curor, caucho, &c. &c; in fine, under all circumstances and conditions possible; a fact which readily shows that none of them can be the cause of the evil nor favour its development. Sometimes the epidmic is so abundant that it not only infects the coffee, but all the neighbouring plants also suffer from the destructive effects of the disaase.

The disease reappears in the same plot every winter, and it has been observed that each time it spreads considerably, but less if the year is very dry.

Neither all the leaves nor all the fruit attacked by this disease fa'l to the ground; if the plague does not gain ground, the leaves that remain lose the infected portion and continue living; in the berries a complete mortification of the effected part of the sarcocarp is observed, a network of dead fibrous tissues alone remaining, and sometimes the evil effects penetrate as far as the seed, which experiences a check in its growth, and this is manifested by the crinkled portion of its surface.

It appears that so far no efficacious means of combating this destructive disease has been discovered in this country, In some localities the coffee trees have been cut down to the ground, the shade got rid off, suckers allowed to grow, &c, &c., and the results obtained do not allow us to deduce any precise conclusion or certain success; which could be considered as an axiom. In other parts the sick coffee tree has been allowed to go on growing, and it was noticed that the lower and older branches were attacked worst, the upper and newer ones not at all, and that from them was produced and gathered a good crop every one or two years. The application of some mineral manures has also been tried, but perhaps this operation was not performed with due care, and its results are somewhat obscure.

Considering the general causes of the development of the fungi, which may be excessive dampness, little evaportation, special temperature, abundance of nitrogenous material, &c, a system of treatment might be formed, taking also into calculation *los fondamentos aceptables de los medicaciones anteriores.*

Nothing can be done during the rainy season; but let us hope that at the approach of the dry weather thediseased patches will begin to revive, and then we should proceed in the following manner:—

If the plantation should become too dense and with too much shade, the drains must be slightly enlarged and the excess of shade be taken off the trees; if there are places liable to be overflowed the necessary drains must be cut, and lastly, during the beginning of summer and after the weeding of all the infected portions, a mixture of flower of sulphur and caustic lime must be sprinkled in the proportion of one part of the first to three of the second, and in a quantity of 150 to 200 grammes as a medium dose to each coffee tree. It is very probable that in this way would be destroyed all or nearly all of the spores of the fungus, which had lived aud resisted without any injury the season of dry and hot weather. If it is thought that the effects of the treatment are not satisfactory, the application of sulphur and lime can be repeated a second time.

As the consequences of a disease are so disastrous, that in a few weeks almost all the crops of the affected parts are lost, whose value is now-a-days so considerable, the remedy that I have suggested, whose cost is so small and its results so favourable, although it may not entirely destroy the fungus, yet it ought to be undertaken without hesitation, in view of the beneficial effects that the plants receive from the action of those substances as manures; but if sufficient faith is felt in its results, it ought to be put to the test and a plot chosen for this purpose isolated from the rest of the plantation and free of the infection, taking into calculation the prevalent winds, the relative position, &c., &c.

Let practical planters consent to clear up their estates as much as possible, lessening the shade and destroying entire lines of coffee trees, leaving the next ones standing, so as to double the width of the lanes between, and cause the action of the sun to become more powerful upon the sickly bushes. Thus, although the estate is lessened by a half and the cost of weeding is relatively increased, the probability is that the crop will not be completely lost, and that the isolated coffee bushes will grow stronger and will not sicken or will bear the disease better.

It may be said that to start a coffee estate, which should run the least risk of suffering from the havocs of the *spot*, a locality must be selected whose temperature should be 23°C. at least; a suggestion well founded, for it has been observed that in lower temperatures the fungus develops with great facility. The coffee trees should be planted at a distance of two metres with the views of obtaining crop from all during the first years, until the symptoms of the disease begin, and when that happens we must proceed to root out the alternate lines of bushes, leaving them a passage four metres in width.

As I have also seen special symptoms under shade, let it be decided to have either little or none at all, although the temperature of the place may be high. In this case, the result will be that the estate will yield abundant crops every two years, that they will generally come on with a rush, so that the planter will have great difficu'ty in gathering them and will most likely lose some, that these, crops will alternate with small yields, and finally that the estate will last relatively a short time, for after each large crop a general array of bare sticks supervenes, which compromises the life of many of the trees which have to be supplied, until it comes to the replanting of the whole estate.

Under this system of cultivation it may be said that the *spot* attacks the patches of coffee in a less degree, and that the trees are able to stand it and promptly repair the ravages which it causes, although the soil may not be of the first quality, and if it is, the disease causes the plant either very little injury or none at all.

CULTIVATION OF COCA IN INDIA.

The cultivation of Coca to supply the requirements of the Government Medical Departments in India appears to be in course of being established at the Government Cinchona Plantations at Mungpoo, Bengal. The fo'lowing correspondence on the subject has appeared in the *Proceedings* of the Agri-Horticultural Society of India, January—March 1893:—

J. GAMMIE, Esq., Acting Superintendent, Cinchona Cultivation, Bengal, to the SECRETARY TO THE GOVERNMENT OF BENGAL, Financial Department, Government Cinchona Plantation, Mungpoo, Kurseong.

May 20, 1892.

Sir,—With reference to your office endorsement, No. 92, dated 6th January last, and your reminder, dated the 14th instant, concerning the manufacture of cocaine at the Government Cinchona Plantation, Sikkim, I have the honour to state that no experiments during the past year were made, as there are as yet no leaves to work upon.

During the year the stock of plants and cuttings has been raised to 3,600, of which 1,270 have been planted out at an elevation of 2,000 feet above the sea, and ground is now being got ready 600 feet lower down for another experimental plot. So far the plants look healthy, but their growth is slow, and they suffer somewhat from the cold in winter. There is but one old plant of *Erythroxylon Coca* on these plantations, all the others being 18 months old or less, and few of them over a foot in height, so that some time must elapse before leaves are available for manufacturing purposes on even an experimental scale. A few seeds of the plant have been got from Ceylon, Madras, and Calcutta, and the plants raised from them show at least two distinct types. These types will be carefully watched and compared with each other as regards hardiness, rapidity of growth, and yet of alkaloids.

A few Coca plants have been put out in different places by tea planters in the Darjeeling Terai, but I am given to understand that although the growth has been good, the leaves are so thin in texture that the yield in weight is not encouraging, and the prices offered have been so disappointing that no extensions are being made, which is perhaps an extra reason for the Government persevering with the experiment on these plantations. I have, &c., (Signed) J. GAMMIE, Acting Inspector.

Military Department, Government of India, Fort William, December 20, 1892.

EXTRACT paragraph 30, of a Military (Stores) Letter from the Right Hon. the Secretary of State for India, No. , dated the 24th November 1892.

"30. The information contained in the enclosure to the paragraph under reply regarding the cultivation of the Coca plant for the manufacture of cocaine in India has been noted. With regard to the letter from the Acting Superintendent, Cinchona cultivation in Bengal, No. 2EC/L, dated 20th May 1892, it has been ascertained from Surgeon-General Sir Benjamin Simpson, K.C.I.E., that the fine sample of Coca leaves referred to in Dr. Macnamara's Report of 7th March 1890, a copy of which was forwarded to your Government with Military (Stores) Department, No. 19, of 10th April 1890, was grown in the Meenglas Tea Estate in the Dooars. It is, therefore, thought that the plant would flourish equally well, and perhaps better, at a lower elevation than the Sikkim Cinchona Plantation, and it would appear to be desirable to make the experiment." By order, &c. (Signed) J. M. KING-HARMAN, Colonel, Deputy Secretary to the Government of India.—*Kew Bulletin.*

CEYLON COCA LEAVES.

In the *Kew Bulletin*, 1889, pp. 1–13, an exhaustive account was given of the Coca plant, together with some interesting chemical notes respecting the yield of alkaloids obtained from the different sorts under cultivation in different parts of the world. It was shown that leaves from the Huanuco, *Erythroxylon Coca*, Lam., the typical plant, yielded the larger percentage of crystallisable cocaine, while the Truxillo leaves from *E. Coca*, var. *novo-granatense*, yieldednearly, if not quite, as much total cocaine, but a large proportion of it was in an uncrystallisable form. Under these circumstances, it was suggested that the broad-leaved typical *Erythroxylon Coca* was better for general cultivation at high altitudes to yield crystallisable cocaine; but that the variety *novo-granatense*, distributed largely from Kew up to 1889, was better suited for cultivation at low elevations, to yield large crops of leaves "for use in pharmacy and for Coca wine."

Leaves of the typical (Huanuco) *Erythroxylon Coca* were received from Ceylon in 1888, and the best were found to yield 0·60 per cent. of crystallisable with no uncrystallisable alkaloid cocaine These leaves had been grown at Dolosbage, at an elevation of 2,300 feet.

We have recently received from Dr. Trimen, F.R.S. Director of the Royal Botanical Gardens, Peradeniya, a further supply of Ceylon Coca leaves, and these are of the Truxillo sort, and probably yielded by *Erythroxylon Coca*, var. *novo-granatense*. They were grown at the Henaratgoda Gardens, in the lowlands of Ceylon. These leaves were submitted to Mr. Alfred G. Howard, F. C. S., F. L. S., who has been good enough to furnish a result of his analysis. The dried leaves yielded crystallisable alkaloid, 0·56 per cent.; uncrystallisable alkaloid, 0·47 per cent ; total, 1·03 per cent. The total yield of alkaloid is larger than in any leaves examined by Mr. Howard in 1888 (see *Kew Bulletin* 1889, p. 8), but the large proportion of uncrystallisable alkaloid fully agrees with the general character of Truxillo Coca.

The following correspondence gives further particulars respecting these Ceylon Coca leaves:—

MR. ALFRED G. HOWARD TO ROYAL GARDENS, KEW.

Stratford, near London, E., June 6, 1893.

Dear Sir,—I now have the pleasure to enclose the analysis of the Coca leaves you sent me on May 1st, as follows:—

Crystallised alkaloid ...	...	0·56 per cent.
Uncrystallised alkaloid ...	...	0·47 ,,
Total ...		1·03 ,,

You will notice that the amount of uncrystallised alkaloid is large, and therefore would detract largely from their value from a commercial point of view. I am sorry that I have not been able to let you have the result before, but I only finished it yesterday, as I was exceedingly busy all last month.

Yours, &c. (Signed) ALFRED G. HOWARD.

John R. Jackson, Esq., A.L.S.

MESSRS. BURGOYNE, BURBIDGES & CO. to ROYAL GARDENS, KEW.

16, Coleman Street, London, E.C., July 25, 1893.

Dear Sir,—In reply to our favour of the 21st, inst., I cannot give you a very favourable report of the position of coca leaves at the present moment. Stocks in London, Liverpool, and on the Continent are large, and the demand at present is very slow. Good green Truxillo leaves are held for 8½d. per lb., and fair Huanuco range from 1s. 4d. to 1s. 6d., according to quality. I remain &c. (signed) H. ARNOLD.

John R. Jackson, Esq., Royal Gardens, Kew.

THE COST OF LABOUR IN PERAK.

The information supplied to us by Mr. A. B. Stephens, the Assistant Indian Immigration Agent at Perak, with regard to the cost of labor in the Straits will be perused with interest by many here. For all practical purposes the dollar may be taken at the equivalent of two rupees, so that 25 cents of a dollar is about the same as 50 cents of a rupee. This will enable our readers to follow what Mr. Stephens says on the subject. According to him Mr. Wm. Forsythe was inaccurate in stating in our columns "that a Tamil cooly gets from 30 to 35 cents of a dollar per diem." He receives a little over 17 cents in the case of the statute or indentured cooly, and 25 to 30 cents in the case of the free cooly. Mr. Forsythe was no doubt referring to the latter, and, inasmuch as the price of labor seems to vary according to the distance from "anywhere"—as Mr. Stephens puts it—in all probability he spoke of the price in the particular district which he had prospected for planting purposes. At the same time we are pleased to hear that indentured labor is to be had at as low a rate as 17½ cents per diem, equal to, say, 35 cents of a rupee; but we should like to have some information as to the ability of planters to obtain such indentured labor. If its cost is so much less than free labor, how is it that planters employ the latter? It can only be that indentured labour cannot be had in abundance or is unsatisfactory. The lowest price quoted for free labor by Mr. Stephens is 25 cents, say 50 cents of a rupee, for a day's work—a rate which the Ceylon tea enterprise could not afford to pay for a single day.

Sir,—Some little time back I think in January, there appeared in the *Penang Gazette* a copy of a letter from your paper, which had been written by Mr. W. Forsythe, giving a description of a visit which he paid, together with Mr. Fort, to Perak. What I wish to point out to you is that the labor question is easier solved than Mr. Forsythe would lead one to suppose when he says "A Tamil cooly gets from the planter 30 to 35 cents of a dollar a day, just double the rate given to a Ceylon labourer. The average cooly receives 9$ to 10$ a month and grumbles at that." As I am interested in statute immigration I would like first to give you the cost of the labour of statute immigrants, who are brought into this State under a three years' agreement and under the protection of the Government.