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CACAO PLANTING

IN

CEYLON,

WITH HINTS AS TO THE BEST
VARIETIES TO BE CULTIVATED:

BY

^{James}
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OF

BLACKSTONE AND UKUWELA ESTATES,

CEYLON.



COLOMBO :

A. M. & J. FERGUSON.

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Cacao (Cocoa) Planting in Ceylon.

A LECTURE DELIVERED AT MATALE
ON THE 30TH JUNE 1888,

BY

Mr. J. H. BARBER.

It is not my intention to devote this paper to the consideration merely of such cultural details connected with cacao planting as may be readily gleaned by reference to that most valuable publication, the *Tropical Agriculturist*, or any manual treating on cacao cultivation generally, but to raise for future discussion at our Agricultural Association, as far as the limited scope of this paper will permit me to-night, some of the vexed questions connected with the cultivation of this product, on which it would be desirable to have the experience of planters—facts that should be more generally known and more generally discussed: although they may be within the knowledge and experience of managers of the older and leading estates of the Island. Indeed this want is one that can be easily supplied by an institution such as the Matale Agricultural Association, with the experience that its members have already gained in cacao cultivation. By meeting here frequently, and discussing agricultural matters, not only will

benefit accrue to us individually and directly ; but in the end it will follow that we shall, by promoting the cultural industries of Matala, help materially to the prosperity of a part of the Island which holds great potentialities, and is waiting only for enterprise and capital to develop its resources. With its rich soil and forcing climate, there is no tropical plant that cannot be cultivated here. Cacao, tea and coffee as articles of diet ; pepper, cloves and nutmegs as spices ; and even the costly tobacco and the rare vanilla find a home here, while the graceful areka palm, shading the humble homestead of the poor villager, flourishes here with a luxuriance that is matchless.

In such a district as this, at a happy moment the idea appears to have suggested itself to the promoters of the Agricultural Association to call it into existence. And it is now left with us to make it really useful, and subservient to our best interests, by making the fullest use of our opportunities.

We can also, I think, always rely on the ready support of the Government, and of those who will, from time to time, be connected with our Royal Botanic Department. The desire to support the planters in the colonies is a feeling not merely confined to the incumbents of our local garden in the Island, but one that emanates from higher quarters ; in fact, from the very fountain-head at Kew.

In a letter addressed to the Colonial Secretary of Jamaica by the Director of the Botanical Department there, dated 28th October 1884, I find embodied the views of the Director at Kew, as regards the West India Islands, which have more than a local bearing, and

which convey encouragement to all colonists alike; showing how keenly alive he is to the necessity of publishing information and of promoting new Industries.* These are his suggestions:—"In addition to distributing plants, there might be organised at the Central Institution a regular system of botanical bulletins, containing practical hints as to the treatment of economic plants, and the conditions under which they might best be utilized as objects of remunerative industry.

"There is no doubt a great want felt in the West Indies for reliable information on the culture of new economic plants; and to ensure success it will be necessary not only to supply seeds and plants, *but also carefully compiled and plain practical hints as to the means to be employed for rendering them of the greatest value.*"†

These are the views of Mr. Thiselton Dyer, now Director. We in Ceylon cannot say that this want is not felt by us here also at times: and that the Botanical literature of the Colony, although extensive and varied, is all-sufficient for our wants. There are occasions, indeed, when we do wish for more information and more help. It was only last week that I was travelling with a Matale planter who, speaking of tobacco culture, told me that he intended going all the way to Sumatra, for want of sufficient information here. I daresay the Director of the Royal Botanic Gardens, who has given this subject his attention already, will feel it his duty to give

* Kew Bulletin for June 1887: Botanical Stations in the West Indies, p. 7.

† Italics are mine.

t fuller attention now, and also to afford us hints regarding the curing of the leaf. I will refer to another instance. How many planters are there in Ceylon who cultivate cubebs (*Piper cubeba*)? We all grow pepper here at Matale, and there is no better district for it than this; and cubebs grow where pepper grows.

In 1885 the price averaged for cubebs was 77/6 per cwt.; then it came down for a while, and in 1880 it went up again. Since 1880 the price has steadily gone up, and good genuine cubebs in 1886 realised £20 to £22 per cwt. But who grows it? you ask. In Java small plantations are specially devoted to cubebs. *They have also been latterly cultivated by European planters on coffee estates.** But I fear our getting this variety of pepper is a difficult matter. Dr. Trimen was written to by me for this plant about a year ago. He had not then the plant to give me, and his reply was not by any means calculated to encourage me as regards its cultivation, owing to the fluctuations in price. Here it ended, although I was prepared to give anything in reason for seed or plants, to start it in Matale.

The next reference to it that I find is in his report, which I shall read to you:—

“It is by no means easy to obtain the true *P. cubeba*, which is a plant very little known and indeed very imperfectly understood, even by botanists. Several other plants approach it very closely, and even at Kew the cultivated plant hitherto believed to be *P. cubeba* and figured by me under that name in 1877 has since been determined to be another

* Kew Bulletin, Dec. 1887. Italics are mine.

species." And so it has. It has been proved to be *Piper chaba*, Hunter, or *Chavica officinarum*, Miquel, belonging to the long pepper group.*

The learned Doctor, however, gives us the comforting assurance that he is now endeavouring to obtain seed from Java, stating that hitherto the difficulty was due to the cultivation being in the hands of the natives. I shall give you his very words:—"I am now attempting to get ripe seed from Java. But it appears to be difficult to obtain this from the natives."

It will be found that much of the information contained in this part of the report of Dr. Trimen is drawn from the Kew Gardens Bulletin for Dec. 1887, from which I have just read to you, and from this you will perceive, if the bulletin be correct, that the cultivation is not now entirely in native hands. And we may now be said to be in a fair way towards getting this much-prized variety of pepper, in, say, another eighteen months or so. It is matter for great satisfaction and rejoicing to know that we shall shortly be in the running with our luckier neighbours at Java; although the full period of ten years will have elapsed, when we begin growing this pepper, from the date at which cubebs began "going up in price steadily" (1880). And one is casually reminded of the time consumed in the siege of Troy; in the early history of warfare, before the invention of gunpowder, and the knowledge of steam and electricity. This merely as a coincidence.

I have referred to these facts to shew you how necessary it is for us to devise means, by concerted

* Kew Bulletin, Dec. 1887.

action, to help each other, and the Government ultimately, in developing the resources of our Island.

With these preliminary remarks I shall proceed to the subject I have chosen for discussion today.

We need not wait to inquire where cacao will grow in Ceylon, and where it will not.

Everyone knows that it will not grow in Nuwara Eliya; and that it does grow in Uva on the one side; and on the other side from Dolosbage down to sea-level, embracing Peradeniya, Dumbara, Matale, Kadugannawa, Rambukkana, Polgahawela, Kegalla, Veyangoda and so on down to Colombo, and even Negombo. I obtained some pods from that district, not long ago, sent to me by Mr. F. Driberg, which were remarkably fine of their kind. But it may not be generally known that about thirty or thirty-five years ago there were cacao trees flourishing in Colombo. I remember, among my earlier recollections, seeing two trees growing in Small Pass, Colombo, bearing freely and flourishing for a long time. This was in a property owned by Mr. John Van Dort of the Surveyor-General's Office, father of the Artist and of the Doctor, both so well known in Ceylon. I also remember a tree in Kalutura, standing not far from the Post Office. This tree has stood there for many years, yielding heavy crops.* And all these, as far as my recollection serves me, were the original type that was long after shipped to London from Rajawelle and Pallekelly. Indeed, if it were otherwise, it would have been noticed earlier.

* I have been told that it is still there, and it is said to be over 50 years old. [There is a fine old tree on Keenakella estate, Badulla, flourishing at 4,000 feet above sea-level. There are also very old trees at Hanwella and Kalutura.—Ed.]

A question that very naturally presents itself to the cocoa planter, at the very threshold, is one regarding the selection of seed for planting his estate with; as the commercial value of the future crop and the profits accruing to the enterprising planter will be determined by the variety selected by him.

We have of late all taken up the cry of "*Forastero*" neglecting the much-prized so-called *Caracas*, which gave Ceylon cacao such a reputation, as soon as it went to the London market. How far we shall suffer hereafter when all Ceylon estates take to shipping the coarser variety in large quantities can be only a matter of conjecture just now; but this much is clear, that we seem to be actuated by the idea that cocoa being such a paying concern, we can afford to be content with even less for our crops, so long as we can grow some sort of cacao with a little more success, and with a little less risk than heretofore. Indeed, we could be quite content with the old red pod that was universally planted in Ceylon at first, but for its extremely delicate habit, and the difficulties attending its successful cultivation.

We have, after years of experience, thought it desirable to neglect this variety for the *Forasteros*, just as the West Indian planters, in their day, went from the one to the other for the same reasons.

With what material advantage to individuals and to the Colony we are adopting this sweeping change time alone can show, with heavier shipments of the *Forastera* from our quay; though I suspect there are many here who would still prefer the neglected old red pod, if they only had the choice of land. But much of our best land is in the hands of the Sinhalese villagers as gardens, or has been ruined

by chena cultivation. Talking of chena cultivation and the ruin to land, let me pause here to remark *en passant* that I fear this will be the fate in reserve for the lands taken up extensively for tobacco cultivation: if it is cultivated here as in Sumatra; and if timely measures are not adopted by the Foresters and the Legislative Council to conserve our forests for more permanent cultivation. The native tobacco planter in Jaffna,* Negombo, and other places, with the aid of heavy manuring, keeps his land always cultivated. But the planter who asks Government for a 1000 acres is likely to take the cream of the land from, say, a 50-acre block at a time, and pass on to the next block of 50 acres or more, and so on, abandoning the previous clearing; and well he may, after paying Government a nominal R10 per acre, and netting the splendid profits that tobacco is said to return.

But while we congratulate the individual who makes the most of his bargain in the shortest space of time, no one can regard such a system of cultivation as an unmixed blessing to the Colony; which has not after all an *unlimited extent* of land suitable for cultivation.

A system such as this, while it blesses the receiver, who flourishes on the accumulated wealth of the forest, hoarded up for him for centuries past, can hardly be said to bless the giver—the Colony, should acre after acre, tract after tract, and district after district be opened up, harvested and abandoned, as the chena cultivators did before. The absence

* In Jaffna sheep are penned and fed on land cultivated with tobacco.—Ed.

of that permanence in the cultivation of each and every acre of land in the Island that is opened out, which is a condition essential to its *continued* well-being, cannot fail to tell on its prosperity ultimately. Every such clearing will be a blow at the root and foundation of its agricultural permanence.

To return to the subject in hand, with good cultivation and abundance of shade, the so-called *Caracas*, or red pod variety, continues to flourish in many places that I know of, and in one little place that I own myself, paying very fair returns and bringing high prices for their crops.

One argument advanced in favor of the new varieties is that the attacks of *helopeltis* can be better resisted by the *Forastero*, with its thick pericarp or husk to protect it. But I have seen this fastidious bug, which evinces such partiality for the food of gods, quite indiscriminating in its attentions, when it narrows down to a question of variety only.

You will all remember how this bugbear created a panic among planters a few years back; and the report by Mr. J. R. Martin of Yat'ewatte, to the Planters' Association in 1885, where he stated his conviction that "the scare which was raised by the discovery of its devastations was altogether unjustifiable." About that time I visited an estate at Kadugannawa, fully planted with *Forasteros*, belonging to Mr. Ferdinandus of the Royal Botanical Gardens, Peradeniya, a Sinhalese gentleman of much botanical experience, from his long connection with the gardens, and withal a practical planter.

When I went there, his coolies and conductor were employed in burying his entire season's crop

for manure, under the very trees that bore it: so virulent was the attack. But it has all blown over now, and no one speaks of the mosquito bug seriously.

Now, the question is: if it is essential to our safety that we should grow *Forastero* and not *Cardcas* (I will call this variety *Carácas* for distinction), is there any particular variety, or more than one, out of the many we have, that can take the place of this so-called Ceylon *Cardcas*, of such unquestioned excellence? Now the *Forasteros* are admittedly a coarse variety; and their beans cure darker than the *Caracas*. They cannot be said to have the same commercial value.

I know, for a fact, that of the many West Indian samples that were sent to me from "Mincing Lane," by my agents some years ago, of cocoas that had just then passed the hammer, the *Caracas* stood away from the rest in price. And this was a bright small bean like ours.

Further proof of the superiority of our red pod appeared in a report from Messrs. Rucker & Ben-craft as far back as 1881, when shipments from Ceylon were beginning to attract attention in the Lane. The *Observer* noticed it specially, and gave it prominence at the time:—

"One little parcel of Ceylon marks Amba and Palli fetched the fancy prices of 100s to 100s 6d. This cocoa is much liked; it has the true rose color, and the husks are light and fragile."

So that if the common red of Ceylon is not the true *Cardcas* botanically, it still ranks in commerce as its equivalent from Ceylon.



If we can now only obtain such a variety of cacao as will combine the excellence of the *Caracas* with the hardy habit of the *Forastero*, this will be the variety to be fixed upon for general cultivation. It is well known that we owe our best flowers and vegetables to the skill and care of seedsmen, who devote their closest attention to hybridisation—a study that has for a long time engaged the attention of the naturalist, and one now systematically practised by the gardener as a means of plant improvement. We are told that “the first apples planted in America by the earlier colonists retrograded, until the fruits were no better than ‘crabs.’ Now their apples are equal to any in the world.” (Paper read by Mr. Pink of the Botanic Gardens on the hybridization of plants, before the Royal Society. See *Tropical Agriculturist*, April 1885.)

At the last Autumnal Show of the Royal Horticultural Society, there were exhibited no less than 125 sorts of that homely vegetable, the potato; of these, 47 were produced by one firm alone, of which 27 were already introduced by them among their constituents. I daresay you are aware that a tomato has now been produced by Sutton & Sons which can be grown in the open, in England, as it is grown here. (Sutton's Catalogue for 1888.)

But just in the same way that we have obtained by chance hybridization valuable varieties of cinchona and tea, it is possible that later on we may obtain varieties of cacao, better than those we have; though I am inclined to think that we have already certainly one variety (although there may be more) of great value for future general cultivation. The *Forastero*, known commonly as the pink *Forastero* is,

I think, undoubtedly a hybrid. It is a noteworthy fact that while some of its seed share with the *Forastero* in color, there are others quite white, like the Ceylon common red (so-called *Cardcas*)—others again are neither quite purple nor white, but shaded pink or violet. This diversity exists sometimes in the same pod.

I remember shewing this singular phenomenon to some brother planters, at the last Matale Exhibition, who had not noticed it before.

You will all remember the magnificent pods that came from "Gonambil" estate; it was there among them. I think it worth our while collecting information on this subject. If a separate sample of this can be cured by those who have enough of it, and have the same valued, it would add to our information, materially.

A Matale planter, Mr. Purdon, writing to me the other day on cacao, also makes reference to a variety that he has, as one which he considers to be a superior sort of *Forastero* or a variety of *Cardcas*. From what appears in the letter, I presume it to be a hybrid of much value, whether it is the same that I am talking of or not.

Here is his letter, which I think will be of interest in our investigation, as fresh evidence from an unexpected source on the same question:—

"The pods are not *Forastero*—so says Dr. Trimen—but pink or yellow (I forget which) *Cardcas*. The former is, naturally purple in the bean, but these ones are, or were, all, white when out across. Many, once white, are now purple, having hybridized, but that does not seem to have affected their commercial

value, because they retain the bright golden color outside, when cured. The ordinary *Forastero* usually cures dark."

Talking of this pink *Forastero* variety as a specially fine one: about 18 months ago, when I was collecting seed for the "Ukuwela" nurseries, I was strongly urged by a friend of mine, who was an advocate for another variety, to come over to the plantation under his management,—which was one of our older plantations—and see how well his own favourite variety did. He had been all along supplying me with the pink *Forastero* (which I shall, for the sake of distinction, here call the hybrid variety). Well, I drove down to the plantation one morning, and after we had examined carefully the two varieties, it appeared to me that the hybrid had another advantage, quite apart from the question of quality, over the favourite variety of my host, which was the *Maravilla* or green long pod. By way of test I took a number of average-sized pods of each variety, and proceeding to the office, took out the seeds of the respective pods and weighed them separately. We also weighed the husks, and it was then found that relatively, in proportion to the weight of husk, there was a preponderating weight of seed in the hybrid over the *Maravilla*. In respect to the seed contained in each pod also, we found that the hybrid weighed more than the *Maravilla*. The *Maravilla* contained the larger number of seed; which again gave the advantage to the hybrid in size of bean, which enhanced its commercial value.

Now this variety that I am talking about, it may be of importance to know, is not to be found in the group of *Forasteres* at the Peradeniya Botanic

Gardens. These came into the Gardens from Kew in November 1880, and I have watched them ever since with the greatest interest.

It must also be mentioned that the pink *Forastero* hybrid I am speaking of was then with me, at my little property in Dumbara. This was a plant obtained by me from Mr. Ferdinandus from his own garden. He, in the year 1875, received from Mr. Wm. Rollo, the visiting agent, and for sometime manager of the Ceylon Company, Limited, one of two cases of plants that were brought out from Trinidad. A dozen plants were successfully brought to bearing by Mr. Ferdinandus, all foreign, and different from the common red cacao, and one of these turned out to be the cacao known to many of us now as the pink *Forastero*, and which I conclude to be a hybrid between a *Forastero* and a true *Caracas*. Pods from this tree were sold by Mr. Ferdinandus ever since, year after year, to many planters. And I believe Wariapola, as well as the Dumbara estates, obtained this variety from him, as I did myself afterwards.

I now come to the details of the nursery. There, are various ways of making nurseries, but I have found the following mode the safest, and the cheapest in the end. Two ordinary half round tiles, tied together with a bit of coir rope. These make a pot fully a foot long, giving both taproot and laterals ample scope to establish themselves. But the principal advantage is that in the transplanting, the plant can be placed in its future home, without the slightest molestation. The tiles are withdrawn one after the other, and sent away to cover your bungalow or store, or extensions in your cooly lines. Thus your pots cost you nothing in the end. I

planted about 75 acres last year, and over a 100 this year in this way, and not a single plant was lost, except what was chargeable to the omnivorous white ant, and he is one of the most formidable enemies that the cacao planter has to contend with. If he is omnivorous, he may be said to be also ubiquitous; and his working hours spread over the entire day, and the night as well. He works with an unflagging industry; and his name is Legion. To destroy or to circumvent this unrelenting foe, has been the fondest wish and prayer of every cacao planter that I ever met. But to no purpose; you may clear the ground of all the twigs and branchlets; you may even sift your soil, as I did for the nursery; but you will not exclude his presence. He attacks your plants when he has no twigs to fall upon; and where the ground is strewn with a plentiful supply of rubbish, he then seems to turn in a spirit of mischief, or from sheer fastidiousness, to your much-prized plants of *Forastero* (from pods purchased at R25 per 100!)

The white-ant has no doubt his own special mission on earth: that perhaps of speedily converting twigs and rootlets and waste and dead matter into soil for the agriculturist; just as Darwin tells us the humble earthworm supplies us with so many tons of mould per acre per annum.

But all the same it is terrible to see, after your best endeavours to destroy this enemy, or to beat him off for a time, how he returns to the charge; rising superior to all your devices, and getting back to his mission, with a sense of duty, that is quite exemplary. Only that he is out of his legitimate sphere of usefulness when he attacks living matter.

Now there are one or two things which do not seem to possess special attractions for the white ant, and the neighbourhood of which he appears to avoid. One of these is said to be kerosine; and kerosine and water is used in some places regularly.

But as the oil and water can only be said to mix mechanically, it is likely to follow, when the mixture is poured round the plant in a circle, that the water will gradually filter into the soil, leaving the oil globules more or less on the surface. As the white ant works down to six or eight inches below the surface, very often, it is doubtful whether this will answer as well as it is expected to. Information on this subject from those who have tried it may be of value.

A very good thing is found to be phenyle; a tar product which has the quality of being thoroughly soluble in water, and is a reliable insecticide. It can be mixed safely in a hundred parts of water, and applied at the rate of about three oz. to the plant. Its cost is about six rupees per gallon, and the cost of application per acre including phenyle may be said to be about 50 cents.

The poonac of the *kekuna* seed is another cheap remedy; and it is plentiful in the villages. Its odour is strikingly offensive; and white-ants keep clear of it.*

The sawdust of jak wood, mixed with the soil, round about the roots, has also been known

* Mr. Barber has told us in conversation recently that this is by far the best remedy. The *kekuna* is a tree with beautiful silvery leaves cultivated near native houses for the sake of the oil-yielding nuts. Thwaites gave its botanical name as *Canarium zeylanicum*.—Ed.

to protect the plant; but with all these appliances one has to watch the plantation for the first two years with the closest attention and care.

The next important question is the one regarding shade. Now, although cacao can only be grown here successfully under shade, yet there is a period up to which it is found best to grow it in the open. They not only grow quicker; but with sunshine any light they grow more robust. There are times, however, during long droughts, early in the year especially, just after the N. E. monsoon rains have passed away, when one feels anxious. But it is worthy of notice that at "Ukuwele" my plants in the open survived the last drought without trouble, while plants near about trees that had been spared in the clearing needed all the attention we could give, to save them. The explanation may be that large trees absorb so much moisture themselves, that the little plants suffer more under them and near their roots, than elsewhere, from drought alone. But where there is dense shade from trees, all over a plantation, this is not the case; as the thick carpet or covering of decaying and fallen leaves preserves the moisture in the ground, while the exclusion of sunshine checks its rapid evaporation. But under dense shade, little plants take a very long time to attain maturity, and then they are attenuated and spindly in habit. It is therefore best to clear your ground entirely, and after planting your cacao, to plant your shade.

A tree we all know to be used in the West Indies for this purpose is the *Erythrina umbrosa* or "Immortelle." But we have our Ceylon variety; the *Erythrina indica*, or *erabadu*, which is at our doors, and seed of which the village boys will collect for you for a

few cents. This I found to grow at "Ukuwele" quite nine feet in one year, at some places. Dr. Trimen strongly recommended me this variety, when first the question of shade was being discussed. The *Erythrina lithosperma* or "dadap" is also said to be a very useful variety, and seed of it can now be obtained in Ceylon. But I must not omit to notice a reference to this variety by the editor of the *Tropical Agriculturist* in May 1885:—"Nothing which I saw of the 'dadap' in Java impressed me favorably—quite the reverse indeed—and when I was in the Dutch Island at the latter end of 1881, the planters had transferred their love for it as a shade tree to the luxuriant but brittle *Albizzia moluccana*."

In the meantime, at distances of say about 36 feet apart, where we plant cacao 12 feet apart, it will be found convenient to put in jak for shade. There are many advocates in this and other districts who stand by the jak; although there are some who do not like it. In 1881, Mr. John Drummond, writing from Gangwarily, said: "I find the jak tree answer capitally." And many other cacao cultivators, including Mr. Ross of Kawudupelelle, have proved it a fact. We have also recently introduced into Ceylon the *Albizzia moluccana*. And I planted it in Ukuwele last year among my cacao. But this year when I went there to supply my last year's failures, I found that the *moluccana* had taken entire possession of the field, and was master of the situation. The cocoa holes in its neighbourhood, to an appreciable distance, were so completely filled with its roots, that the new plants of this year would not have had a chance, while those of last year, close by, appeared to be languishing and holding back; so the edict went

forth, and they were all ruthlessly cut down, to make room for the generous shade of the *Madre de cacao*—*Erythrina*—a foster mother truly, under whose spreading arms cacao flourishes best.

I have been asked what I thought of the plantain (*Musa sapientum*) as a shade, in the early years of cacao. The banana, we are told, is used for this purpose in the West Indies; and in Ceylon, in one or two places, the plantain has been tried with advantage to the cacao. But where there is other shade that can be quickly grown, I would not employ the plantain. The one argument that is advanced in its favor is that it is not a profitless cultivation; inasmuch as its fruit may bring in returns for a couple of years. But against this there is, *per contra* in your account, the exhaustion of good soil which should be saved on your estate, as much as possible, for the product that is going to be a permanence; and which, when it is fifty years old, may be said to be still in its prime. Besides, when after a few crops of plantain, you decide on rooting the bushes up, and set about it, you will find the cost a far heavier item than you reckoned at first, as the bulbs will keep growing for ever if you do not get rid of every particle.

It has been pointed out that the plantain fibre may have a sufficient market value to justify looking more closely into the question.

I have considered this matter too, and fear it does not offer a sufficient inducement just now; unless indeed a paper mill is started in Ceylon.

The fibre industry has had some attention paid to it in the West Indies; and it was found that the

plantain yielded in one place 1·81 per cent, and at another 2·25 per cent of fibre on the gross weight; and the fibre may be said to be worth about £15 per ton. There is a plantain (*Musa textilis*) out of which the manilla hemp is obtained, which is worth about £40 per ton. Regarding the plantain being used for paper making, Dr. King, Superintendent of the Royal Botanic Gardens, Calcutta, says: "I have ascertained by reference to a large English paper-maker that if it can be delivered cheap enough, fibre would be readily bought for paper making." (Kew Bulletin, April 1887.)

But we need not wait to inquire into this question further just now. The plantain, suffice it to say, is not only known to exhaust the soil, but I have heard from a high authority that its roots leave in the soil certain acrid matter, positively injurious to vegetation.

So while we copy the example of the West India planters in some matters, it may be well for us to exercise our own judgment in others, and to be guided by that best of masters, one's own dearly-bought experience.

I must leave the subject here for the present, as the paper has been, I fear, longer than I intended it at first.



APPENDIX OF USEFUL REFERENCES.

The production of Cocoa has not only greatly diminished in Venezuela, owing to the perpetual civil warfare prevailing, but its quality has materially deteriorated owing to the introduction into the country of seed, commonly termed "Trinitario," from the Island of Trinidad, which, although infinitely more prolific than the native seed, produces a bean somewhat bitter in taste, and very inferior as regards essential oil and richness of flavour to that produced from the latter. The difference between the two can indeed be detected at once by the most casual observer, and the scale of prices at once confirms it.

Ineffectual efforts were made to guard against the deterioration of the native cocoa, enjoying so high a reputation in foreign countries by the introduction of the Trinidad seed, to the extent of a proposition being made by the Minister of the Interior and Justice to the Congress in the year 1850, that any person detected in introducing the same into the eastern ports of the Republic in constant communication with the Island of Trinidad should be subjected to corporal chastisement.—*Simmonds' Tropical Agriculture.*

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In Trinidad, the high cultivation bestowed up on the native seed has improved its original nature; and in the Gulf of Paria and other places where

it has been cultivated for many years, it has improved so as to be almost equal to the "creole" or Venezuelan cocoa, a result owing entirely to the superior quality of the land, and the improvement of the seed from the lapse of time, the cultivation being of the most simple description.—*Ibid.*

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The first quality cocoa (which is almost entirely absorbed by the Spanish and French markets, whilst the inferior qualities go to England and Germany) is produced almost exclusively in the coast districts, being thus termed commonly "Cocoa dela Costa." The seed within the pod, of a rich dark-brown colour, being larger, richer, and of a more oily quality than that produced anywhere inland. The "Cocoa mezclado," or mixed cocoa, is that grown upon estates where such of the original first-class "Oriollo cacao" trees as may have died out, have been replaced by others raised from Trinidad seed; such amalgamation somewhat depreciates the quality of the produce, notwithstanding that a decided improvement in the quality of the Trinidad seed has been attained in some districts, owing to the favourable nature of the soil. The best or first quality was fetching in the close of 1875, thirty-five to forty Venezolanos (dollars) per fanega of 112 lb.; the second quality twenty to twenty-five Venezolanos the fanega; and the third, termed "Trinitario" (the seed having been originally brought from the Island of Trinidad), only sells at from twelve to eighteen Venezolanos per fanega. This Trinidad cocoa came in favour some years ago on account of the more robust nature and greater productiveness of the plants, but is now universally held to be of an



- inferior quality.—Mr. Middleton's Report on the Commerce of Venezuela, 1875.—*Ibid.*

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The introduction of Trinidad seed has doubtless had a bad effect upon the reputation of "*Caracas*" cocoa, but the conviction that is daily gaining ground of the unadvisability of introducing the "*Trinitario*" on the one hand, and on the other the great improvement that takes place in the bean produced from the seed in the lapse of time, led me to conclude that the period is not far distant when '*Caracas*' cocoa will have re-established its good name.—Contribution of Mr. Anderson, owner of cocoa estate in the "valleys of Barlovento."—*Ibid.*

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The Surinam Cocoa is the ordinary yellow sort, and is planted everywhere. In a cocoa-field many different varieties of cocoa, sometimes even as many as twenty, are found. The best sort, however, is the so-called porcelain cocoa, distinguished by a thin, smooth shell, and the fullness of its beans.

The red *Caracas* sort is rarer than the ordinary yellow sort. The difference between these two is considerable. The *Caracas* sort shoots up more vigorously and luxuriantly, displays more growth, flourishes more exuberantly, and bears a greater quantity of fruit than the indigenous species; it bears also much better the vicissitudes of the seasons. *Caracas* cocoa long preserves its properties in fields where it is planted alone; but planted between the indigenous, it degenerates and assumes the properties of the common sort. The first seeds of *Caracas* cocoa were brought hither (Surinam) by the Governor, R. F. Van Raders, in 1845 or 1846, no not more than

40 years ago—E. J. Bartelink, Cacao Planter at Paramaribo. (Translated from the Dutch by H. J. Vogin.)

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The best quality irrespective of treatment is produced by the Criollo cocoa of the Spanish inhabitants, who almost monopolize this cultivation, and it is getting scarce. The pods are smaller than those of the better varieties of other kinds, but the seeds are thicker, shorter, and almost globular. The interior of the seed is of a pale, crimson, toning down into pink, and the taste slightly bitter.

The *Forastero* kinds are here much prized; there is the Cundeamar of two kinds, one with yellow, and the other with red pods. The former are sooner fit for drying; it has the largest seeds, which are easily fermented and prepared. They are of a pale crimson, approaching the Criollo.

The Amelonado comes next, and then the Calabacillo, which is the lowest kind; its seeds are small and very bitter, and the crimson pigment is so dark that it is very easily distinguished from the other varieties by this mark alone.—*Simmonds' Tropical Agriculture*.

JAS. H. B.

