 1879-80, then the Government have already had the satisfaction of recovering all their outlay, with interest thereon, and of possessing estates which yield a nett revenue of 3½ to 4 lakhs a year, with a steadily rising tendency. But, though making a very handsome thing out of their own estates, the Government encourage competition by their free sale of seeds, and in 1879-80 as much as 1,711lbs. of seed were distributed. They have 847 acres under cultivation, and at the end of 1879-80, there were 677,350 plants in permanent plantation. Colonel Beddome reports that in the Sikkim plantations there are 4,945,630 cinchona trees. He does not mention the amount of bark that is obtained at Sikkim, and, strange to say, the very bulky Administration Report of Bengal for 1880-81 makes no allusion to cinchona. The bark that is obtained at Sikkim is all made into a febrifuge in a factory on the estate. This febrifuge "is said to be quite as efficacious as quinine, and it is much cheaper, and very easily made." The cost is R9-3-10½ per lb., or about 9 annas per ounce. We are not aware of a census having been taken of cinchona trees in Government and private estates; but it is well known that year by year the area of cultivation is increasing both in Madras and in Bengal, so that we may confidently expect to see quinine brought in a short time within the reach of those poorest of the poor, who, in this more or less fever-stricken land, have the greatest need of the medicine.—*Madras Mail.*

CINCHONA : A REVIEW.

The Cinchona Planter's Manual. By T. C. Owen. (Colombo : A. M. & J. Ferguson. London: J. Haddon & Co., 3, Bouverie Street, 1881.)

It is not every day that we are called upon to review works printed on such distant soil as Colombo. Here is one, however, to which it is worth while calling our readers' attention, for it is a highly praiseworthy attempt to produce an exhaustive practical treatise on the cultivation of cinchona trees in Ceylon and (for the greater part of the volume applies elsewhere equally well to any climate in which quinine bark canbe grown.)

In learning the results yielded by cinchona cultiv-

ation in Ceylon, in reading of cinchona tree growing side by side with the coffee shrubs, and in being reminded how apt the former are to "sporting," or hybridzation, a curious physiological suggestion raises itself in our minds. Remembering what we were taught in our youth, that the coffee and the cinchona both belong to the very natural and well-defined family of the *rubiaceæ*, we are tempted to enquire what might be the effects of the pollen of the cinchona on the stigmates of the coffee flower; and *vice versa*, what influence the pollen of the coffee might exert if transported into a flower of any of the cinchona. Shall we some day find quinine or cinchonine in our Ceylon coffee berries, or caffeine among the "total alkaloids" of the Ceylon cinchona barks? Good black coffee is the nearest approach to sulphate of quinine in intermittents, as was well proved at Ghent in 1829, when the latter fell short during a violent epidemic; and at the present time it is not unusual, in malarial districts, for the physician to administer a pinch of sulphate of quinine in a table-spoonful of strong coffee decoction. Again, the "sporting" tendency of the cinchona trees has been so keenly observed in Ceylon that some of our most eminent botanists are "at loggerheads" with regard to the existence of several species, and only those observers who are actually on the spot, and eye-witness of the phenomena, can possibly realize the gradual transformation of the hybrid varieties, their divergence from the original species, and their return to it under certain given circumstances. Whether coffee and cinchona can be crossed at all, and to what extent, is a problem for the future, but it is natural to conclude that a soil and climate so eminently suited to the one must prove equally suitable to the other. This appears to be beyond all doubt, since the Ceylon experiements were first started by Keir, Dundas & Co., in the year 1868.

But even under these advantageous circumstances, no success can be looked for by the planter who is ignorant of the botany, physiology, and agricultural chemistry of the cinchonæ; and to guard against such an undesirable state of thigs, Mr. Owen has written: "The Cinchona Planter's Manual," which is at once an exhaustive and popular treatise upon the subject, and a work which we can confidently recommend to all who are interested in this important enterprize.

Analyses of the barks taken from different kinds of trees, grown in different circumstances, and analyses of the soils are numerous throughout the work, and prove of the greatest value in enabling us to form an opinion upon the cinchona cultivation in its present state and future prospects. We are particularly interested in the experimental trials of manure which have been carried out during the last few years. Here we see very clearly that sulphate of ammonia and guano both increase, to a slight extent, the yield of total alkaloids, but that a much greater increase is obtained by the use of farmyard manure. The difference is so considerable that it proves conclusively our utter ignorance as to the manner in which manures act upon crops in general, and how much we have yet to learn upon this important subject; nor do the analyses of soils help us much in the elucidation of this difficult problem.

We have said enough, however, to show that Mr. Owen's volume is well worth perusal, and if it should be read as much as it deserves to be, a new edition will soon be called for. He has condensed a mass of highly useful information into a very small compass, and no cinchona planter, either in India or South America, can fail to derive some benefit from the author's meritorious efforts.—*Messrs. Burgoyne, Burbidges & Co.'s Monthly Report.*

DOMESTIC INDUSTRIES IN INDIA.

Those who favour the scheme for establishing land banks in India will be gratified to see the marvellous development of similar institutions in Germany, as shown in the latest official returns. Herr Schulze-Delitzsch reports that, at the end of last year, there were 3,250 co-operative associations of all kinds at work, and of these 906 were "people's banks." 1,144 associations, including these 906 people's banks, have published their balance-sheets; from which it appears that they have over one million members, and that the business done by them during the year exceeded 100 millions sterling. The report is also important, with reference to this country, as showing the impetus given by co-operative Societies to those domestic industries which experience shows are indispensable to the maintenance of a thriving peasant proprietary. In Germany, and also in Belgium, where the small proprietor is most prosperous, he does not look solely to agriculture for a livelihood; but he has auxiliary means generally in the shape of some industrial pursuit, such as weaving, mining, fishing, straw-plaiting, clock-making, wood-carving, glass-blowing, pottery, &c. And in this way he and his family fill up their leisure time, especially in winter, when field work is slack; and make a comfortable addition to their agricultural earnings. In Japan exactly the same thing may be observed, each agricultural village having some hereditary industry in which by long practice they have acquired exceptional skill: thus in one village all the people are occupied in making fans, in another umbrellas, in a third wooden clogs, pottery, or lacquer work; and so on. Now in Germany these industries are supported by no less than 1,355 co-operative societies, having for their object to purchase in common raw materials and instruments of trade; to facilitate manufacturing operations; and to provide for the sale of the articles produced. And thus Prussia, which fifty years ago depended almost entirely on agriculture, has now developed important industries, and exports from her rural districts metals, cottons, woollens, silks, chemicals, glass, pottery, wood-carving, tobacco, sugar, &c. Unfortunately in India this happy process has been reversed; and the raiyat is gradually losing such auxiliary means of support as he formerly possessed. In his Indian tour Mr. Caird noticed how in every village men were "standing idle in the market-place," not because they were unwilling to work, but because there was nothing for them to do when their field work was completed. Foreign competition and other causes have killed off the ancient domestic industries for which India was once so famous, so that the whole burden of the population is thrown back upon the land; and this burden the land is altogether unable to support. It appears therefore that side by side with agricultural banks, vigorous efforts should be made to establish industrial associations, having for their object to revive ancient domestic industries, and to introduce into each district such new industrial pursuits as are best suited to the locality and the character of the people. Any local efforts in this direction will no doubt receive the support and approval of the Government. And the present time seems a favourable one for action, looking to the revived taste in Europe for all articles of Indian manufacture.

—I have &c. W. WEDDERBURN.

Ahmednagar, Jan. 30th.

—*Times of India.*

COFFEE IN LONDON.

It is extremely difficult for any one engaged in the coffee trade to keep up his spirits just now. It would tax the powers of a Mark Tapley to be jolly under such circumstances. Firms, who have been in the habit of selling Cey-

lon coffee direct to the Continent, find their occupation gone, and it is pretty much the same with the export houses who execute orders on the spot. There is literally nothing to be done and men sit idle in their offices, or wander in and out of the commercial sale room, their faces growing longer with each foreign telegram posted on the board, and every fresh report from the auctions going on up-stairs, for they all tell the same tale of the utter want of confidence, and consequent decline, because supplies are in excess of the demand. For the moment at least the pessimists have it all their own way, and nobody has a good word to say for coffee. You will have noted that even Messrs. Patry and Pasteur express the opinion that we have not reached the lowest point, and it would be cruel deception to say that there are any strong or well-defined hopes of a speedy reaction. The latest telegrams from Brazil put down the probable available supply thence from 1st July, 1882, to 30th June, 1883, at 7,000,0000 bags divided in this way:—balance remaining in the two ports on June 30th next 1,000,000 bags:—next seasons crop from Rio 4,000,000. and from Santos 2,000,000 bags, as however, Messrs. Kern, Hayn & Co. pointed out in their December circular, it is too early even in the middle of January to form trustworthy estimates and it is obviously impossible to tell how much will be left on hand when the current season closes. There is plenty of time I take it for bad weather, to upset all present calculations, but still it is tolerably certain that nothing has occurred so far to mar the prospects of a crop equal to the one now coming forward, and that it is manifestly in excess of consumers' requirements. At the same time there is this gratifying feature in the situation so far as Ceylon growers are concerned; notwithstanding the exceptional depression, fine colory plantation sold yesterday as high as 113s and it may be taken for granted that the higher grades of your staple will still maintain their value, though middling and ordinary qualities are dragged down by competition with foreign sorts, and the present quotations for the low grown begin at 54s for small. Such a wide range of prices is entirely without precedent, but it is after all quite natural under the circumstances. Ceylon proprietors at home, are encouraged to hope by the latest advices from your side, that they may be recompensed for a bad market, by a big crop next season, whilst the outlook in regard to cinchona, tea and cocoa is very satisfactory. It is worth noting that the consumption of cocoa has gone on steadily increasing in this country during the last 22 years from 1550 tons in 1,859 to 4,865 tons in 1881 and during the last three or four years all descriptions of Indian Peas, with which Ceylon is included, have grown in popular estimation with amazing rapidity.—"C. Times" Cor.

PRODUCTION OF QUININE.

The *Laboratoria* (a Barcelona journal) gives the following figures as the annual product of the various quinine makers in the world, but does not state the source from which they are obtained:

	Kilos.
North America	20,000
Howard, London	10,000
Whiffen, London	3,500
Jobst, Stuttgart	9,000
Bohringer & Sons, Mannheim	9,000
Brunswick Chininfabrik ...	6,000
Zimmer, Frankfort ...	6,000
F Koch, Oppenheim ...	1,500
Pelletier, France	4,000
Taillandier, France ...	3,000
Schissmann, France ...	1,000
Dufour Fratelli, Genoa ...	3,000
The Lombard Factory, Milan	40,000

We learn from an American journal that,—"The Lombard Factory is a limited company, with a capital of 4,000,000f. in shares of 500f. It is under the direction of Mr. Alexander Bohringer. The factory stands on a space of 8,300 square metres, and the whole superficial floor space is 130,000 square metres.'

The above table gives a total of 116,000 kilogrammes or about 255,200 lb. of quinine, which is singularly close to the aggregate of the estimate we embodied in the last edition of our "HANDBOOK AND DIRECTORY," although the details differ. Our calculation was as follows:—

MANUFACTURE AND CONSUMPTION OF QUININE.

MANUFACTURED IN	lb.	CONSUMPTION.	lb.
United States ..	63,000		
Germany	56,250	United States ...	88,000
Italy	45,000	Germany, Holland & Belgium ...	30,000
France	40,000	Italy	22,500
England	27,000	France	20,000
India	12,500	Russia, Austria, Turkey & Greece	40,000
	243,750	India	17,500
		(Other countries, Japan, Brazil, Africa, and Australia, &c.) ...	25,000
			243,000

India is however left out of the Barcelona estimate, and, if we include the cheaper alkaloids in our reckoning, we suppose 300,000 lb. would be a fair estimate of the world's manufacture at the present moment. If we take 2 per cent of quinine as about the average obtained from the bark worked up, this would give 15 millions pounds' weight of bark per annum required by manufacturers. Here again we are in close approximation to the estimate we ventured to compile a year ago of the probable consumption of Cinchona Bark for all purposes:—

IMPORTS AND CONSUMPTION OF CINCHONA BARK.

United Kingdom and British Colonies import about 9 millions lb., but consume only ...	3,500,000 lb.
India (manufactures from local growth apart from quinine, &c., imported)	500,000 lb.
Europe, Continent of, through Holland and France (5½ million lb.) chiefly	8,500,000 lb.
United States	6,500,000 lb.
Other Countries (Brazil, Africa, and rest of Asia)	1,000,000 lb.
Increase within next few years	1,850,000 lb.
Total...	21,850,000 lb.

Thirteen millions of pounds was the estimate in 1880 of the quantity of bark utilized for quinine, the rest being required for bark preparations by druggists, by brewers (in Germany especially) as a substitute for hops, and as a dentifrice. Before we go further we may ask how many trees of an average description would be wanted for this yield of quinine, if cut down and rooted up on plantations, and how many if scraped only? But the practical value of such an enquiry is interfered with when we remember the sometimes enormous quantity —hundreds of pounds' weight of dry bark—got from a single full-grown tree in the South American forests as compared with the 5 lb. to 25 lb. of bark per tree harvested in Ceylon and India. A reference to our London Commercial Letter today will however shew that the steady diminution of the supply of bark from South America is already freely anticipated, and it is manifest that if it depended on Ceylon, India and Java to supply even half the present total of requirements for all purposes—or ten millions of pounds

of bark per annum,—the strain on the planted area would be very great. The supply, in fact, could not be kept up. There is room therefore for a vastly extended cultivation of cinchona.

The scope for the extended consumption of quinine and the inferior cinchona alkaloids is also enormous. A leading London Veterinary Surgeon has said that if quinine were only half its present price, he would never prescribe a "ball" for a horse without an appreciable quantity of the valuable tonic. As a substitute for opium the merits of quinine have yet to be pressed on the notice of European philanthropists as well as on that of the millions of Chinese. The other day, an American visitor told us that his companion across the Pacific to China, an experienced Shanghai Missionary, was carrying back to his adopted country as the greatest earthly blessing he could give to the people he laboured amongst, in the rural districts, a basketful of quinine pills! The efficacious and precious febrifuge is almost unknown in China, and largely as a substitute for opium, the whole of the present production of the world might be absorbed if only it were brought within the reach of the people and at a price within their means. That the Chinese can afford a good round sum is evident from the ten millions sterling which is at present paid by them on account of "opium" to the Indian Government. It would be well if all who are interested in the welfare of Ceylon and India as well as of China, would endeavour to give a practical turn to the agitation against opium, by adding to the negative object of "Anti-Opium Societies"—namely, the putting down of the opium traffic—the positive recommendation to encourage the substitution of quinine; and just in the same way we must do our best to turn the influence of the powerful British Anti-Slavery Society against the false Brazilians; while we should like to see the united influence of every coffee-growing country directed to the overthrow of the present iniquitous system whereby "coffee" mixtures are ruining the consumption and market for pure coffees in the United Kingdom.

Here then are three great movements which are sure of success sooner or later, and which Ceylon colonists and their friends at home may do a good deal to foster and to agitate in support of. The one to encourage the substitution of *quinine* for *opium* in the trade between India and China has only to be mentioned to secure universal approval, and it may be pointed out that it is not in China only, that such substitution is required. In the Fen districts of England and in the low-lying portions of Essex, Middlesex and Kent, the consumption of laudanum among people suffering from chronic ague is large beyond the conception of most people, many country apothecaries confessing that they sell the soothing though deleterious extract, by the wineglassful to hundreds of customers every Saturday night. We should urge the example of the good American Missionary in China who goes among his people with a basketful of quinine pills as worthy of being copied by the philanthropic and charitable in all the ague-stricken districts of England and civilized Europe, and we may then anticipate with confidence the day when a doubled or even quintupled production of bark will enable the febrifuge to be issued at a rate which will ensure consumption in quarters where as yet, this most valuable of febrifuges, is entirely unknown.

When the present mail left England, we observe that a Deputation against the Opium Traffic with China, with Alderman MacArthur as its head, was about to wait on Mr. Gladstone. We must endeavour to induce Mr. MacArthur as a friend of Ceylon, to consider the suggestion we have thrown out about quinine; as well as to take up the question of Slavery in Brazil and that of Coffee Adulteration. We might then well regard the worthy ex-Lord Mayor as "M. P. FOR CEYLON" (just as Mr. Fawcett was named "M. P. for India"), and surely never did an ill-used, badly-governed Colony, stand in more need of a Parliamentary Representative.

MR. CHRISTY OF LONDON ON CALISAYA SEED.

We received by a recent mail, an envelope containing a few seeds, with the following letter and extract:—

DEAR SIR,—I send you by this post a few seeds of the cinchona just to hand this week. I gave the *Gardener's Chronicle* in Dec. a letter upon the same subject that I sent to you. The gentleman who sends us this seed speaks of the woods that yield the cinchona from which Ledger is supposed to have taken his specimens, as "wild cinchona."

We think the most of it will go out to Ceylon and India by the mails this month, as it is all bespoken.—Yours truly, THOMAS CHRISTY & Co.

I send you a slip I had printed today, which is a translation of a letter.

Coca.—I know of one contract that is being made for 2,000 lb. weight of green leaves. The gentleman left last night who is to collect them in Peru. They are going to be made into extract. The green leaf only keeps good for five months.

CINCHONA SEED.

Translation of Letter received 19th February 1882 by T. Christy.

I can now advise you that the seeds that are sent you proceed from trees of calisaya, similar to those of which I left you samples of the bark. I cannot tell you exactly if they proceed exclusively from either the "Morada," "Zamba Morada," and "Verde," but it is probable that the greater part is of the latter, and that it is mixed with the other kinds, as the "Verde" is the one which most abounds. As to choice quality among these several classes, you may take it that they are more or less equal. "Morada" and "Zamba Morada" produce more quinine, but the "Verde" recoups me, as it possesses alkaloid in smaller quantities, but bark in larger, so that you can classify it as equal to the others in value.

The cinchona, called "Ledgeriana," is just the same as those which are represented by the samples of bark which I left with you; the only thing different being that these samples are from cultivated trees, which contain twice as much quinine as the wild trees from the woods, which Mr. Ledger classifies as "Roja Morada," and "Naranjada;" but these significations vary only according to the districts from which the bark is cut. With the best faith you can dispose of the seed as being the very best which exists among calisayas, and, if necessary, state that it is "Ledgeriana," which is identical with these calisayas.

From analysis given, there is no doubt that the alkaloids are very greatly increased by cultivating the trees, as, in the wild state, the bark scarcely ever gives more than

three to four per cent of quinine, whereas the cultivated trees yield nine to ten per cent.

I have ordered some seed to be collected from the wild trees in the woods, and it shall be sent you with next shipment.

The present mail has brought the following further communication :—

DEAR SIR,—I enclose you a slip, which I have had printed this evening, and it carries the matter of cinchona seed as far as Mr. Holmes could get it done in time for today's mail. No doubt, with your experience in Ceylon, you will be able to follow it further. I shall send you any information that I can gather.—Yours truly,

THOMAS CHRISTY.

The barks will be sent to Howards and others who may be able to throw any lights on the matter.—T. C.

Pharmaceutical Society of Great Britain, 17, Bloomsbury Square, London, W. C., January 27th, 1882.

Messrs. Thos. Christy & Co.—Gentlemen,—In reply to your enquiry respecting the leaves, barks, and seeds of cinchona forwarded to me, I may say that I have carefully compared them with specimens in the Museum of this Society, and the barks correspond well with the finest specimens of cultivated Bolivian Calisaya here.

With respect to the leaves and fruit, so far as I can judge, the "*Calisaya morada veluta*" is the *Cinchona Calisaya Bolivina sub. var. pubescens* of Weddell's Notes (Transl. p. 44), and the *Calisaya verde* is, so far as I can ascertain, Weddell's *Cinchona Calisaya oblongifolia*, and the tree concerning which Markham ("Travels in India and Peru," p. 270) gives the following account :—"I have been assured by Gironda and Martinez that there are three sorts of Calisaya; the *Calisaya fina* (*C. Calisaya a vera*, Wedd.), the *Calisaya morada* (*C. Boliviana*, Wedd.) and the *Calisaya verde*. They also told me that the last-named tree was a very large one, with leaves wholly devoid of any red colour on the nerves, and habitually growing very far down the valleys and even in the plains. A tree of this variety supplies 600 or 700 lb. weight of bark, whereas the *Calisaya fina* yields only 300 or 400. Gironda declares that, in the province of Munecas, Bolivia, he saw one that furnished 1,000 lb. of tabla, that is to say, of the bark, of the trunk, and lower branches."

These remarks confirm the statement made in the copy of the letter forwarded with the barks, viz., that it pays better to cultivate the *Calisaya verde* than the *Calisaya fina*, or in other words, that, although the *Calisaya verde* yields only 6½ to 9 per cent of pure Sulphate of Quinine (while the very best Ledgeriana yields 13 per cent, and other specimens not more than 6 per cent, yet, as the *Calisaya verde* yields twice the amount of bark that the *fina* or Ledgeriana does, this is equivalent to from 13 to 18 per cent of Quinine in the *Calisaya verde* moreover, from the fact that the *Calisaya verde* is a more vigorous tree than the delicate Ledgeriana, and will grow at a lower elevation, it is obvious that it can be cultivated to a much greater extent and may be extremely valuable for grafting the Ledgeriana upon.

I am not aware that the *Calisaya verde* (*Cinchona Calisaya oblongifolia*) has as yet been introduced into India, and I think you are to be congratulated on having succeeded in obtaining seeds of so valuable a Calisaya.—I am, gentlemen. yours very truly, E. M. HOLMES.

THE WAX-PALM OF BRAZIL.

Doubts have been freely expressed as to whether the seeds of this plant *(Copernicia cerifera)* sent out to Ceylon by Mr. Scott-Blacklaw would germinate; but this doubt should now be set at rest by Messrs. Auwardt & Co., who write :—

"We beg to enclose for your inspection a couple of the wax-yielding palm seeds which we put in a flowerpot just to test them about a fortnight ago, and you will see that they have sprouted."

The seeds in question have sprouted splendidly. Dr. Trimen is trying some of the seed at the Peradeniya Gardens, and recalling all we are told about the tree and its uses :—its delicious fruit, its leaves used for hats and clothing, the wood for building, the roots medicinal, besides the all-important wax which is so easily collected and utilized :—we certainly trust this "new product" will receive a fair trial in Ceylon. Our native friends with land to plant up ought more particularly to give it a trial.

A PLANTER'S ORGAN : "THE TROPICAL AGRICULTURIST." —We have read with much pleasure a new monthly publication, which made its appearance at Colombo on June 1st last, in connection with the *Ceylon Observer*. It contains a great deal of useful information for planters. It contains capital articles on various details of coffee planting, also numerous paragraphs dealing with cocoa, cinchona, sugar, and other tropical products. The magazine supplies a distinct want and ought to succeed. It can be ordered through Mr. Gall's book store, Harbour Street.—*Gall's Jamaica News Letter.*

INDIAN TOBACCO.—The export of tobacco from India is steadily increasing. Five years ago the exports were valued at less than 9 lakhs; in 1880 their value had risen to over 14 lakhs. Mr. J. E. O'Conor, in commenting on the tobacco trade, in his latest review, expresses great satisfaction with the tobacco and cigars of Poosa, and the Madras cigars also he finds to be improving. It is known that in the estimation of the London agents and merchants the Indian leaf only requires the labour of skilled curers to compete successfully with the produce of America and the Manilas. —*British Trade Journal.*

HAPUTALE, 13th Feb.—The weather up here is now everything that could be desired and estates hereabouts never looked in better heart or more capable of giving a heavy crop than they do at present. Down the Pass, on the Haldummulla side, they have had a little wind, but the trees will quickly respond to the present favourable change in the weather and autumn blossoms promise to be good. Old Kahagala is a *perfect picture* and the surrounding estates are equally good —so good in fact does coffee look in this particular quarter that it puts cinchona quite into the shade, and that is saying a good deal for Haputale cinchona, like its coffee, is not to be surpassed anywhere in Ceylon. Leaf-disease is conspicuous by its absence.

CINCHONA BARK SALE.—Messrs. Robinson & Dunlop disposed of the following lots of bark by auction today (Feb. 10th). Considering that quinine is reported to be lowering in price again, the result is very successful.

			R.	c.	
T C A	1,500	lb. offi. branch bark @	0	30	₱ lb
W B L	118	„ pub. twigs and chips	0	27½	„
	50	„ condaminea „	0	35	„
	36	„ calisaya „	0	21	„
R P	113	„ suc. chips and twigs	0	50	„
	232	„ „ „ and stem root	1	05	„
Waverley	500	„ offi. stem shavings	1	97½	„
New Forest	1,940	„ s. twigs mixed with tgs.	0	21	„
Mousakande	230	„ „ twigs	0	15	„
Aldourie	1,550	„ „ bold twigs	0	32½	„
	186	„ „ twigs	0	17	„
Goatfell	1,570	„ off. stem chips	0	52½	„
Agrawatte	815	„ mixed stem root and chips	1	0	„
	286	„ succ. twigs	0	15	„
Avisawelle	408	„ off. stem chips	1	15	„
Rangbodde	460	„ mixed off. and succ. stem chips and twigs	0	27½	„
Wighton	1,100	.. off. chips and twigs	0	35	„
	433	., do	0	87½	„
	1,560	„ succ. chips and twigs	0	40	„
	149	„ stem and branch quill	0	50	„

Correspondence.

To the Editor of the Ceylon Observer.

NEW FIELDS OF ENTERPRIZE: THE SOUTH SEAS.

Na Songo Plantation, Upper Rewa, Matailamtan, Viti Levu, Fiji, 21st November, 1881.

SIR,—Noting, in nearly every issue of the *Overland Observer* which comes to hand, the publicity which you give to "new fields for emigration," I have taken the liberty of forwarding you by this mail two letters, from a gentleman in the New Hebrides group, which, I think, may be of considerable interest to planters in Ceylon to peruse, and which may probably result in one or more planters turning their attention to that quarter, where everything seems to be to the advantage of the planter, with the exception of hurricanes.

Planters in Ceylon will be glad to hear that coffee is still doing well here in Fiji, and that little or no leaf-disease is to be seen. Some of my oldest coffee, about nineteen months old, which I topped at 3 feet 6, two or three months ago, had a magnificent maiden blossom last month, which set splendidly, and which I reckon at five or six cwt. to the acre.—Yours truly,

WM. LAING MALCOLMSON.

Rathmoy, Sandwich Islands, August 21st, 1881.

Wm. Laing Malcolmson, Esq., Fiji.

Dear Sir,—Your letter requesting information about this island, and its capabilities for coffee-growing, reached me a couple of days ago. I will preface my remarks by saying that I am a coffee planter, but in a very small way, and all the experience I have ever had with the plant has been since I came here. To try the capabilities of soil and climate for that article, I put in one acre at the back of my house, on jungle land, and at an altitude of about 500 feet above sea-level, and about three-and-a-quarter miles distant from the coast. I planted this purely for experiment, and it answered admirably. In 22 months from the time the seed began to come up in the nursery, I was picking my maiden crop of beautiful, well-developed coffee (the seed came from Ceylon). I did not weigh my crop either then or since, but I put it down in my own mind that the yield (first) was from 3 to 4 cwt. to the acre. The following year we were visited with the most severe hurricane yet experienced here, and the coffee trees, at the time it came, were 5 feet high, beautifully shaped, and *covered* with blossom. The acre was white, like a field of snow. You may guess the effect; the trees were nearly all blown flat, and, when they were put straight and earthed up comfortably, I found that, from the sheer force of the wind, all, or nearly all, the primaries were killed. I broke them off, and at the time, not knowing what to do with it, I just left it to itself, the consequence being that it threw out a lot of shoots, suckers and gormandizers, and so it has been going on ever since, totally neglected, with the exception of cleaning the ground now and then. It has since every year continued to give very fair crops, more than I ever could have expected, and the trees, although, as I tell you, a *mass* of shoots and gormandizers, are *perfectly healthy*, not a symptom of leaf-disease or anything else. So far my experiment has been a great success, and, you will admit, a very severe test. The only wonder to me has been that it has survived at all.

In October last year, I commenced felling and clearing at Sea-view, distant three miles back from my house, ar three-and-a-half miles from sea coast, altitude 1,500 feet by aneroid, *heavy* jungle land, and commenced putting out nursery plants of 15 months old in February, for experiment sake again. I put out about half an acre of whole plants, which then had two to three pairs of primaries out, but while doing so, a burst of sunshine came out, accompanied by very strong wind, and, of course, down went all the tender tops and leaves. Although feeling very much disposed to take my knife and cut them down to stumps at once, I left them. They recovered amazingly, and they are now fine plants, well shaped, about, or a little over, four feet high, and budding out blossom for a maiden crop (some have blossomed). With the exception of a scale, which is identical with the scale on orange trees, and is on many of the plants in the jungle here, there is no disease of any kind; they are a beautiful, rich dark green, and growing fast. All the plants of six acres, which I put out in the early part of this year, I cut down to stumps, and find it the safest way. The shoots from those are now about 2 feet high with 2 or 3 pairs of primaries. This will convey all the information, I think, you require on this head. This scale only comes on an odd plant here and there, and only on the green and tender parts, and does not appear to affect either the growth or the health of the plant. Can you tell me anything about it? There is plenty of land on the island everywhere, well adapted for coffee, but the streams of water unfortunately are few and far between. On my property there are 3 running permanent streams, and so far I am well off, for they are suitable for pulping &c.; and adjoining my land and for miles beyond there are two splendid streams, and thousands of acres of coffee land, a little stony and broken, perhaps, but magnificent coffee land, in a valley, well sheltered, and all jungle; but I know of no other part of the island where it is so. Certainly, I have not travelled about much beyond my own limits, but I am in my tenth year of residence here. All or any of this land can, I believe, be purchased from the natives, at the rate of say 2/6 per acre, paid for in trade. The general altitude of what I call coffee land may be put down, I think, at about 1,500 feet, and the mountains which back it up on the east and north-east (the prevailing wind quarter) may be, or look like, 1,500 feet more. What may be on the top of those, in the shape of available coffee land, I know not. I get abundance of rain at Sea-view. Scarcely a week passes without showers. In fact, drying and burning off is often difficult. The general temperature may be put down at, in the shade, in summer from 80° to 86°, and in winter from 60° to 70°. This is at Sea-view. On the low coast land it is several degrees higher. I have a thermometer at each place, and sometimes keep record, and compare notes, but I have seldom tried it in the sun. I have no hesitation in affirming that I do not think there is a more suitable coffee climate and soil in the world. The soil varies both in depth and colour. Some is black, rich, loose mould for several feet down, and the subsoil chocolate; and, in others, more reddish than chocolate. In others, I believe you could go down 20 feet through rich, black, soil, and, in odd places, patches here and there, you will come in 18 inches on a mineral-looking tenacious red clay; something of the aluminum style. I dig all my coffee holes 2 feet each way. I can give you no idea what it costs to bring an acre of coffee to maturity here, but I should say it could not be done in any part of the world cheaper. I do not want to tell you things I know nothing about. *Labour* has to be imported from other islands in this group. The Sandwich natives, or any others in the New Hebrides, will not work on their own island. Labour costs at the rate of say £6 per annum, with every expense added; wages only £3 per head. Cost of procuring them from £5 to £7, food, clothing &c., making up the sum. Term of servitude,

3 years. Cost of returning to their homes, 10s. to £1. Free trade, and no taxation. The latter is what will tickle you Fiji people. Title to land good, if properly bought from the proper owners, and paid for in full. All the labour I have came to me under "the stars and stripes." I am a subject of Queen Victoria. Labourers can be obtained here, if a man has the cash ready to pay for them. Direct communication with Sydney can only be had twice a year by missionary schooner "Dayspring" and for letters only. They will not carry anything else for a planter. even if he pays for it. Sydney is distant about 1,200 to 1,300 miles, and New Zealand a little less. New Caledonia is about, I think, 400 miles or 2 to 3 days' sail for a schooner. Captain McLeod is an old and very regular trader between this and Noumea, and his schooner makes trips every two months, from and to Noumea and Sydney; there is a large steamer, the "City of Melbourne," twice a month. We are *subject* to hurricanes about January and February every year, and they happen, and are of about the same strength as those you have in Fiji, neither more nor less. The island of Sandwich, or any other of this group, is not so healthy as Fiji. There are fevers here sometimes, but, if a man is *temperate* and *works hard*, there is nothing here to injure him. This unfortunate island has in some way got a much worse name and reputation than it deserves. Every malady under the sun here is called fever and ague. If a man kills himself by emptying a gin bottle, people will have it that it is fever and ague that has brought about his collapse. No man, who comes here with a determination to succeed, and erects his dwelling on the high lands, need be more afraid of Sandwich than any other place, and that is the truth. Any one who is afraid to meet it had better not come. I have seen too much here of that sickening rubbish. If you, or any of your friends, are desirous of settling here, the best way would be for you or one of them to come over in one of the labour vessels, and see and judge for yourself. I will be happy to give you or them accommodation and all the assistance in my power in arriving at a true comprehension of Sandwich and its belongings; and, as far as coffee is concerned, as you know very well, to a man of experience, seeing is believing.

Mr. Leefe of Fiji has been over a large portion of my coffee land, and, if you can drop on him, he can describe it to you exactly. I trust I have told you all you wish to know. I cannot think of anything else, which would enlighten you now, but upon any question you may address me in the future, I shall be most happy to give you all the information in an honest way, neither exaggerating nor concealing, and I will conclude this by saying that I believe with all my heart in the success, ultimately, of coffee-growing in Sandwich, and, if I did not, I would not remain a day longer in it.—I remain, dear sir, yours truly,

ROBERT GLISSAN.

P. S.—I forgot to add that Captain McLeod has about 15 acres of coffee planted on his estate in Villa Harbour or South West Bay, on the southern end of this island. I saw it about two months ago, and it was looking very healthy and well, although badly and carelessly planted; it was then about 15 months old. There were also a few trees about 5 to 6 years old, all jumbled together in what had been an old nursery. They had never been pruned or attended to in any way, but they were looking blooming, and laden with ripe fruit. All are growing about ½ mile from the salt water and at about 200 to 300 feet altitude. Unfortunately there is no stream of water *there* for pulping &c. Latitude of Sandwich 17·30.

Rathmoy, Sandwich Island, New Hebrides Group,
September 10th, 1881.

Wm. Laing Malcolmson, Esq.

Dear Sir,—I wrote, in answer to your letter, about a fortnight or so ago, and sent it in to the harbour, to Mr. Salisbury, to forward by first opportunity offering. I do not know whether it has left there yet. On considering the matter contained in your letter, about the probability of some of your Ceylon friends coming here to settle, if my report of the place proved favorable, I think it as well to lay a proposition before you and them, which might greatly tend to confirming that inclination, and it is as follows:—If I could meet with a Ceylon man of good sound coffee experience, I would be glad to enter into partnership with him, giving up to him all the management of the coffee plantation. To make the matter clear, I hold somewhere about 10,000 acres of land here, 3,000 of which is first-class coffee land, and on which are three running streams of water. I have about 6 acres of coffee already planted out, the greater portion of which is at this moment in flower for a maiden crop. I have about 10 acres more cleared and burnt off, and about two-thirds of that pitted or holed, ready for favorable planting weather, and hope to have 10 acres more cleared and ready for planting next February, the rainy season. I have 4 different nurseries, containing something like 8,000 plants over a year old, and have another nursery in the middle of my clearing containing 26 beds of 4 × 60 feet each, or, as I estimate, about 40,000 plants, planted this year, and which are all up and throwing out their second leaves. This gives me an unlimited supply of plants to carry on with. I have put up a nice comfortable three-roomed cottage at Sea-view, and there are huts for the men also; there is a large quantity of tools for the men, and carpenters' tools also. In fact, there is everything needed both on Sea-view and Rathmoy for the efficient and separate working of both places—everything but pulpers and machinery for working up the coffee. I have 33 head of labour, 23 of which have nearly 2 years yet to serve, and 10 recently got, which have their 3 years of time to serve. I am also going to receive 20 more at the end of this year. In fact, I may just broadly state that the whole place is formed and in good working order. I will take a partner for a half share in the whole estate of 10,000 acres, and all working implements on the place, for everything but my own personal property. If he pays me in cash the sum of three thousand pounds (£3.000), I will then place to the credit of working expenses of the estate £1,000, against the same amount placed by my partner, and together work the property, share and share alike in every way. I will carry on maize-growing down at Rathmoy with a separate gang of labour, to cover all the labour expenses (which I am at the present time doing) and each gang can be made available at times of push at either place. The maize pays well here, and the ship comes to the Corn House and takes it away *whenever* it is ready for shipment, and I have gathered crops here giving a yield of 80 bushels to the acre. So that I deem it advisable to continue the maize-growing for a few years with the coffee. I have received many offers (and favourable ones) of partnership here, but would not take any one that was not experienced in coffee culture.

It is, as you know, a very different thing for a man to come to a settled place and home, with everything ready-made to his hand, to settling down on new ground in some lonesome spot, with labour, tools, buildings and in fact *everything* to provide, and any person joining me would do so under most favourable auspices. If you know of one to do this, let him first come and visit the place and judge for himself, and do nothing in the dark, and if it is to be done, let it be done quickly.

I may tell you, that I have years ago secured the best, most convenient, and most valuable land in my neighbourhood, and, previously to settling here, I made two trips of inspection from Queensland, and

took good care to establish myself in what I considered the best locality. The title of my property is good, as I paid the natives every pennyworth asked for it, and my deeds are well drawn out and all property witnessed there can be no possible doubt of its security. Although the greater portion of it was purchas d 9 years ago, the natives all round acknowledge my right to it, and there has never been the slightest dispute of ownership. I have beautiful creeks of fresh water on Rathmoy also, and a large extent of as fine sugar land as there is in the world. My chief reason for proposing this arrangement is that I find it rather too much to be continually shifting myself about between Rathmoy and Sea-view. I am not so young as I was 20 years ago, being now in my 47th year and the continual separation from my wife of a week and a fortnight at a time is very unpleasant and lonely for both. There can be no harm done in proposing the matter to some of your Ceylon friends, and, if they deem the thing advisable, they can come over at once, or communicate with me without loss of time. So now, as I think I have laid the matter before you in an intelligible form I will say good-bye for the present and remain, yours truly,

ROBERT GLISSAN.

COFFEE LEAF-DISEASE: MR. STORCK'S MODE OF "PATENT EVAPORIZATION."

5, Laurence Pountney Lane, London, E. C.,
12th January 1882.

DEAR SIR,—I have been reading the last *Overland Observer*, and have perused with much interest Mr. Storck's letter of 20th October 1881, in which he states that the cure he avers to have discovered for "leaf-disease" is a system of *permanent vaporization*.

All concerned must agree that Mr. Storck is fully justified in withholding his secret, until he has obtained a well-secured guarantee (in which the Governments of India and Ceylon should unite with the coffee planters of both countries) for a reward, which should be commensurate with the immense interests it would benefit, if Mr. Storck's process proved a success; a stated time, however, to be named to thoroughly establish this point of a successful remedy.

I would suggest either of the following as the most suitable forms of reward. Either that the two said Governments should alone give the reward; or that a patent, free of expense, should be granted to Mr. Storck for his process, to extend over a given number of years, and that all planters availing themselves of it should annually pay a certain moderate fee of so much per acre.

If the process proved successful, an ordinance should then be passed making it compulsory that all coffee planters should make use of it, until such time as the disease had completely disappeared. All abandoned estates and gardens should have the coffee rooted up and burnt. This also should be made a "*sine qua non*" by law; and if natives neglected to use the remedy, their gardens should be treated in like manner.

By such means alone, if we believe in such men as Thwaites, Abbay, Morris, Marshall Ward, and Storck, could the pest be thoroughly stamped out.—Yours faithfully, WILLIAM SABONADIÈRE.

LOCAL MARKET FOR TEA.

DEAR SIR,—With reference to your correspondent's letter of the 6th inst., which appears in your paper of yesterday, respecting a local market for tea, I should recommend your friend "A." and several owners of small blocks to send down their tea to some one in Colombo, and make a small depôt here. I shall be glad to be of service to them in rendering them every assistance, and I might possibly give them a fair idea of the value in the London market. I expect to receive very shortly samples of Ceylon tea, and, having a knowledge of tea-tasting, acquired in a London dealer's office, I may be of use to them.

I have orders already, but cannot hit upon the quality I want.—Yours truly, B.

COFFEE STATISTICS.

Deyenewatte, Passara, 24th Jan. 1882.

DEAR SIR,—On reading the *Statist*'s article on coffee production and trade of the world, it occurs to me that there is an error in the Java statistics,* 96,000 tons being the highest, and 42,000 tons the lowest; the former being reduced to cwt. 1,920,000 (one million, nine hundred and twenty thousand cwt.), and the latter only 840,000 cwt. (eight hundred and forty thousand cwt. exported).

I do not like to trust the printer's devil with figures only, and therefore give the quantity in brackets in writing, for even that wonderful book of *Tropical Agriculture* by Simmonds is misprinted, giving the outturn of coffee of the world at one million cwt. *instead of ten million cwt.* (Look it up for yourself, Mr. Editor.)†

Your own statistics of the coffee production of the world were usually ten million cwt. something like as follows:—

	Brazil	5 millions
	Java	2½ ,,
	Ceylon	1 ,,
Other coffee producing countries including India		1½

or *ten million cwt.*‡.

Now, we find Brazil pouring into the market during the current season 1880-81, crop of six millions four hundred and eighty thousand hundredweights, viz. from Rio ... ... 5,080,000 cwt.
From Santos ... ... 1,400,000 ,,

Total Brazil ... ... 6,480.000 ,,

Ceylon crop being only half-a-million or less by forty thousand hundredweights, and less than half the outturn of 1872 and 1873.

It would be interesting to discover whether the Java statistics are correct or not, because, at present, they point to a decrease of two-thirds, or say over a million cwt. on the average. So far this fact would show *Java a greater sufferer from leaf-disease and short crops in proportion to Ceylon.*‖

Both the abovenamed countries have the advantage of Ceylon in being enabled to extend cultivation as railway extension progresses and woe to the Ceylon Government for not taking greater care of *her staple product.*—I remain, dear sir, yours faithfully,

HENRY COTTAM.

LOCAL MARKET FOR TEA.

February 6th, 18 2.

DEAR SIR,—Will you permit me to ask, through the medium of your valuable journal, whether a local market can be found for small lots of carefully manufactured tea. I ask, as owners of small blocks of tea planted on trial do not care to export small quantities, as, I believe, small lots do not usually pay to export. You, who know everything, may be able to give us a hint.—Yours truly, A.

[Our correspondent should try the local storekeepers. —ED.]

* We have answered this by anticipation. The figures are correct.—ED.

† Simmonds' book has a number of gross errors.—ED.

‡ Our last Handbook gave 11 million cwt. as the quantity exported, the producing countries consuming three millions more.—ED.

‖ Apart from leaf-disease, seasonal influences and other circumstances tell on Java crop.—ED.

NEW FIELDS OF ENTERPRIZE: BEWARE OF SHARPERS.

Badulla, 8th February 1881.

DEAR SIR,—I enclose the copy of an extract from the *Scottish American Journal*, dated 15th December 1881, which, I think, ought to be widely circulated through every paper. Some of the young men referred to were, for some time, in Ceylon, but, thinking they could better themselves in another part of the world, and se ing such an advertisement as that referred to below, at once jumped at such an opening, and were shamefully deceived. This system is not only confined to America; as I have heard of similar cases having been connected with Ceylon, where young men paid large premiums, such as £100 per annum, to learn their work and another £100 for their board. Such cases of extortion ought to be exposed. Any man, after six months' planting experience, is surely worth not only his board but also a small salary.—I remain, dear sir, yours faithfully, A NOVICE.

PEELING CINCHONA AND CINNAMON BARK.

Koslanda, 12th Feb. 1882.

DEAR SIR,—In your issue of the 9th, I observe a note on peeling cinchona with the help of a cinnamon-peeler's stick for rubbing the bark, so as to facilitate the peeling.

From my experience, it is undoubtedly a fact that this stick is necessary in peeling cinnamon, but it is no help whatever in peeling cinchona.

I tried both the cinnamon-peeler's knife and the rubbing process with cinchona, and found the stick utterly useless, to say nothing of the damage it did the bark; but I strongly recommend the knife to cinchona planters, if they really go in for barking and making pipes *à la mode*.

Cinnamon, as a rule, will not peel all the year round, but I never found it the case with cinchona: so the stick for rubbing is not necessary, even if it were a success.

I tried it simply for curiosity sake, and found that the rubbing, although gently applied, damaged the bark to a great extent.

I also observed that cinchona will not peel after 36 hours (from the time it is cut), and the only remedy in a case of that kind is to steep the sticks for an hour or two in water.—Yours faithfully, H. J. C.

KAPOK, COTTON, COTTON TREE, SILK-COTTON.

DEAR SIR,—I fear these terms have got somewhat mixed, and some have added to the trouble by confounding the Sinhalese word 'kapu,' for the common cotton, with 'pulun,' the Sinhalese for the silk-cotton. The following may prove of interest to your readers:—The red-flowered silk-cotton tree not uncommon from the coast up to the Kandyan country is, I believe, truly indigenous to Ceylon, and is the 'katu (thorny) imbul-gaha' of the Sinhalese, and in the *Flora of British India*, 1, p. 349, the following botanical names are given for it:—*Bombax malabaricum, heptaphylla*, and *Ceiba salmalia malabarica*, and *Gossampinus rubra*, whilst Maxwell 1. Masters, who has elaborated this order, calls it "cotton tree." From 'Bombax' comes 'bombastic,' inflated, puffed up, &c. The woolsack is said to be in some way connected with this. I think Masters is wrong in calling this the "cotton tree," and leaving the other without a common name. One of the generic names, *samalia*, is, I think, derived from the Malayalim name of the tree under which Rheede figured it in his *Hortus Malabaricus*. The cotton of this tree is scant compared with that of the next tree. There is a very common drug sold in the bazars of India and Ceylon, and which is used for the same purpose as shark-fins, rat-tails, &c., in fact as an aphrodisiac, and known as 'madana-kamapu' in Tamil. 'Madana' means intoxicating, 'Kama,' the goddess of love, 'pu,' flower, which I have never seen identified with any known plant. Several years ago I had some of this drug soaked in warm water, to which some soda was added, and I discovered that the drug was composed of the young unexpanded flower-buds of this tree. [Indian compilers, writers, plagiarists, please copy!]

2nd.—The tree commonly known in Ceylon as the silk-cotton tree, very common near gardens and cultivated grounds, is remarkable for its green bark, and the regular manner in which its branches spring from the trunk in equidistant threes forming angles of 120° with the trunk when the trees are young. It is, also, like the other, remarkable for having its flowers and its cottony pods on when the tree is bare of leaves. The flowers are generally white, and when in young bud they are a favourite food of the flying-foxes, *Pteropus Edwardsii*, which infest the trees in the evening. The Sinhalese name of this tree is 'pulun (silk-cottou) imbul-gaha,' and it is the cotton from this tree which is so much used in Colombo and on the coast of Ceylon for stuffing pillows, mattresses, &c. It is to be had in Colombo for 12 to 16 cents a lb., but not quite free of seeds. The contents of one good ripe dry capsule of this tree when opened out will fill a beaver hat. The two trees produce silk-cotton, the staple of which is too short to be woven, but I think this one should be called the cotton tree in preference to the other. I am away from my books and do not know the meaning of the Sinhalese word 'pulun' always used for the cotton from the tree, but it is never confounded with the 'kapu,' the produce of a species of *Gossypium*, none of which is indigenous to Ceylon. I do not think the 'pulun imbul' tree is indigenous, as I never saw one truly wild.

In *Fl. Brit. Ind.*, 1, p. 350, the following names and synonyms for this tree are given:—*Eriodendron anfractuosum* and *A. orientale*, *Bombax pentandrum* and *B. orientale*, and *Ceiba pentandra*.

From all I know about this tree, I think it is likely to have been introduced into India and Ceylon from the West Indies. W. F.

MR. STORCK AND COFFEE LEAF-DISEASE.—We shall not fail to call Mr. Storck's attention to the letter of Mr. W. Sabonadière, which appears on the previous page: the latest reference we have seen to the subject is contained in the following paragraph in the *Madras Mail*, in which a quoation occurs we had not seen before:—

Mr. J. R. Storke, a coffee planter in Fiji, has been experimenting with coffee leaf-disease *hemileia vastatrix*. He makes two important announcements—first, that the disease may be contracted, under certain conditions, by the Liberian coffee plant; and second, that he has discovered a means of "infecting a tree, a run, a plantation, or a whole province, and of curing it again at will." He gives no details of his method of cure, but invites personal investigation on his estate at Upper Rewa, Fiji.

FIBRE.—A Report has been issued on the materials in India, suitable for the manufacture of paper. Several fibre-yielding plants are mentioned; amongst others, various species of the plantain or banana tribe. Trade returns show a large and continually increasing delivery of hemp from the Philippine Islands. The quantity is estimated at 20,000 tons, valued at half a million sterling. M. Léotard says there is no doubt that the Manilla hemp plant, *Musa textilis*, grows as well in British India as other species of the plantain or banana tribe. Further British India could, in a space of two years, supply London market with all that it could take of hemp fibre.—*Madras Mail.*

ABOUT PERAK.

Mr. Dean's very able report on the State of Perak enables me to condense what I have to say, and all who wish for details should procure it. As he says, the country is one mass of heavy jungle, with perfect soil, for Coffee, Cinchona, Tea, and Sugar, suitable elevation for each being easily obtained, from sea level, up to 8,000 feet. From 150 000 to 200,000 acres are available, and numerous rivers, which are being cleared, will afford all necessary means of transport, until railway are opened. It is it present the intention of Government to open about eight miles of rail, from the proposed post of this place, and afterwards twenty-three miles to Kwala Kangsas on the Perak River. I may say the work will not stop until it has opened up the whole State. Land is to be had for $2 per acre, and no doubt capital would be treated with on easy terms if it was shown the work of opening up would be carried on with energy. The rainfall varies above this; at an elevation of 3,200 feet, about 300 inches fell during the past twelve months. From all accounts this must have been an exceptional year, and this place is known to have the greatest rainfall in the State. About 20 miles to the South-east and at the same elevation the rainfall was 80 inches. The average rainfall for the State may be taken at 75 inches. The young Coffee, Cinchona, and Tea that I have visited will compare most favourably with the best district in Ceylon and those who have not, as yet, lost their all, should pay this place a visit. There is a good resthouse here, and one is being built at Kwala Kangsas. Travelling by boat, with short walking trips to inspect the soil, &c., on the hills would be the best way of seeing the country. This can be done, as the mountain ranges are not so continuous as to make it necessary to cross them. Labour will have to be imported, for which the permission of the Indian Government has been obtained, and, I conclude by saying there is nothing to be done here, at present, without capital, but it is expected the war debt will be paid off this year, and when it is, Government intend spending money freely in opening roads, &c., &c. Then, no doubt, there will be employment for experienced men, accustomed to Tamil coolies.

C. H. CAULFIELD.

Taiping Larut, Perak, 14th January, 1882.—*C. Times.*

SUCCESSFUL EXPERIMENTS IN TEA PLANTING.

[I send you a copy of the *Glasgow Herald.* It contains a letter by a Glasgow grocer, S. Cranston, mentioning a very successful method of preserving tea seed, and other points of interest.—*Cor.*]

SIR,—We are indebted to Mr. Richard D. Cruickshank, Indian tea merchant, Glasgow, for the following particulars of his experiments and experience as a grower of Indian tea seeds for exportation to the different localities in India, Ceylon, Fiji Islands, &c., and we have no doubt they will be read with interest by every one connected with the tea trade, and especially by the Government officials and capitalists who are engaged in various undertakings which are intended to open up the vast tracts of India, by bringing them within the reach of commercial enterprise, and thus tend to develope the resources of the Empire. The difficulties which Mr. Cruickshank encountered may best be realized by a few quotations from Colonel Money's Prize Essay on Tea Cultivation, which states, with the clearness of an acknowledged authority, the conditions and circumstances under which the propagation of the tea plant in India was begun upon scientific principles. It is matter of history that the early efforts of the East India Company were directed solely to obtaining seeds and plants from China. The opinion of the most experienced Indian planters of the present day is, that all this trouble on the part of the East India Company was not only useless, but positively injurious; and when the Government was doing its best to foster cultivation by distributing China seeds and seedlings gratis; it made a mistake, the harm of which it will take years to undo. Colonel Money begins his essay with a laconic truism, "Nothing was known of tea formerly when everybody rushed into it; and not much is known even now." Speaking of the varieties of plants, he says:—"These are many, but all arise from the species which was discovered some forty years ago in Assam. The indigenous tree has a leaf nine inches long and more; the leaf of the China bush never exceeds four inches. The indigenous 'flushes,' that is produces, new tender leaf (from which only tea is manufactured) much more copiously than the China, and this is in two ways: first, the leaves are larger, and secondly it flushes oftener. The infusion of tea made from indigenous species is far more "rasping" and "pungent" than what the China plant can give. A pure specimen of either is rare, and it is very difficult to rear successfully the pure indigenous. The China is much hardier when young. The plants between indigenous and China are called "hybrids;" they were in the first instance produced by the inoculation, when near together, of the pollen of the one kind into the flower of the others. Now there are very many varieties of the tea plant—a hundred, or even more—and no garden is wholly indigenous or wholly China. Had China seed never been introduced into India, a very different state of matters would have existed now. The cultivation would not have been so large, but far more valuable. The Indian tea is vastly superior to China, and commands a much higher price at home, but it is still very inferior to what it would have been had not China seed been so recklessly imported and distributed over the country—it will never be possible to undo the harm then done. Another difficulty was the transport of seed to any new localities, for nine times out of ten a large proportion failed; and again, the enormous cost of tea seed in those days, 200 rupees a maund (about 80 pound weight), 500 rupees a maund at least, deducting what failed, was its real price. This item of seed alone entailed an enormous outlay, and was another difficulty tea cultivation had to contend with. It was, however, a source of great profit to the old plantations, and principally accounts for the large dividends paid for years by the Assam Company. The seed of indigenous hybrid, and Chinese is like in appearance and cannot be distinguished. Thus, when seed formerly was got from a distance, the purchaser was at the mercy of the vendor. The tea flower (the germ of next year's seed) appears in the autumn, and the seed is ripe at the end of the following October or early November. It thus takes one year to form, and when picked the mass is still in capsules. It should be laid in the sun for half-an-hour daily for two or three days, until most of the capsules have split. It is then shelled, and the clean seed laid on the floor of any building where it will remain dry. Sunning after shelling is objectionable. The sooner it is sown after it is shelled the better. If for any reason it is necessary to keep it—say a fortnight or three weeks before sowing—it is best kept towards germinating in layers covered with dry mould. But if to be kept longer, leave it on the dry floor, as above, taking care it is thinly spread, and collected together, and re-spread every day to turn it. For transport to a distance it should be placed in coarse gunny bags, only one-third filled; if these are shaken and turned daily during transit, a journey of a week will not very materially injure the seed. For a long journey it is best placed in layers in boxes, with thoroughly dry and fine charcoal between the layers, and

sheets of paper here and there to prevent the charcoal running to the bottom. In round numbers, one maund of tea seed contains, say 30,000 seeds. If you get 8,000 to germinate with seed that has come a long distance you are lucky. After a two months' journey 3,000 is probably the outside which will be realised.

This state or condition of the Indian tea plantations at the time when greater intelligence and careful study of climate, soil, and situation were beginning to attract attention, must have rendered it a difficult task to procure really fine seeds of a pure strain from the indigenous stock; and the condition of the gardens to which Mr. Cruickshank turned his services affords an abundant corroboration of Colonel Money's deliverance. When he first joined the Company the seeds he gathered were only the size of a blackberry (currant), and they brought only £25 per annum to the Company; but by careful cultivation and experiments, extending over the short space of two years, he raised seeds the size of a boy's marble, weighing ten times heavier than those with which he began his task, and in three years their revenue from seeds alone was £1,600 per annum, with the prospect of a large increase upon that sum. This statement seems almost incredible, but what follows renders its acceptance quite easy and natural. The number of litigations arising out of sales of bad seed must be patent to everyone who is connected with India, and here is one case out of many which came under Mr. Cruickshank's personal observation:—1,600 pounds of seed were delivered, weighing 500 seeds to the pound, which gives the enormous number of 800,000 separate seeds; they were carried from Assam to Cachar, and were five months in transit, and after being duly planted, and when the time for the plants to be appearing had come, it was discovered that not one seed had germinated. Mr. Cruickshank himself saw these seeds planted under instructions from the agents, and payment was to be made upon the percentage that germinated. All these seeds cannot have been bad at first; but such a result speaks volumes for the carelessness and ignorance of probably both the seller and the buyer. This fact almost suggests the story of "wooden nutmegs." It is a noteworthy fact that many planters have acted on Colonel Money's advice and have rooted up and cleared from their gardens every bush grown from China seed, and have replaced them by sowing indigenous seed. Great difficulty having been experienced in packing the seeds, so that their germinating power might be preserved unimpaired, even for one month, or until they could be conveyed from the gardens to Calcutta, Mr. Cruickshank tried the experiment of having them packed in strong loamy soil which had been thoroughly dried in the sun and broken up by passing through a fine sieve and hermetically sealed, and found that there was no particular loss sustained in their germinating power by keeping for six months, in fact, he has kept some seeds for fourteen months by this method. He recommends boxes to hold 20 pounds of seed as being the most convenient for carriage, and less liable to breakage and damage to the seed. On the principle that one accomplished fact is better than a dozen theories, it is interesting to note that Mr. Cruickshank has asked us to exhibit in our window seeds and plants of his own growing, and they have been examined and admired by thousands. Mr. Thyne, of Buchanan Street, was struck with their robust, healthy appearance. The seeds from which this plant was grown were gathered by himself on the 1st of November, 1879, and were preserved by the abovenamed method and brought home, and were planted in the hot-house at Garscube, near Glasgow, on the 20th of June, 1880, and every one of the seeds germinated, and their progeny consists of a beautiful hardy plant (or rather six plants or stems), standing three feet high, and bearing a vigorous foliage, many of the leaves measuring nine inches long, and it is still sending out fresh shoots, the bright pale green of the younger leaves contrasting with the darker tints of the older growth. To the non-professional mind the questions arise—What are the virtue of the two methods as practised by Colonel Money and by Mr. Cruickshank? and what is the action on the seed, the one method contrasted with the other? Charcoal packing cannot exclude the air, and Colonel Money seems to advocate as much air as possible, provided it be dry, cool, and in the shade. Is it possible that the charcoal absorbs some virtue from the seed, or absorbs the natural moisture from the seed, and thus renders it too dry to germinate when placed in soil at the end of two months, except to the very small extent of 10 per cent? These gentlemen, experienced planters both, are agreed upon the treatment of the seed up to the point of packing for transport—but here they differ widely. Mr. Cruickshank uses strong, loamy soil that has been dried in the sun, and hermetically seals the box, which shuts out all air from the seeds and retains in the seed whatever moisture may have been left in it when the drying process was completed; and the percentage of the seed that germinated is 100 as against 10! One could not look for so large a percentage from Mr. Cruickshank's method if his seeds has been planted in the open (in India); but he would be disappointed if at least 50 per cent did not germinate after a long journey and six months' keeping, because he has realized 80 per cent of seedlings by his method from seed sown in the open after keeping them for three weeks covered with dry mould. It would thus seem that tea seeds are prone to decomposition, and the point to be overcome is to arrest this tendency until after the seeds have been sown. That excluding the air has this result is partly proved by the fact that of two seeds of equal virtues, one planted at the depth of a foot from the surface, does not germinate for a long time after the other, planted at the depth of one or two inches. But the interesting and valuable fact remains that Mr. Cruickshank's method has preserved the germinating power for six, eight, and fourteen months, while Colonel Money's system appears to be capable of preserving this germinating beyond two months, and then only to the extent of 10 per cent. Of course, we cannot touch on the vicissitudes that attend the young seedlings after they have germinated, for here this comparison naturally ends. We may, however, state that Mr. Cruickshank brought home orchid roots by the same method, and with a like success. These facts are doubly interesting when we read that the growth of tea is now being experimented upon in America and many other countries, other than India and China, and in commencing a new industry it is well to get the best material to work with. This seed has the reputation of being the finest strain in Assam, and the parent plant was planted by Bruce, "the pioneer of tea in India," on the northern division of the great "Assam Tea Company's Gardens" at Jaipur, near Makkum Petroleum Springs, 550 feet above the sea level, and just on the British frontier. The Assam railways "guaranteed by the Secretary of State for India in Council" will have their terminus at Makkum—the prospectus of which was advertised in the *Herald* recently, and shows that the company was formed for the purpose of working coal, timber, petroleum, and iron in Assam, and for establishing a service of steamers on the Brahmapootra River, as well as the railway from the river (near Dibrugarh) to the Makkum coal-fields near the Dehing River. A few miles up the river Dehing forests of indigenous tea are found, so that this district may be considered the *habitat* of the plant. An acre of this class of plant will yield from 800 to 1,200 pounds of manufactured tea per annum when the plant comes to its maturity, and if properly manipulated will bring 3d per pound more than the ordinary hybrid or China varieties more commonly grown. The value of this seed is fifteen

times that of China seed, and the demand is so great that orders have to stand over for years. This method of preserving and packing seeds for export is calculated to have a wonderful effect on the prosperity of Indian tea planters, for they have now the assurance of an established fact that seed can be packed so as to keep for a length of time sufficient to carry them to any part of the world that may be found suitable for their growth. Owners of good stock can derive a large revenue from their seeds, while their less-fortunate brethren may take heart, and, by purchasing good seed, they may safely calculate on a larger outturn per acre, and the finer quality of the manufactured tea will soon recoup them for their outlay for seed and loss of time and ground rent. While the new plants are coming to the leaf-bearing stage, the experiments that are now being carried on in California and Australia (and suggested for New Zealand by letters in the *Herald)* will be watched with interest, and, should they prove successful, they may be the means of helping to solve that vexed problem of Chinese labour by providing a new industry eminently suited to the deft fingers and natural occupation of the yellow man. If we are not taking up too much of your valuable space, we should like to touch on a point which is suggested by one clause of Colonel Money's—namely, "The Indian tea is vastly superior to China tea, and commands a much higher price at home." This is no doubt quite true, and from a planter's point of view it cannot be denied; still we should like to record our opinion after 20 years' experience in Glasgow, where we have had many opportunities of noting the public taste, and it is well to look at the question from all sides.

That the Indian plant is more prolific and fetches a higher price is a fact which goes to show that planting from Indian seeds has a double chance over China seeds of turning out a profitable undertaking. Indian tea commands a higher price because it is much stronger, and is, therefore, valuable for giving body to a mixture of China teas; but this high price is very often out of proportion to its real value in the pot—the value is fictitious on account of their beautiful appearance to the eye, being in reality what the Highlandman said of his daughter, although he meant the reverse—"She was bonnier nor she was better."

Strength of body and toughness is a *sine qua non* in a piece of iron or steel, but is not absolutely so with regard to tea. Tea is drank under the belief and hope that it will have an exhilarating and invigorating effect upon the system—which it undoubtedly has if properly infused and used in moderation. Now, the great bulk of Indian, and especially Assam, teas are usually strong, thick, dark, and pungent, and these qualities are often so decided as to render them nauseous to the palate of ladies and delicate people; but these very properties commend them to the working classes, who "like something to grip the mouth." In China tea these characteristics are not so marked; but it possesses a finer flavour, and a more refreshing and exhilarating quality than the Indian, and these are virtues of no little moment. Given a sample of Indian (Assam) tea costing 2s 6d on the London market, and a sample of China tea at the same rate; an infusion of one ounce in a large teapot of each tea will yield liquors vastly different. The Indian sample will be very strong, rasping, and dark, with a flavour that is not pleasant to nine out of every ten people, a weaker infusion simply tones down, but cannot remove the unpleasant taste and flavour. On the other hand, the China sample will be of a moderate strength, with a soft, silky feeling on the palate, a pleasing colour to the eye, with a most agreeable flavour to every palate—except one that may have been rendered less susceptible to a delicate, delicious impression by reason of much smoking and drinking. In short, it may be said that Indian tea satisfies the palate very quickly without giving much refreshment to the system, while China tea refreshes the system without leaving any depressing sensation or a feeling of over-satisfaction. Judged by its effect on the human system, and not by its price on the market, we beg humbly, and with considerable diffidence, to contradict so exalted an authority as Colonel Money by declaring our opinion that "China tea is vastly superior to Indian tea."

At present it is well-known that India teas are not much used by themselves, very few people relish them alone, and they are almost solely used for mixing with China tea. Now, we venture to think, and give the suggestion for what it may be worth, that if the Indian planters could or would produce a "self tea" (one needing no mixture), combining the body and fullness of the Indian tea along with the refreshing qualities of the China tea, they would give an immense impetus to the increasing consumpt of the Indian product at the expense of the Chinese, thus supplying ourselves from our own empire, at the same time promoting the well-being of the native population. Some of the Darjeeling teas of recent years have been approaching this style of a "self tea," but the fine ones are (in our opinion) too dear; and the medium and common ones are often raw in taste, and slightly herby in flavour, something like the smell of new hay—a very pleasant flavour in its own place, but the breakfast table is not that place. In the preface to the first edition of his prize essay, Colonel Money states that "up to the last, at every visit to plantations other than his own, he has taken notes and learnt something—if rarely nothing to follow, something at least to avoid."

The writer of this letter has learnt much from Colonel Money's able essay, and much from personal intercourse with Mr. Cruickshank; and the copious notes which he took and received during many conversations with Mr. Cruickshank have enabled him to string together a number of facts which cannot fail to interest many readers of the *Herald;* and in this hope he begs to subscribe himself, sir, your obedient servant,

STUART CRANSTON.

FLOWERS FOR THE TROPICS.

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

(*Continued from page* 736.)

LOASA.

A very beautiful climber.

LINUM GRANDIFLORUM.

A beautiful annual of slender growth. It thrives better in a well-manured border than in pans. Sow in October.

LOBELIA.

A useful and beautiful annual, suited for pot culture, hanging baskets, bedding or edgings. Light sandy soil required, with plenty of moisture. Sow in October, and prick out when large enough to handle.

LUPINUS.

A good old-fashioned showy flower. Sow 3 or 4 seeds together after having soaked them in water to render germination easier. Sow in October, and do not transplant.

MESEMBRYANTHEMUM.

This beautiful annual is highly appreciated in India, the flowers, when open in the sunshine, being of great beauty. Sow in October in shallow pans filled with good soil, and transplant as soon as ready.

MALOPE.

Sow in October where the plants are to remain, as they seldom thrive after transplanting.

MARIGOLD.

Sow in any good soil, and transplant to the places where they are intended to bloom when about 2 inches high.

MARTYNIA.

A free flowering plant, bearing very handsome large flowers. Sow in October on good rich soil; the plant will begin to flower 7 weeks after, and continue in bloom for a long time.

MIGNONETTE.

Sow in October, in patches in the open ground, or in pans in which the plants are to flower. On no account transplant, and if it is wished to prolong the blooming period, do not fail to pick off the flowers before they begin to form seed-pods. A sandy soil is best, but Mignonette will succeed in any garden with a little care. Liquid manure once a week will be useful.

MIMULUS.

This beautiful plant should be in every garden. Mix with sand to sow, to ensure regularity, the seed being very small. Prick out into pots, which should be kept in pans of water, as it is almost an aquatic. Plenty of silver sand should be mixed with the soil.

MYOSOTIS (FORGET-ME-NOT).

Must be cultivated as an annual, as it does not survive the hot season. Sow in October, and, if possible, keep the pot in a pan of water, to ensure perfection of growth.

NASTURTIUM.

Very little care is necessary in the growth of these beautiful flowers in Southern India, but in the North-West Provinces frost must be provided against by covering at night. In Bengal the seed should be sown in October and the ground kept well watered.

NEMESIA.

A very profuse blooming dwarf annual. Sow in October.

NIGELLA.

An annual with large flowers, which are surrounded with Fennel-like foliage. Sow in a damp soil in October. Does not do well when exposed to the sun.

NEMOPHILA.

A very pretty little annual, producing a profusion of flowers; should be grown in every garden. Must not be sown earlier than the middle of November, or the seed will not all germinate.

NOLANA.

A hardy trailing plant, bearing large and beautiful flowers. Very effective in pots, when the stems should hang over the sides. Sow in October. Will not bear transplanting.

NICOTIANA.

A highly ornamental plant, with showy delicate-coloured flowers. Sow in October, and transplant when large enough.

ŒNOTHERA (EVENING PRIMROSE.)

Sow at the beginning of the rains in a bed or pot of fine soil; prick out 3 inches apart; by the end of the season they will be fit to move to permanent quarters, where they will bloom well throughout the cold season.

OXALIS.

A dwarf but strong plant suitable for pots or rock-work. Sow in October.

PANSY.

Sow in pots about the middle of the rainy season to bloom about Christmas and continue flowering till February.

PEA, SWEET.

Sow in October, in circles at intervals along the border. When 9 or 10 inches high, sticks should be given to support the plants.

PETUNIA.

A very showy plant. Although really a perennial must be cultivated in India as an annual. Fresh seed should be ordered each year, or the plants speedily revert to their original type. Sow in October, and transplant when 3 inches high.

PERILLA.

Chiefly attractive for its rich bronze foliage; the flowers are not showy.

DOUBLE POPPY.

A free flowering annual and very effective. The Pæony-flowered variety is best. Sow in October on light rich soil where the flowers are required, as Poppies will not transplant.

PHLOX DRUMMONDI.

A very beautiful annual: no Indian garden should be without it. Sow in gumlahs, from which, when 2 inches high, plant out into small beds or clumps. Self-sown plants should be destroyed, as they are inferior to those produced from English seed. Sow in October or in January, to bloom in pots during June and July.

PLATYSTEMON.

A beautiful plant of trailing growth; will not bear transplanting. Sow in October.

PORTULACA.

By far the most brilliant and dazzling of all the annuals. Sow in the open ground in good rich soil, and great care should be taken that the spot chosen be not shaded by trees. Portulaca looks best in clumps, edgings, or circular beds. Sow in October.

RHODANTHE.

A beautiful annual, very useful for pot culture. Requires frequent shifting from one pot to another, with plenty of well-rooted manure. Sow in October.

SALPIGLOSSIS.

A highly ornamental annual, with a great profusion of delicately pencilled flowers. Sow in October; plant out when an inch or two high, to bloom about the end of April.

SALVIA.

A useful tribe of annuals, especially valuable for bedding.

SANVITALIA.

An exceedingly handsome dwarf growing plant with small oval leaves, thickly studded with daisy-like flowers. Sow in October.

SAPONARIA.

A handsome free-flowering annual, well adapted for bedding or sowing in clumps. Sow in October.

SCHIZANTHUS.

A very pretty annual when in full bloom, but of rather straggling habit. Sow in October, in light, sandy soil.

SCABIOUS.

A showy border plant, bearing large heads of flowers. Will not sometimes flower same season; but if not, keep till next cold season. Sow in October.

SILENE.

Very attractive, and remarkable for its fresh-looking foliage. Sow in October.

SPHENOGYNE.

The foliage and flowers of this beautiful annual are very attractive. Sow in October, and transplant 3 or 4 together in the open border.

STOCK (TEN-WEEK).

These usually succeed well in India, but in the immediate neighbourhood of Calcutta, just before the blossom developes, the plants are liable to be injured by a minute insect. Sow in open ground in October, and protect from the sun and rain. Some persons transplant when 2 inches high, but we think the best plan is to allow them to remain where sown.

SUNFLOWER.

This well-known annual thrives in India, producing very large flowers. Sow in July.

THUNBERGIA.

An elegant climbing annual. Sow in October.

TROPÆOLUM.

The seeds should not be sown till the cold weather has set in, as the young plants cannot endure the heat. It is a remarkably pretty creeper and should be trained to a trellis.

VERBENA.

A very attractive plant, well adapted for bedding. Sow in October.

VIOLA.

Strikingly handsome and beautiful flowers, which blossom well in the cold weather. Sow in October, and shelter from the sun and rain.

VENUS'S LOOKING-GLASS.

A profuse-flowering dwarf annual. Sow in October.

VIRGINIAN STOCK.

This pretty annual is well adapted for edgings or for planting in clumps, as the profusion of flowers renders it exceedingly attractive. Sow in good rich soil in October.

VISCARI.

A beautiful and profuse flowering annual, most attractive when grown in beds or clumps.

WHITLAVI.

A very beautiful annual, well suited to Indian gardens. Useful for borders. Sow in October.

ZINNIA.

This beautiful annual is useful for bedding purposes or for planting 3 or 4 together in a border. Sow in pots in July.

A NEW ALKALOID IN THE BARK OF CINCHONA CUPREA.*

BY B. H. PAUL AND A. J. COWNLEY.

In operating upon the cinchona bark that has lately been much employed in the manufacture of quinine, under the name of *Cinchona cuprea*, we observed some months ago the frequent occurrence of a crystallization from the ethereal solution of the alkaloids extracted from the bark. As this bark had never been found to contain cinchonidine, it seemed at first sight probable that the crystals thus deposited from an ether solution of the alkaloid might be quinidine, which is almost always present to some extent in cuprea bark. Further examination of these alkaloid crystals showed, however, that they did not consist of quinidine, but of an alkaloid which resembled quinine in forming a sparingly soluble sulphate, as well as cinchonidine in forming a sparingly soluble tartrate, though it differed from quinine in being crystallizable from an ether solution and from cinchodidine as well as quinidine by the mode in which it crystallized from ether.

There seemed, therefore, every reason to conclude that the cuprea bark contained an alkaloid which had not previously been isolated, and the probability of this being the case was consistent with the long observed peculiarity of the quinine sulphate obtained from this bark, as regards crystalline form or rather the texture of a mass of crystals. We consequently proceeded to separate a sufficient quantity of this alkaloid for studying its history more completely. This was, however, a work of some difficulty, since the sparing solubility of the sulphate did not admit of any satisfactory separation by the method of fractional crystallization, and we were constrained to have recourse to the plan of crystallizing the alkaloid from ether. By this somewhat tedious process we have obtained a small quantity of it, from which we have prepared some of the salts, and now give the following details of the characters of them and of the alkaloid.

* The data contained in this paper find confirmation from the observations of Mr. Whiffen, recorded in the following paper, which was received at the moment of preparing for publication.—ED. *Ph. Journ.*

The alkaloid is sparingly soluble in ether, crystallizing from it in long thin plates and sometimes in needles.

The sulphate resembles quinine sulphate in its sparing solubility in water, thus differing from the sulphates of cinchonidine and quinidine. It crystallizes out in needles.

The tartrate resembles cinchonidine tartrate in regard to its comparatively sparing solubility in water.

In the absence of any method of effecting a definite separation of this alkaloid, it is difficult to form any correct estimate of the amount present in the bark, and we have good reason for thinking that the amount of it varies considerably in different samples. Sometimes no indications of its presence are to be detected, and we are of opinion that this was generally the case with the earlier importations of cuprea bark. At any rate, it is only within the last four months that we have noticed the occurrence of this alkaloid, and then only in some samples. In certain instances, when there is much of the alkaloid present, its behaviour simulates that of cinchonidine, so much as to give rise to the conclusion that the bark contains that alkaloid, as well as quinine and quinidine.—*Pharmaceutical Journal.*

NEW ALKALOID FROM CINCHONA.

BY W. GEORGE WHIFFEN, F.I.C.

In the examination of the bark known as *Cinchona cuprea*, which has been imported from South America in large quantities during the last two years for the manufacture of quinine, I have repeatedly noticed the presence of an alkaloid differing apparently from the known cinchona bases.

Having lately collected a quantity of this substance for examination, I found it to be a previously undescribed cinchona alkaloid having great similarity to quinine.

It occurs, I believe, in greater or less extent in all the cuprea bark, and I have found from ·1 to ·8 per cent in samples recently analysed.

If the impure quinine, as obtained from a bark containing the new alkaloid, be dissolved in ether, there will be found, on long standing, massive groups of prismatic crystals. These crystals are collected and washed and recrystallized several times in ether to purify from traces of quinine.

As thus prepared the alkaloid is very soluble in alcohol even when dilute; the solution is strongly alkaline to litmus. When freshly precipitated the alkaloid is soluble in ether, from which it crystallizes in stellar groups of fine tabular prisms, having a pearly lustre. It is also considerably soluble in dilute liquid ammonia. It is not decomposed by cold oil of vitriol, nor by concentrated nitric acid. Sulphuric acid and potassic bichromate produce with it a deep green coloration.

So far as I have been able to examine them, its salts closely resemble those of quinine. The sulphate crystallizes from a solution in boiling water in pearly white needles, which taste intensely bitter; it is rather more soluble in cold water than sulphate of quinine, but far less soluble than sulphate of cinchonidine.

The cold saturated solution in water is precipitated by Rochelle salt, but is not precipitated by the cautious addition of potassic iodide. Chlorine water and ammonia produced an emerald green coloration like that formed by quinine and quinidine. With excess of acid its solution is fluorescent even when very dilute.

The most characteristic reaction is its action on polarized light. The solution of the sulphate in acid rotates the ray to the left more powerfully than sulphate of quinine, the relative angles obtained from effloresced salts being thus represented:—

Sulphate of cinchonidine	.. ..	$(a)\ j = 135°$ ←
Sulphate of quinine	.. ..	$(a)\ j = 196°$ ←
Sulphate of new base	.. ..	$(a)\ j = 221°$ ←

I have prepared specimens of this alkaloid for combustion analysis, and hope shortly to publish its ultimate

composition; meanwhile, on account of its similarity to quinine and of the great action it exerts on polarized light, it may be distinguished by the term "ultra-quinine."—*Pharmaceutical Journal.*

TROPICAL PRODUCTS AND THEIR USES:

CASTOR-OIL—BEES—ALKALOIDS—PARSLEY AND MILK—CUPREA BARK.

(*Pharmaceutical Journal.*)

A curious statement is made in the *Bulletin de la Société d'Horticulture d' Orléans*, that the castor oil plant is an excellent remedy against flies. Those that alight on the leaves and suck the sap are said to fall down dead, their bodies becoming white. The castor oil plant is easily grown, and the experiment is worth a trial, although it is quite possible that the observation is a mistaken one.

In a paper recently read at the Linnean Society, Sir John Lubbock showed that bees have a preference for blue colour, and explained the fact that there are so few blue flowers by supposing that all blossoms were originally green and then passed through white or yellow, and generally red, in becoming blue, changes which may be observed in certain flowers during the development of flower-buds, *e.g.*, Boraginaceæ.

Some experiments by Herr Karl Hock (*Archiv*, Nov., p. 358) point to the spectroscope becoming available in the detection and recognition of alkaloids and other vegetable principles. Thus if digitalin be dissolved in concentrated hydrochloric acid and warmed, a greenish yellow liquid is formed that gives an absorption band in the blue at F. If sulphuric acid be used instead, a brown red solution is produced that gives two dark lines, one strong one in the green at Eb, and another rather fainter in the blue-green before F. If a few drops of Erdmann's mixture be added to the sulphuric acid solution, a third intense line is produced in the yellow at D. Delphinine, treated with sulphuric acid, gives a distinct band in green-yellow at $D\frac{1}{2}$ E. Cubebin, amygdalin and salicin all form, with sulphuric acid, red solutions which are easily distinguishable from one another by their absorption bands. Other substances that have been found by Herr Hock to give characteristic absorption spectra of dark lines under similar conditions are belladonnine, solanidine, morphine, narcotine, codeine, papaverine, cryptopine, quinine and strychnine.

Dr. Stanislas Martin, in the *Bull. de Thérap.*, remarks that fresh parsley leaves used as an external application act most efficaciously in arresting the secretion of milk. For this purpose freshly plucked leaves are used and renewed several times a day as fast as they begin to fade. He states that they were used for this purpose by the Roman matrons of old, and are still used by women in the East, who renew a cataplasm of the leaves three times in twenty-four hours.

In August last mention was made in these columns (p. 179) of the fact that Herr Skraup had questioned the existence of homocinchonidine as a body distinct from cinchonidine, and had attributed the differences observed by Dr. Hesse to an overlooked admixture of quinine. Dr. Hesse has since replied, and whilst admitting that the sample of alkaloid supplied to Herr Skraup was slightly impure, denies entirely his conclusions. According to Dr. Hesse cinchonidine occurs in several South American cinchona barks, especially in those from *C. lancifolia* and *C. tucujensis*, and also in East Indian barks from *C. succirubra* and *C. officinalis*. In consequence of the enormous number of plants of the latter two species now under cultivation, it is probable that a considerable quantity of this alkaloid will come into the market in a few years. On the other hand homocinchonidine is found in the latter two species only seldom and then in traces, although it occurs in considerable quantity in South American red bark. In many respects the alkaloids closely resemble one another; under similar conditions they crystallize exactly in the same form, but whereas cinchonidine melts at 200° to 201° C., homocinchonidine melts at 205° to 206° C. Both alkaloids when dissolved in alcohol or chloroform under similar conditions rotate polarized light equally strongly to the left, though in acid solutions they differ. Much the same may be said of the hydrochlorates, both as to crystallization and rotatory power. But if 2 parts of the hydrochlorate be dissolved in 240 parts of hot water, and 1 part of Glauber's salt dissolved in the least possible quantity of water be added, the sulphate of cinchonidine forms crystalline prismatic needles, which when dried in the air, though they slightly effloresce, retain five molecules of water several months, whilst the sulphate of homocinchonidine forms delicate clusters of needles, which when dried in the air shrivel up and lose nearly all water of crystallization. The difference in the sulphates is said to be perceptible to the touch and taste. At 22° C. homocinchonidine sulphate is the best soluble in water, at 30° it equals cinchonidine sulphate in solubility, and as the temperature rises it becomes increasingly the more soluble of the two. Both bodies yield cinchotenidine upon oxidation, and Dr. Hesse thinks probably their difference is dependent upon the position of the hydroxyl groups.

According to a statement in the *Monthly Review of Medicine and Pharmacy* (December, p. 374), an examination of samples recently received in the London and New York markets as "cuprea" bark, seems to indicate that the number of bales of *Cinchona nova* held in stock, but called cuprea bark, is a not inconsiderable element in determining the price of quinine, and that the real stock of bark available for manufacturing purposes is considerably less than the monthly stock summary shows. It is not easy to understand this statement. It would be difficult to confound two cinchona barks so utterly unlike in their external characters, *Cinchona nova* being thick and marked with transverse fissures, caused by the shrinking of the bark in drying, and its inner surface distinctly fibrous, while cuprea bark, on the contrary, is a thin bark, externally resembling the false yellow bark of Para, the periderm being coarsely cracked longitudinally, the derm also cracked longitudinally, with occasionally concave depressions, and the inner surface smoother than any other known cinchona bark. It may further be noted that the bark is occasionally described as "*Cinchona cuprea*," which would indicate that such was the botanical name of the tree yielding it. This is an error, the tree not being known to botanists in this country, neither Mr. Howard nor the Kew authorities having as yet seen specimens of the leaves and flowers of the tree. Although it is quite possible that the name *Cinchona cuprea* may be given to it if it prove to be a new species, it is premature to call the bark other than cuprea bark, or *cuprea* cinchona bark. There are apparently two or three varieties of the cuprea bark in commerce, but none of these in the least degree resemble *Cinchona nova* (*C. magnifolia*), and evidently all belong to the same group or section of the genus as the typical cuprea bark. Nor does there appear to be any record of the cuprea bark appearing in the London market in 1857, although Mr. J. E. Howard noticed a somewhat similar bark in 1853.

CINCHONA.—In accordance with a suggestion of Colonel Beddome, the Government have sanctioned the expenditure of a sum not exceeding R1,000 for the experimental trial of various patent manures. It is understood that valuable artificial manure can be obtained from the firms on the West Coast, Mr. W. Rowson, Assistant Superintendent, Government Cinchona Plantations, Naddiwuttam, having proposed "that our soils be sent home for analysis, and that suitable patent manure be procured from England." The Government have replied that no analysis of the soils need be made at present.—*Indian Agriculturist.*