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MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No. 781 Press Mis.

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Not to be folded or roughly handled

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

17th May 1881, No. 781.

Read the following papers :—

No. 255. From Colonel R. H. BEDDOME, Conservator of Forests, Madras, to the Secretary to Government, Revenue Department, Madras, dated Ootacamund, 21st April 1881, No. 62.

In forwarding the correspondence as per margin, I have the honor to inform you that I have lately seen the Santa Fè and Carthagena Chinchona plants, and as I consider them well established, it can now hardly be necessary to retain Mr. Cross's services solely for looking after these plants. I am not aware whether it is contemplated to employ Mr. Cross on any other duty, or to give him any charge in connection with the Chinchona.

1. Letter from Major Jago to the Conservator of Forests, No. 22, dated 13th April 1881.
2. Letter from the Superintendent, Government Gardens, to Major Jago, No. 14, dated 11th April 1881.
3. Letter from do. to do., dated 11th April 1881.
4. D.O. letter from Mr. R. Cross to Major Jago, dated 7th April 1881.

Enclosure No. 1.

Letter from Major R. S. JAGO, Deputy Conservator of Forests, in charge Chinchona Plantations, to Colonel R. H. BEDDOME, Conservator of Forests, Madras, dated Ootacamund, 13th April 1881, No. 22.

With reference to G.O., No. 328, dated 21st February 1881, I have the honor to enclose copy of a letter from Mr. Cross, reporting on the condition of the C. Santa Fè plants. A copy of Mr. Jamieson's report on the C. Carthagena plants is also enclosed.

2. As the sanction accorded by Government in the above order to the retention of Mr. Cross's services expired on the 8th instant, I have the honor to request that you will be good enough to obtain the early orders of Government as to whether his services are to be retained any longer.

3. You will perceive from the enclosed copy of Mr. Jamieson's letter that he is willing to take charge of the Santa Fè plants should Government decide to relieve Mr. Cross of the charge.

Enclosure No. 2.

Letter from R. CROSS, Esq., to Major R. S. JAGO, Deputy Conservator of Forests in charge, dated Government Gardens, 7th April 1881.

In reply to communication with date of 6th of this month, received this morning, I beg to state that the original three Santa Fè plants are doing very well and making quite satisfactory growth. Besides these there are twelve cuttings several of which are rooted, the remainder in course of rooting. Some of these cuttings are uncommonly small, and possibly there may be one or two casualties among them, but I have no doubt the majority will, with care, become plants.

The collection of plants just as they are would be regarded as perfectly safe in a London nursery. At the same time it might be well for me to look to them for five or six months longer.

I beg, however, to state that even with treble the number of plants grown up and planted in the plantation, I would hesitate to pronounce the Santa Fè plants as *supremely perfectly safe*. This simply owing to the way cattle have been allowed to roam about in the plantation.

In all portions of forests in South America inhabited by the finer species of Chinchona trees to which cattle obtain access, the young bark, plants and saplings disappear in the most amazing and unaccountable manner.

ENCLOSURE No. 3.

Letter from A. JAMIESON, Esq., Superintendent of the Government Botanical Gardens, to Major R. S. JAGO, Deputy Conservator of Forests in charge, Chinchona Plantations, Ootacamund, dated Ootacamund, 11th April 1881, No. 14.

IN reply to your letter, No. 7, of the 6th instant, I have the honor to inform you that the Chinchona Carthagena plants are in a healthy and satisfactory condition. The stock at present consists of five rooted plants and eighteen cuttings, some of which will be rooted in a few days and the others by the end of the current month.

ENCLOSURE No. 4.

Letter from A. JAMIESON, Esq., Superintendent of the Government Botanical Gardens, to Major R. S. JAGO, Deputy Conservator of Forests in charge, Chinchona Plantations, Ootacamund, dated Ootacamund, 11th April 1881.

WITH reference to your letter, No. 8, of the 6th instant, I have the honor to inform you that I am quite willing to undertake the care of the Chinchona Santa Fè plants, at present in Mr. Robert Cross's charge, until they are sufficiently established and increased in number to be handed over to the Head Overseer, Dodabetta Plantations.

No. 256. From N. A. ROUPELL, Esq, Acting Commissioner, Nflgiris, to the Secretary to Government, Revenue Department, Madras, dated Ootacamund, 28th April 1881, No. 53.

I HAVE the honor to forward in original a report* from Mr. Robert Cross on the Government Chinchona plantations on the Nflgiris, and to submit thereon the following remarks.

* Enclosure I.

2. It is very satisfactory to learn that some of the Condaminea trees at the bottom of the ravine on the Botanical Garden side of the Doddabetta plantation are considered by Mr. Cross as equal in appearance to anything of the kind he has seen in the Loxa forests. Mr. Cross remarks that in places it would have been well had twice the original number of trees been planted. The profuse seeding of many of the trees was noticeable. This is attributed to the nature of the situation and the arid aspect. This undue drain upon the strength of the trees would probably be much mitigated by higher culture.

3. Attention is invited to defects in the coppicing system as practiced at Doddabetta, especially as regards the too early and too extensive removal of the young growths, and the cutting of the trunks too near the ground.

4. The formation of terraces to prevent injury to the trees by wash during the rains had been taken in hand some time prior to Mr. Cross's inspection and has been marked by beneficial results, the condition of the trees having much improved. The terraces made have, I think, been as a rule no larger than was necessary to meet the object in view.

5. Mr. Cross's suggestion that the cultivation of the Pitayo species should be more carefully and extensively taken up should be acted upon if the good quality of the bark is matter either of certainty or of reasonable expectation. The analysis of selected specimens from the existing trees should settle any doubt regarding its excellence.

Since writing this paragraph I observe that according to Dr. Paul's Chinchona analysis printed in Government Proceedings, No. 1,336, dated 23rd June 1879, the crystalized quinine sulphate from the natural bark of this species stood at 2·02 per cent.

6. Mr. Cross next proposes what should be done in the case of decaying trees which are by no means of rare occurrence. I would, however, mention that I learn that many of such trees have presented this appearance of decay for years past, in the course of which they have again and again been operated upon. Of late the appearance of several has greatly improved under a liberal manuring.

7. I do not quite follow Mr. Cross in his observations upon additional plantings and the formation of underwood. "That vacant spaces should be filled up seems obvious. But it is not to me clear why "these annual plantings should, after a time, so accumulate and become so thick as to form a sort of underwood which * * * would yield a good deal of quilled bark of fair quality from occasional thinnings," or why "a planter in order to have his plantation in thorough good condition for producing, should, on going through it, be literally wading through a growth of underwood." The quill bark thus obtained would, as Mr. Cross says, be of "fair" quality. The object however is to secure the best quality possible: quantity is quite a minor consideration. Government Renewed Crown bark has sold as high as 17*s.* 8*d.* per lb., and it appears to me that renewals should, so far as possible, be of the same character as the growth which produces the richest results known. Such results have been obtained from trees and not from underwood. Neither do I understand how the mere filling up of vacant spaces could produce such a dense growth of underwood unless either more trees were planted in the course of the renewal than originally existed or, if the numbers were the same, unless the renewals were coppiced. Again, I fail to see why, "if the coppicing system be adopted, it will always be of the greatest advantage to have an abundant supply of sapling growth." In the earlier stages of coppicing the advantage of numerous shoots is intelligible as explained by Mr. Cross under the head "Coppicing," in which, however, he distinctly states that when the necessity for mutual protection no longer exists the young growths should be judiciously thinned.

8. Under "Collecting of seed of Condaminea," Mr. Cross offers some important remarks. His suggestions for obtaining the very best description of seed especially deserve notice. In connection with this subject, I would beg leave to express my opinion that the most certain and effective method of securing plants of superior quality has not been kept in sight, or at least has not been steadily pursued. The most successful Chinchona grower in Nflgiri, Wynaad and indeed in this district, Captain W. T. Hody Cox of Cherambadi, stated to me, when visiting his estate last January, his opinion that, in the present state of our knowledge of Chinchona and with careful attention, the production of a bark bearing 10 per cent. of alkaloid could be relied upon. Captain Cox's plantation contained a large number of the Ledgeriana variety which will only grow at low levels, 2,000 to 3,000 feet. But he had a high opinion of the Condaminea variety and thought that nearly, if not quite, as good results could be obtained from it.

9. His method was to select with the greatest discrimination trees which gave indications of especial healthiness and vigour; to give them high and careful culture, having originally chosen for them the site best fitted from the character of the soil, aspect and sheltered position. A faithful history was kept of each such tree and seed was taken only from the richest alkaloid producers. The plants reared from such seeds were in their turn subjected to similar selection and the most promising received the special treatment above indicated. This system, if in fact carried out at all in the Government Gardens, appears never to have been taken up with anything approaching the continuous systematic care shown by Captain Cox. Its importance cannot, I think, be over-estimated.

10. Mr. Cross calls attention to the necessity of cutting off the panicles of seed with which many of the young trees are loaded, as these undoubtedly tend to retard growth. I may here add my own experience of how tangibly and visibly the growth is hereby retarded. I observed that, save in the case of the larger ones, it was the rule to find that boughs upon which the seed had fully ripened had died back, commonly right up to the stem of the tree. The seeding had exhausted the strength of the boughs. The period, therefore, at which the panicles are removed is an all-important point. They must be picked off in the early stage of their formation, for when the panicle has once set and the seed is on the way to maturity the harm has been done.

11. The amount of seeding this year at Doddabetta was very profuse but, I was told, not unusual. Mr. Cross remarks the effectual remedy for diminishing too free

seeding is closer planting. I will venture to suggest that the effect of high cultivation will be in a similar direction.

12. The desirability of improved propagating houses will doubtless be acknowledged and the want supplied.

13. Mr. Cross's description of the Red bark plantation at Naduvatam is gratifying. This species, however, is of comparatively small value as an alkaloid producer and especially at the Naduvatam level. In Captain Cox's plantation at Cherambadi the yield of alkaloid from this variety is much higher. Its vigour of growth at Naduvatam is however remarkable, and coppicing and other experiments may yet show a very superior return to any yet given there. But, at the best, it can never be expected to compare with the Condaminea. It would seem from the memorandum which formed the enclosure to the Secretary of State's despatch published in Government Proceedings, No. 1,395, dated 25th October 1880, that this species finds so little favor in the Home market that it is more advantageous, as a rule, to sell it than to extract the alkaloids on Government account. The Secretary of State has lately decided in favor of retaining these plantations.

14. Mr. Cross's remarks (under "The Calisaya Bark") upon the effect of grafting deserve careful perusal. I would invite attention to his statement regarding the comparative value of trunk and branch barks, in connection with the views I have advanced in paragraph 7 *supra*.

15. The concluding remarks in the enclosures sufficiently explain themselves. I will only say that the question of the advisability of retaining the "Wood" and "Hooker" Estates may finally be now considered.

ENCLOSURE.

Letter from ROBERT CROSS, Esq., to N. A. ROUPELL, Esq., Commissioner of the Nilgiris, dated Government Gardens, 13th January 1881.

IN accordance with the desire expressed in the Government Order, with date of 25th October 1880, I beg to state that I have examined the Chinchona plantations and now take the liberty to submit a few remarks on the general appearance and condition of the principal sorts cultivated therein.

The Dodabetta Plantation.—The first plantation visited by me was Dodabetta. This, according to Captain Walker, contains 226,936 trees, being mostly of the Crown Condaminea or Loxa bark. There is in addition 48 plants of an important species known as Pitayo bark which has not been cultivated.

On ascending from the Government Gardens the road, after a short distance, leads up the bank of the Dodabetta ravine, on both sides of which Condaminea trees are planted. The oldest portion of the plantation is that which fringes each side of the road, having been planted in 1863. These trees, it appears, have been subjected to the renewing process by moss and have been barked several times. On examining the trunks of several, some portions of decayed heartwood which had not been covered over by renewed bark was noticed, though this circumstance may not be a feature in the barked trees generally throughout the plantation. I observed that any little pieces of old bark left on the trunks of these trees were very thin, so that, manifestly, when any injury results to the wood the tree lives chiefly on the bark. At the bottom of the ravine there were some very fine well-developed trees presenting the most perfect form and appearance of the best specimens of this bark tree I saw in the Loxa forests. On ascending the opposite bank the soil is often shallow with bare rocky places and stony debris, and over a great portion of this slope the plantation presents a painfully thin, arid aspect, and where the trees have been wrought, I fear over ten per cent. are not in the best condition. But those trees which have not been barked, although stunted, owing to the conditions just noticed, are sound and healthy, though from the nature of the situation many have been induced to a profuse state of seeding. This circumstance has had a further effect in retarding the growth of the trees. The fact is that in this locality especially the plants at the beginning have been placed far too wide apart; indeed, as a general rule, twice as many plants should have been planted all over the plantation. On some of the more prominent brows and heights it would have been better had Blue gums been put down, but now that the bark trees are there established a more prosperous state of growth would be produced by additional plantings. In any case I would not advocate the rooting up of any portion. On crossing the Dodabetta ridge, I found the trees on the opposite slope generally very healthy, and this feature was conspicuous all the way down to the jail. The deposit in this part of the plantation would compare well with that of any of the forests in South America yielding the Condaminea, Pitayo or Soft Columbian barks. The surface is

usually composed of a deep layer of rich old vegetable loam readily absorbing the rain as it falls and slowly parting with its moisture, which even in the steepest places very gradually oozes or trickles downwards without any appearance of the rills or torrents producing the "wash" incident to deposits of a different character.

Coppicing.—A piece of land above the jail to the extent of ten acres has recently been coppiced as an experiment. Possibly one acre might have proved sufficient for illustrating the object in view. The young growths from the stools have all been removed with the exception of two, and had all these been allowed to grow up together for some time mutual protection during high winds would have been afforded, and subsequently, by judicious thinning, a more fair estimate of the value of the coppice system might have been obtained. I may remark that the trunks have been cut too low indeed down to where the primary roots divide, whereas in all cases of coppicing from 4 to 5 inches of the trunk or collar should be left, as from this portion the strongest and most vigorous shoots push and develope sooner. The crowns of the stools have been properly smoothed, but these instead of being cut flat as has been done in this case, should, in large trees, be left in the form of a very short wedge, or in the case of saplings one single short-sloping cut is sufficient.

Formation of Terraces.—Respecting the terracing of Chinchona land I may take the liberty to express my opinion that if the trees have been planted previous to the formation of the terraces a very modified form of terracing similar to that of a potato drill running exactly in the line of each row of trees across the slope to prevent the formation of rills or streamlets would be all that would be necessary. This course, however, might be adopted only on the steepest slopes and where there is an absence of spongy vegetable mould to absorb the rain as it falls. Moderately sloping land or undulations possessing a turfy surface soil are in my opinion better without terraces.

The Pitayo Bark.—The Pitayo trees, 48 in number, growing near the jail have not been multiplied. It appears this sort was considered to be of slow growth or that it yielded an inferior bark, though I find no actual proof on the latter head. The tree may not be so prolific as the Crown bark, but when it is considered to attain a height of 80 feet with a trunk from 3 to 4 feet in diameter it appears to me worthy of a fair trial should the bark prove of good quality. I can assert with the greatest confidence that the 48 trees growing beside the jail at Dodabetta are in the most robust state of health, indeed several of these are pushing stronger and more luxuriant shoots than any I have seen of similar size at Pitayo. By selecting sheltered sites with good fertile soil and by devoting a little more care and attention to its early cultivation I see no reason to doubt of this tree being successfully cultivated. Captain Walker in his enumeration of the stock plants of this sort in the propagating houses at the Government Gardens gives the number as 7,000, but he has been totally misinformed.

There are not six plants fit for planting out and only a few pots of weak cuttings.

Decaying Trees in the Plantation.—I beg to call attention to the occurrence of trees in various parts of the plantation in a more or less advanced state of decay. When trees are thus allowed to die the bark afterwards becomes worthless. It appears the person in charge cannot cut down or uproot one of these trees without the express order or permission of Government. I would suggest that when a tree is seen to exhibit signs of decay it should be carefully examined and treated accordingly. If the decay is limited to the branches these should be cut back or pruned as may be necessary. But if the trunk was seen to be affected—and this would often be found to be the case—then the roots should be closely examined, and if any unsound roots were found it would be best to uproot the tree at once. If, however, the roots were fresh and healthy by far the best course would be to cut the tree down, or in other words to coppice it.

Injury caused by Cattle.—I observed at the head of the Dodabetta ravine that cattle had been treading about a good deal in various parts. It ought to be known that any description of cattle, goats, &c., frequenting land devoted to the cultivation of trees, plants or crops do far more injury than is generally perceived. I used to calculate when travelling in South America that the rearing of pigs by the natives cost them at least eighty times more than their marketable value owing to the way these animals are allowed to run about.

Hybrid varieties of Crown and other Barks.—As regards the varieties of Crown bark, of which notices from time to time have appeared, I have not been able to see one single authentic instance. It might indeed be said that no two trees in the Dodabetta plantation are alike. The Condaminea, although a hardy prolific species, is extremely sensitive to the variable conditions of soil, moisture and exposure, and on this account the tree presents a more or less luxuriant habit of growth and foliage accordingly. The "Angustifolia," "Lanceolata," "Crispa," &c., &c., are simply the pure Condaminea. But that known as Pubescens and specially claimed as a hybrid, is a narrow-leaved variety of Red bark from South America. Not unfrequently it may be seen at Naduvatam among the first planted trees there. It was called *Pata de Gallinaso* by the South American bark collectors, while to the broad-leaved variety of Red bark they gave the name of *teja* or "tile" bark. Both of these varieties appear to be sold and cultivated under the name of Pubescens; but whatever may be the commercial value of the bark obtained from either it is certain that the climate of the Nilgiri sholas is not adapted for their full development as they

naturally require a lower elevation. There is not a particle of the character of the Condaminea in the sorts sold as Pubescens.

Additional Plantings and the formation of Underwood.—In order to maintain the full growth and vigour of the plantation it seems to me the best method would be to go over it annually and fill up the thinly-planted or vacant spaces with good strong plants. In this way an abundant supply of young trees to take the place of occasional failures is insured. These annual plantings should after a time so accumulate and become so thick as to form a sort of underwood which, besides shading and preserving a moist surface, would supply young saplings to run up where wanted and in addition yield a good deal of quilled bark of fair quality from occasional thinnings. A planter, in order to have his plantation in thorough good condition for producing, should, on going through it, be literally wading amongst a growth of underwood.

If the different classes of bark obtainable from a plantation managed in this way were wrought to the greatest advantage the yield, I am convinced, would be astonishing. Such a system of bark cultivation would be more applicable to the Condaminea than to the Red bark. It could not of course be developed in one season, but with diligence might in good sholas be in operation in a very few years. I make these remarks simply in this light that, whether the renewing or coppicing, or whatever be the system of bark-producing followed, it will always be of the greatest advantage to have an abundant supply of young sapling growth coming up in a plantation.

Collecting of Seed of Condaminea.—In order to possess a supply of good seed either at the Government or private plantations, a small clump of trees should be set apart for this purpose and rather widely planted in a favorable situation where the plants would have the benefit of full sunshine and plenty of air. For the Nilgiris the elevation should not be less than 7,000 feet. When the capsules or seed-fruit are about half grown each bunch or panicle should be gone over and all the small fruit thinned out. By this method seed of the very best description would be procured. Throughout the plantation generally, I think it would be well to cut off the panicles of seed with which many of the young trees are loaded as these undoubtedly tend to retard their growth. The effectual remedy, however, for diminishing too free seeding is closer planting.

On the whole, I am glad to be able to testify to the generally healthy state and good condition of the Dodabetta plantation so zealously and industriously attended to by Narrainasawmy, the Head Overseer.

The propagating houses attached to the Botanic Garden and partly used for raising young stock for the plantation as well as for the garden are chiefly "lean-to" tile roofed structures with sky-light windows here and there, and for the purposes of propagation are little better suited than a shoemaker's garret. Down below in the Botanic, only a short distance away, there is a large three-ridged conservatory enveloped outside with hardy climbers, whilst the majority of the plants inside would, in my opinion, do equally well without any covering whatever. Possibly the glass of this conservatory might be utilised in roofing over the propagating houses or erecting others in convenient localities.

Examination of Naduvatam Plantation.—On the 7th, 8th and 9th of December, I examined the Government Red bark plantation at Naduvatam, which occupies the debouch of a ravine towards the plains of Wynaad. The number of trees in this plantation, according to the report of Captain Walker, amounts to 208,780, the majority being of the Red bark species, although there are also a good sprinkling of Condamineas. The soil is an excellent deep yellow friable loam quite equal I would say in fertility to the lower slopes of Chimborazo, the native habit at of the Red bark. The tree here, in the general appearance of vigour, growth and development, equals, and in fact excels, those I have seen growing in South America. It is true the success of Red bark plantations everywhere in the East has become proverbial. Planters from different parts of India assured me "it rushes up like a weed" "it grows up and gives us no trouble." The renewing process for obtaining bark here is the same as that followed at Dodabetta, only straw is mostly employed for covering the trunks instead of moss. The most disappointing feature about Red bark is its inferiority for the purposes of the quinine manufacturers. The Condaminea, scattered throughout the plantation, appear to grow up quickly and tolerably robust, though not so much so as in some of the Nilgiri sholas. One thing I noticed, and that is, that the trees do not possess the vitality of those of Dodabetta. On endeavoring to procure a sample of old bark from the base of the trunks I had to go from one tree to another, as every tree examined had more or less decay, a fact to which Mr. Hillier, who came over to Naduvatam, was also a witness. At the same time if Naduvatam was thickly planted over with Condaminea and carefully managed it would, I am convinced, yield annually a prodigious quantity of bark of good quality. For such an enterprise the employment of seed from the higher sholas would be preferable.

The Calisaya Bark.—The Calisaya bark, of which there appears to be several varieties at Naduvatam, has been the victim of a sad mistake; I knew what was wrong with these Calisaya plants the moment I saw them. They have been planted at an elevation of 1,200 or 2,000 feet too high. Down somewhere in the Wynaad, the proper climate would have been found. The plants are mere broom bushes and no method has been taken to ascertain the merits of the

different varieties. Lately we have been told of a planter who has "imported a man to graft Calisayas," but neither will this at too high elevations prove successful but rather the contrary. The fact is no one who knows anything about the principle of grafting would graft Chinchona trees even at the proper elevation, that is, if such trees are intended for producing a large crop of good bark. Grafted trees would grow into a spreading bushy head of branches, for the tendency of the operation is to diminish or prevent the development of the trunk. Then branch bark is to a positive certainty always inferior in quantity and quality to bark derived from the trunk. In addition to this, grafted trees are short-lived. The only thing that could be urged in defence of grafting is that the trees would come into flower sooner and produce seed more abundantly. At the same time all Chinchonas when fairly treated and planted at the proper elevation seed perfectly in India. For the successful cultivation of Calisaya it is only necessary to go down to a warmer locality. I think it not improbable that the Calisaya has been planted at too great elevations both on the Himalayas and in Java. Apart from this subject the value of the different varieties is doubtful and ought to be determined. With the assistance of Mr. Rowson, the Superintendent, I was enabled to obtain a sample of one sort. Of the others it was impossible to obtain fair samples, by which means a just estimate might have been formed of their value on analysis.

Pykara Hooker Plantation.—I made a brief examination of this estate reported by Captain Walker to contain 87,557 trees.

Both Condaminea and Red bark have been planted, but the elevation is decidedly too high for the latter. There are one or two good pieces of Condaminea, but generally speaking the plantation is in a wrecked, ruinous state and overgrown with grass and portions of it are quite vacant. It is impossible to say it is exemplary in any way. The soil is invariably good, but the plantation is out of the way and isolated, and I think it is a pity that any plants were put down at this place. The "Wood" plantation is situated on the opposite side of the Pykara river, and is chiefly planted with Red bark. Everybody said it was worse than the Hooker Estate, so I did not go to see it.

Concluding Remarks.—I will now make a few general remarks respecting the plantations and the sorts cultivated therein.

The Red bark, as also the Condaminea, seems to be sufficiently well known and widely planted, and so does not call for any special remark.

But the Calisaya bark, although introduced at the same time as these sorts, has not as yet become an established plant commercially. As there appears to be several varieties of this tree, some reported inferior while others are considered valuable, I would beg to suggest that the various varieties of this species at Naduvatam be noted, cleared of grass and brushwood, and properly and thoroughly cultivated, so that ample growth may be induced to afford samples of each. When these can be had, a sufficient quantity of bark of each sort could be collected and sent to a quinine manufacturer, who would no doubt be able to indicate the comparative value of each variety. If it was then thought necessary a site for a plantation might be sought for at a lower elevation for the cultivation of the best variety of Calisaya. There still remains two sorts of known value, the Pitayo bark, ten years here but never to any extent propagated or cultivated, and the Soft Columbian or Santa Fè lately introduced. It might be well to put down a number of these two kinds among the Condamineas in the most sheltered fertile places of the Dodabetta site, and in addition one or two of the best neighboring sholas could be added to the plantation and planted entirely with Soft Columbian in order to fully develope the cultivation of this valuable bark. It is probable that either of these species would also do well at Naduvatam, for the assertions that have been made that the Pitayo will not succeed there have made no impression upon me. At the same time I wish it to be clearly and emphatically understood that for permanent sites for such sorts as the Crown Pitayo or Soft Columbian I would always prefer the higher sholas of the Nilgiris.

Looking to the inferior position that Red bark occupies in the market it may be a matter of consideration whether Government would propose to retain permanently the Naduvatam and Pykara Estates. This, too, owing to the expressions of opinion which have been given that the Government is competing with private planters. Regarding this point I may assure planters and others that I consider they are mistaken. It may be so to some extent respecting Druggist's bark. But for bark suited for the extraction of quinine the South American market is the source that planters really have to compete with as yet. A gentleman well acquainted with the bark trade lately assured me that the East supplies only about 2 per cent. for the manufacturers, so that there is a wide field for the private planter. But in order that every one be thoroughly successful the very best species—and these are now in India—must be cultivated. And not only this alone, but to produce the best description of bark which these sorts can yield is the supreme aim that every one must stedfastly have in view. Following in this course those who cultivate bark on the Nilgiris need fear no competition from South America, Ceylon, Java, or anywhere else.

No region of country in the East possesses, in my opinion, such a magnificent and perfect field for the cultivation of the various commercial products of tropical America as does Southern India. The Nilgiri plateau, 50 miles in length with its deep sholas on the crown, and running

down both sides, affords numerous excellent sites for the cultivation of bark trees, while the densely wooded humid tracts spread along the base of the Western Ghâts present a choice field for the growth of the Cocoa tree and India Rubber.

In making those statements I do not do so on mere book information. Brought up in a rural district we were early acquainted with the principles of agriculture and afterwards went through the whole course of forest planting, seed raising, and propagation of all classes of plants and trees. On commencing to travel in the Spanish Republics we were able to acquire amidst other occupations and duties a knowledge of the various modes pursued in the cultivation of the different kinds of Cocoa, likewise the picking, classifying, and curing of tobacco as practiced by the best Spanish planters. In addition to these our experience extends to the forest life of bark-collecting in nearly every bark region of South America, and also the tapping or bleeding of India Rubber trees. I make these remarks to show that the assurance given as regards the adaptability of these trees to Southern India is based on a practical acquaintance with their habits and other circumstances in the distant regions in which they grow.

I have given no opinion on the various methods adopted of taking the bark from the trees, thinking it best to await the analysis of the samples, 30 in number, collected with the permission of Government and already forwarded to your office.

Whilst awaiting the results of the analysis I may at the same time remark that no one need be greatly surprised if notwithstanding all that has been said that Renewed bark is *not* the richest in quinine. As far as I can judge the ingenious "scraping" or paring process of the Dutch is manifestly not so injurious to the tree as the renewing plan, though it seems to me that less bark would be obtained by the "scraping" method. But of the renewing system one thing appears to me certain, which is that when once a tree has been operated on it is placed for the future on crutches and must always remain so, and will require to be wrought after the same manner as long as it lives.

The three Soft Columbian plants originally brought out and formerly briefly reported on, have, considering all things, progressed fairly well and four young cutting plants obtained from them are in process of rooting. All these are likely to do well. Two of the largest plants have been recently placed in a position to enjoy some artificial heat so as to accelerate the growth of shoots suited for propagation in order to increase the stock as quickly as possible. Cuttings will now drop in.

I must, however, remark that the propagation of the Soft Columbian in an extensive way will be found to be by no means an easy task to any one, owing to the bad state of the hot-houses and flues and to the filthy state of the inside of these houses from slugs, beetles, spiders, insects and mould. Nor even after the plants are rooted and planted out in the beds will their preservation be an easy matter on account of the cattle and goats which feed around and find their way into the cultivated plots. These things demand remedial measures.

Now that the product of these plantations has become a regularly established article of the export trade of India, I think it would be well in all communications when making mention of this commodity to employ the word "bark," a term which a child can understand and which has been in use since its first introduction from America. It appeared to me ludicrous to see the Auctioneer at Mincing Lane—an Englishman in the Capital of his native country—selling off the South American product as "bark" and then afterwards on turning over the leaf saying "Chinchona, yes, East Indian Chinchona," thus disposing of the same article under two names.

In conclusion I trust that these observations may meet with the approval of the Government.

No. 257. ORDER THEREON, 17th May 1881, No. 781.

Miscellaneous.

THE Right Honorable the Governor in Council regrets that Mr. Cross's interesting report on the Government Chinchona Plantations should have been detained so long in the Commissioner's Office. The paper will be forwarded without further delay to the Secretary of State and copy will be furnished at the same time to the Conservator of Forests for information and for any remarks he may wish to offer. Colonel Beddome will take the necessary steps for carrying out Mr. Cross's suggestions.

2. The reports on the Chinchona Plantations are scarcely so favorable as the Government had hoped to receive; but still there is much in them that is encouraging.

3. Adverting to the Conservator's letter recorded above, His Excellency in Council does not think it desirable to dispense with Mr. Cross's services at present. The least neglect or carelessness might prove fatal to the C. Santa Fè plants, and the Government accordingly resolve to retain Mr. Cross on the same terms as hereto-

fore till after the south-west monsoon is over. The change of season is so great that every precaution is desirable in regard to plants which have been obtained at such cost of trouble and money.

4. The Commissioner's attention will be drawn to Mr. Cross's remarks upon the propagating houses attached to the Government Gardens. Their condition, as described, is very discreditable and should be at once remedied.

(True Extract.)

(Signed) C. G. MASTER,
Secretary to Government.

To the Conservator of Forests.
„ the Commissioner of Nilgiris.
„ the Accountant-General.

Exd. W. H. French.

50 Copies.

15-6-17.
23-11-16.

Govt. of {1881} Madras.

REVENUE.

To

THE CONSERVATOR OF FORESTS,

&c., &c., &c.

Dated May 17th.

Printed 28th.

Read. Encl.

G.O., 17th May 1881, No. 781.

MAY.

Nos. 255—257.

SUBJECT.

Mr. Robert Cross's Report on the Government Chinchona Plantations, Nilgiris.—Passing orders on letter from Conservator of Forests and Commissioner of the Nilgiris relating to —.

Ecle ent. 5-922/81.

11

Enclosure I to
letter from Commissioner
Nilgiris No. 53 dated
28 April 1881. —

Report by Robert Cross
On the Government Cinchona
bark, Plantations at
Dodabetta and Naddivattum.

3/1/81.

To
W. A. Campbell Esq.
Commissioner
Nilgiries.

Sir,

In accordance with the desire expressed in the Government Order, with date of 25th October 1880. I beg to state that I have examined the Cinchona Plantations and now take the liberty to submit a few remarks on the general appearance and condition of the principal sorts cultivated therein.

The Dodabetta Plantation.

The first plantation visited by me was Dodabetta. This according to Captain Walker contains 2 & 6,436 trees being mostly of the Crown Condaminea & Ova barks.

There is in addition 4 & 8 plants of an important species known as Pitayo bark which has not been cultivated.

On ascending from the Government Gardens the road after a short distance leads up the bank of the Dodabetta ravine on both sides of which Condaminea trees are planted. The oldest portion of the plantation is that which fringes each

side of the road having been planted in 1863. These trees it appears have been subjected to the renewing process by moss and have been barked several times. On examining the trunks of several some portions of decayed heartwood, which had not been covered over by renewed bark was noticed though this circumstance may not be a feature in the barked trees generally throughout the plantation. I observed that any little pieces of old bark left on the trunks of these trees was very thin so that manifestly when any injury results to the wood the tree lives chiefly on the bark. At the bottom of the ravine there were some very fine well developed trees presenting the most perfect form and appearance of the best specimens of this bark tree I saw in the Loxa forests. On ascending the opposite bank the soil is often shallow with bare rocky places and stony debris and over a great portion of this slope the plantation presents a painfully thin arid aspect and where the trees have been brought I fear over ten per cent are not in the best condition. But those trees which have not been barked although stunted owing to the conditions just noticed are sound and healthy though from the nature of the situation many have been induced to a prosperous state of seeding. This circumstance has had a further effect in retarding the growth of the trees. The fact is that in this locality especially the plants at the beginning have been placed far too wide apart indeed as a general rule twice as many plants should have been planted all over the plantation. On some of the more prominent brows and heights it would have been better had blue gums been put down. but now that the bark trees are there established a more prosperous state of growth would be produced by additional plantings. In any case I would not advocate the rooting up of any portion.

On crossing the Dodabetta ridge I found the trees on the opposite slope generally very healthy and this feature was conspicuous all the way down to the jail. The deposit in this part of the plantation would compare well with that of any of the forests in South America yielding the Condaminea Pitaya or soft Columbian barks. The surface is usually composed of a deep layer of rich vegetable loam readily absorbing the rain as it falls and slowly parting with its moisture which even in the steepest places very gradually oozes or trickles downwards without any appearance of the rills or torrents producing the "wash" incident to deposits of a different character.

Coppicing

A piece of land above the jail to the extent of ten acres has recently been coppiced as an experiment. Possibly one acre might have proved sufficient for illustrating the object in view. The young growths from the stools have all been removed with the exception of two and had all these been allowed to grow up together for some time mutual protection during high winds would have been afforded and subsequently by judicious thinning a more fair estimate of the value of the Coppice system might have been obtained. I may remark that the trunks have been cut too low indeed down to where the primary roots divide whereas in all cases of coppicing from 4 to 5 inches of the trunk or collar should be left as from this portion the strongest and most vigorous shoots push and develope sooner. The crowns of the stools have been properly smoothed but these instead of being cut flat as has been done in this case should in large trees be left in the form of a very short wedge or in the case of saplings one single short sloping cut is sufficient.

Respecting the terracing of Cinchona land I may take the liberty to express my opinion that if the trees have been planted previous to the formation of the terraces a very modified form of terracing similar to that of a potato drill, running exactly in the line of each row of trees across the slope to prevent the formation of rills or streamlets would be all that would be necessary. This course however might be adopted only on the steepest slopes and where there is an absence of spongy vegetable mould to absorb the rain as it falls. Moderately sloping land or undulations possessing a turfy surface soil are in my opinion better without terraces.

The Pitayo Bark.

The Pitayo trees 48 in number growing near the jail have not been multiplied. It appears this sort was considered to be of slow growth or that it yielded an inferior bark though I find no actual proof on the latter head. The tree may not be so prolific as the Crown bark but when it is considered to attain a height of 80 feet with a trunk from

3 to 4 feet in diameter it appears to me worthy of a fair trial should the bark prove of good quality. I can assert with the greatest confidence that the 48 trees growing beside the jail at Dodabetta are in the most robust state of health indeed several of these are pushing stronger and more luxuriant shoots than any I have seen of similar size at Pitayo. By selecting sheltered sites with good fertile soil and by devoting a little more care and attention to its early cultivation I see no reason to doubt of this tree being successfully cultivated. Captain Walker in his enumeration of the stock plants of this sort in the propagating houses at the Government Gardens gives the number as 7,000 but he has been totally misinformed. There are not 6 plants fit for planting out and only a few pots of weak cuttings.

Decaying trees in the Plantations

I beg to call attention to the occurrence of trees in various parts of the plantation in a more or less advanced state of decay. When trees are thus allowed to die the bark afterwards becomes worthless. If appears the person in charge cannot cut down or uproot one of these trees without the express order or permission of Government. I would suggest that [illegible] or is seen to exhibit the sign of decay it should be carefully examined and treated accordingly. If the decay is limited to the branches these should be cut back or pruned as may be necessary. But if the trunk is seen to be affected — and this would often be found to be the case — then the roots should be closely examined and if any unsound roots were found it would be best to uproot the tree at once. If however the roots were fresh and healthy by far the best course would be to cut the tree down or in other words to coppice it.

Injury caused by cattle

I observed at the head of the Dodabetta ravine that cattle had been treading about a good deal in various parts. It ought to be known that any description of cattle goats &c frequenting land devoted to the cultivation of trees, plants or crops do far more injury than is generally perceived. I used to calculate when travelling in South America that the rearing of pigs by the haciendas cost them at least eighty times more than their marketable value owing to the way these animals are

allowed to run abou

Hybrid Varieties of Crown and other barks.

As regards the varieties of crown bark of which notices from time to time have appeared I have not been able to see one single authentic instance. It might indeed be said that no two trees in the Dodabetta plantation are alike. The Condaminea although a hardy prolific species is extremely sensitive to the variable conditions of soil moisture and exposure and on this account the tree presents a more or less luxuriant habit of growth and foliage accordingly. The "Angustifolia" "Lanceolata" "Crispa" &c are simply the pure Condaminea. But that known as pubescens and specially Cinnei as a hybrid is a narrow leaved variety of Red bark from South America. Not unfrequently it may be seen at Neddivattum among the first planted trees there. It was called Pata-de-Gallinazo by the South American bark collectors while to the broad leaved variety of Red bark they gave the name of teja or "tile" bark. Both of these varieties appear to be sold and cultivated under the name of pubescens but whatever may be the commercial value of the bark obtained from either it is certain that the climate of the Nilgiri Shola is not adapted for their full development as they naturally require a lower elevation. There is not a particle of the character of the Condaminea in the barks sold as pubescens.

Additional plantings and the formation of underwood.

In order to maintain the full growth and vigour of the plantation it seems to me the best method would be to go over it annually and fill up the thinly planted or vacant spaces with good strong plants. In this way an abundant supply of young trees to take the place of occassional failures is insured. These annual plantings should after a time so accumulate and become so thick as to form a sort of underwood which besides shading and preserving a moist surface would supply young saplings to run up where planted and in addition yield a good deal of quilled bark of fair quality from occassional thinnings. A planter in order to have his plantation in through good condition for producing should on going through it be literally wading amongst a growth of underwood.

If the different classes of bark obtainable from a plantation managed in this way were brought to the greatest advantage the yield I am convinced would be astonishing. Such a system of bark cultivation would be more applicable to the Condaminea than to the Red bark. It could not of course be developed in one season but with diligence might in good shape be in operation in a very few years. I make these remarks simply in this light that whether the renewing or coppicing or whatever be the system of bark producing followed it will always be of the greatest advantage to have an abundant supply of young sapling growth coming up in a plantation.

Collecting of Seed of Condaminea.

In order to possess a supply of good seed either at the Gouernment or private plantations a small clump of trees should be set apart for this purpose and rather widely planted in a favourable situation where the plants would have the benefit of full sunshine and plenty of air. For the Nilgiris the elevation should not be less than 7,000 feet. When the capsules or seed fruit are about

half grown each bunch or panicle should be gone over and all the small fruit thinned out. By this method 23
seed of the very best description would be procured. Throughout the plantation generally I think it would be well to cut off the panicles of seed, which many of the young trees are loaded as these undoubtedly tend to retard their growth. The effectual remedy however for diminishing too free seeding is closer planting.

On the whole I am glad to be able to testify to the generally healthy state and good condition of the Dodabetta plantation so zealously and industriously attended to by Varrainaswamy the Head Overseer.

The propogating houses attached to the Botanic Garden and partly used for raising young stock for the plantation as well as for the Garden are chiefly lean-to tile roofed structures with sky light windows here and there and for the purpose of propogation are little better suited than a shoemakers garret. Down below in the Botanic only a short distance away there is a large three ridged conservatory enclosed outside with hardy climbers whilst the majority of the

plants inside would in my opinion do equally well without any covering whatever. Possibly the glass of this Conservatory might be utilized in roofing over the propogating houses or erecting others in convenient localities

Examination of Neddivattum Plantation.

On the 7th 8th and 9th of December I examined the Government Red bark Plantation at Neddivattum which occupies the debouch of a ravine towards the plains of Wynaad. The number of trees in this plantation according to the Report of Captain Walker amounts to 208,780 the majority being of the Red bark species although there are also a good sprinkling of Condamineas. The soil is an excellent deep yellow friable loam quite equal I would say in fertility to the lower slopes of Chimborazo the native habitat of the Red bark tree here in the general appearance of vigour growth and development equals and in fact excels those I have seen growing in South America. It is true the success of Red bark plantations everywhere in the East has become proverbial. Planters from different parts of India assured me "it flushes up like a weed" "it grows up and gives us no trouble" The renewing process for obtaining bark here is the same as that followed at Dodabetta only straw is mostly employed for covering the trees instead of moss. The most disappointing feature about Red bark is its inferiority for the purposes of the quinine manufacturers. The Condamineas scattered throughout the plantation appear to grow up quickly and tolerably robust though not so much so as in some of the Nilgiri Sholas. One thing I noticed and that is that the trees do not possess the vitality of those of Dodabetta. On endeavouring to procure a sample of the bark from the base of the trunks I had to go from one tree to another as every tree examined had more or less decay a fact to which Mr Hillier who came over to Neddivattum was also a witness. If the same time if Neddivattum was thickly planted over with Condamineas and carefully managed it would I am convinced yield annually a prodigious quantity of bark of good quality. For such an enterprise the employment of seed from the higher Sholas would be preferable.

The Calisaya bark.

The Calisaya bark of which there appears to be several varieties at Neddivattum has been the victim of a sad mistake. I knew what was wrong with these Calisaya plants the moment I saw them. They have been planted at an elevation of 1,200 or 2000 feet too high. Down somewhere in the Wynaad the proper climate would have been found. The plants are mere broom bushes and no method has been taken to ascertain the merits of the different varieties. Lately we have been told of a planter who has "imported a man to graft Calisayas" but neither will this at too high elevation prove successful but rather the contrary. The fact is no one who knows anything about the principle of grafting would graft Cinchona trees even at the proper elevation that is if such trees are intended for producing a large crop of good bark. Grafted trees would grow into a spreading bushy head of branches for the tendency of the operation is to diminish or prevent the development of the trunk & then branch bark is to a positive certainty always inferior in quantity and quality to bark derived from the trunk. In addition to this grafted trees are short lived. The only thing that could be urged in defence of grafting is that the trees would come into flower sooner and produce seed more abundantly. At the same time, all Cinchonas when fairly treated and planted at the proper elevation succeed perfectly in India. For the successful cultivation of Calisaya it is only necessary to go down a warmer locality. I think it not improbable that the Calisayas have been planted at too great elevations both on the Nilgiris and in Java. Apart from this subject the value of the different varieties is doubtful and ought to be determined. With the assistance of Mr Corcon the superintendent I was enabled to obtain a sample of one sort. Of the others it was impossible to obtain fair samples by which means a just estimate might have been formed of their value on analysis.

Pykara Hooker Plantation

I made a brief examination of this Estate reported by Captain Walker to contain 87.0.5 trees

Both Condamineas and Pelvians have been planted but the elevation is decidedly too high for the latter. There are one or two good pieces of Condamina but generally speaking the plantation is in a wretched ruinous state and overgrown with grass and portions of it are quite vacant. It is impossible to say it is exemplary in any way. The soil is invariably good but the plantation is out of the way and isolated and I think it is a spot that ought never have been put down at all. The "Hood" plantation is situated on the opposite side of the Otta River and is chiefly planted with Red bark. Everybody said it was more than the latter entitled to did not go to see it.

Concluding remarks.

I will now make a few general remarks respecting the plantations and the soils cultivated. The Red bark as also the Condamineas seems to be suffering by well known and widely practised methods does not call for any special notice. But the Calisaya bark although introduced at the same time as the Pelvians has not as yet become

established plant commercially. As there appears to be several varieties of this tree some reported inferior while others are considered valuable I would beg to suggest that the various varieties of this species at present cultivated be noted, cleared of grass and brushwood, and properly and thoroughly cultivated, so that ample growth may be induced to afford samples of each. When trees can be had a sufficient quantity of bark of each sort could be collected and sent to a quinine Manufacturer who would no doubt be able to indicate the comparative value of each variety. If it was then thought necessary it would be for a plantation might be bought for at a lower estimation for the cultivation of the best variety of Calisaya. There still remains two sorts of known value the Pitayo bark 10 years here but never to any extent propagated or cultivated — And the Loft Columbian or Santa Fe lately introduced. It might be well to put down a number of these two Kinds among the Condamineas in the most sheltered fertile places of the Dodabetta Site and in addition one or two of the best neighbouring Sholas could be added to the

plantation and plant each with a part
Soft Columbian in order to fully test
the cultivation of this valuable tree.
It is probable that either of these species
would also do well at Neddivattum
for the assertions that have been made
that the Pilayo will not succeed there
have made no impression upon me.
At the same time I wish it to be clearly
and emphatically understood that for
permanent sites for such sorts as the Crown
Pilayo or Soft Columbian I would always
prefer the higher Sholas of the Nilgiris.
Looking to the inferior position that
Red bark occupies in the market it may
be a matter of consideration whether
Government would propose to retain perma-
nently the Neddivattum and Pykara
estates. This too owing to the expressions
of opinion which have been given that
the Government is competing with private
planters. Regarding this point I may
assure planters and others that I con-
sider they are mistaken. It may be
so to some extent respecting Druggists
bark. But for bark suited for the
extraction of quinine the South
American market is the source that
planters really have to compete with
as yet. A gentleman well
acquainted with the bark trade
lately assured me that the East

is prices only about 1½ per cent for the
manufacturers so that there is a wide field
for the private planter. But in order
that every one be thoroughly successful
the very best species - and these are now
in India - must be cultivated. And
not only this alone, but to produce the
best description of bark which these
soils can yield is the supreme aim
that every one must steadfastly have
in view. Following in this course those
who cultivate bark on the Nilgiris need
fear no competition from South America
Ceylon, Java, or anywhere else.
No region of country in the East
possesses in my opinion such a magnificent
and perfect field for the cultivation of
the various commercial products suited to
America as does Southern India. The
Nilgiri plateau 50 miles in length
with its deep Sholas on the Crown and
running down both sides affords nu-
merous excellent sites for the cultivation
of bark trees, while the densely wooded
humid tracts spread along the base of
the western Ghauts presents a choice
field for the growth of the cocoa tree
and India Rubber.
In making these remarks I do
not do so on mere book information
Brought up in a rural district and
perfectly acquainted with the

principles of agriculture and after
ment through the whole course of
planting seed raising and propog a
of all classes of plants and trees.
On commencing to travel in the Spanish
Republics we were able to acquire amidst
other occupations and duties a knowledge
of the various modes pursued in the cul-
tivation of the different kinds of Cocoa
likewise the picking classifying and curing
of tobacco as practiced by the best
Spanish planters. In addition to these
our experience extends to the forest life
of bark collecting in nearly every bark
tree of South America and also the
tapping & bleeding of India rubber trees.
I make these remarks to show
that the assurance given as re-
gards the adaptability of these
trees to Southern India is based on
a practical acquaintance with their
habits and other circumstances in
the distant regions in which they grow.
I have given no opinion on the
various methods adopted of taking the
bark from the trees thinking it best
to await the analysis of the samples
30 in number collected with the per-
mission of Government and already
forwarded to your office.
Whilst awaiting the results of the
analysis I may add for the present time

remark that no one need be greatly
surprised if notwithstanding all that has
been said that renewed bark is not the
richest in quinine. So far as I can
judge the ingenious "scraping" or paring
process of the Dutch is manifestly not
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State of the hothouses and glazed ones to the filthy state of the inside by their houses from slugs, beetles, spiders, insects, and mould. & how can after the plants are rooted and planted out in the beds — will their preservation be an easy matter on account of the cattle and goats which feed around and find their way into the cultivated plots. These things demand remedial measures.

Now that the product of these plantations has become a regularly established article of the export trade of India I think it would be well in all communications from making mention of this Command to employ the word "bark" a term which a child can understand and which has been in use since its first introduction from America. It appeared to me ludicrous to see the Auctioneer at Mincing Lane — an Englishman in the Capital of his native country — selling off the South American product as "bark" and then afterwards on turning over the leaf saying "Cinchona, yes, East Indian Cinchona" thus disposing of the same article under two names.

In Conclusion I trust that

these observations may meet with the approval of the Government.

I am
Sir,
Your most Obedient Servant
Robert Cross.

Government Gdn.
13th January 1881.

N. N. Campbell Esq
Commissioner
Ootacamund.

Rev 1/2241 of 81

COMMISSIONER'S OFFICE,

Ootacamund, 2nd April 1881.

No. 573

From N A Naupell Esquire
Ag COMMISSIONER, NILGIRIS,

To The Secretary to Government
Revenue department
Ootacamund

Sir,

I have the honor to forward in original a *Report from Mr Robert Cross on the Government Chinchona Plantations on the Nilgiris, and to submit thereon the following remarks.

*Enclosure

2 It is very satisfactory to learn that some of the Condaminea trees at the bottom of the ravine on the Botanical Garden side of the Doddabetta plantation are considered by Mr Cross and equal in appearance to any thing of the kind he has seen in the Loxa forests. Mr Cross remarks that in places it would have been well had trees that

exceed

original number of trees been planted. The pro-fuse seeding of many of the trees was noticeable - This is attributed to the nature of the situation and the arid aspect - This undue drain upon the energies of the trees would probably be much mitigated by higher culture -

3 Attention is invited to defects in the cropping system as practised at Dodda Betta, especially as regards the too early and too extensive removal of the young growths, and the cutting of the trunks too near the ground -

4 The formation of terraces to prevent injury to the trees by wash during the rains had been taken in hand some time prior to Mr Cross' inspection and has been marked by beneficial results, the condition of the trees having much improved - The terraces made have I think, been as a rule no larger than was necessary to meet the objects in view -

5 Mr Cross' suggestion that the cultivation of the Pitayo species should be more carefully and extensively taken up should be acted upon if the good quality of the bark is matter either of certainty or of reasonable expectation - The analysis of selected specimens from the existing trees should settle any doubt regarding its excellence -

6 Mr Cross next proposes what should be done in the case of decaying trees which are by no means of rare occurrence - I would however mention that I learn that many of such trees have presented this appearance of decay for

years

Since writing this para I observe that according to Dr Paul's chinchona analysis printed in Government Proceedings No 1336 dated 23d June 1879, the crystalized quinine sulphate from the natural bark of this species stood at ~~2.00~~ 2.00 per cent -

years past, in the course of which they have again and again been appealed upon. Of late the appearance of general has greatly improved under a liberal manuring -

3 I do not quite follow Mr Cross in his observations upon additional plantings and the formation of underwood. That vacant spaces should be filled up seems obvious. But it is not to me clear why "these annual plantings should after a time so accumulate and become so thick as to form a sort of underwood which x x x would yield a good deal of quilled bark of fair quality from occasional thinnings"; or why "a planter in order to have his plantation in thorough good condition for producing should on going through it be literally wading through a gravelly of underwood" - The quilled bark these plantations would as Mr Cross says be of "fair" quality The object however is to secure the best quality possible: quantity is quite a minor consideration - Government renewed crown bark has sold as high as 1/- 8d per lb and it appears to me that renewals should - so far as possible be of the same character as the gravelly which produces the richest results known - Such results have been obtained from trees and not from underwood - Neither do I understand how the mere filling up of vacant spaces could produce such a dense gravelly of underwood unless either more trees were planted in the course of the renewal than originally

- ginally

ginally existed or, if the numbers were the same, unless the renewals were coppiced.- Again, "fail to see why, if the coppicing system be adopted, it will always be of the greatest advantage to have an abundant supply of sapling growth". In the earlier stages of coppicing the advantage of numerous shoots is intelligible as explained by Mr Brass under the head "Coppicing", in which however he distinctly states that when the necessity for mutual protection no longer exists the young growths should be judiciously thinned.-

8 Under "collecting of seed of Cordaminea" Mr Brass offers some important remarks - His suggestion for obtaining the very best description of

4

45

of seed especially deserve notice.

In connection with this subject I would beg leave to express my opinion that the most certain and effective method of securing plants of superior quality has not been kept in sight or at least has not been steadily pursued. The most successful Chinchona grower in Nilgiri Wynaad and indeed in this district - Captain W.T. Brady Commissioner of Cherambadi - stated to me when visiting his estate last January his opinion that, in the present state of our knowledge of Chinchona and with careful attention, the production of a bark bearing 10 per cent of alkaloid could be relied upon. Captain Bois, plantation contained a large numbers of the Ledgeriana - namely

variety which will only grow at low levels, 2000 to 3000 feet. But he had a high opinion of the Condamined variety and thought that nearly if not quite as good results could be obtained from it -

9. His method was to select with the greatest discrimination trees which gave indications of especial healthiness and vigour; to give them high and careful culture, having originally chosen for them the site best fitted from the character of the soil, aspect and sheltered position. A faithful history was kept of each such tree and seed was taken only from the richest alkaloid producers. The plants reared from such seeds were in their turn subjected to similar selection and the most promising received the special treatment above indicated - This system, if, in fact, carried out at all in the Government Gardens, appears never to have been taken up with anything approaching the continuous systematic care shown by Captain Cox - Its importance cannot I think be overestimated -

10 Mr Cross calls attention to the necessity of cutting off the panicles of seed with which many of the young trees are loaded, as these undoubtedly tend to retard growth. I may here add my own experience of how tangibly and visibly the growth is hereby retarded - I observed that, save in the case of the larger ones, it was the rule to find that branches upon

upon which the seed had fully ripened had died back,— commonly right up to the stem of the tree. The seeding had exhausted the strength of the boughs.- The period therefore at which the panicles are removed is an all-important point. They must be picked off in the early stage of their formation for when the panicle has once set and the seed is on the way to maturity the harm has been done -

11 The amount of seeding this year at Doddabetta was very profuse but I was told not unusual. Mr Cross remarks the effectual remedy for diminishing too free seeding is closer planting - I will venture to suggest that the effect of high cultivation will lie in a similar direction -

12 The desirability of improved propagating houses will doubtless be acknowledged - and the want supplied -

13 Mr Cross' description of the Red Bark Plantation at Nadiuttam is gratifying - This species however is of comparatively small value as an alkaloid producer and especially at the Nadiuttam level. In Captain Cox's plantation at Cherambadi the yield of alkaloid from this variety is much higher. Its vigour of growth at Nadiuttam is however remarkable and coppicing and other experiments may yet show a very superior return

to any yet quien there.- But, at the best, it can never be expected to compare with the Condamineas.- It would seem from the memoran dum which formed the enclosure to the Secretary of States despatch published in Government Proceed- =ings N° 1395 dated 25th October 1880 that this species finds so little favour in the Home Market that it is more advantageous, as a rule to sell ~~them~~ it than to extract the alkaloids on Government account.- The Secre- =tary of State has lately decided in favour of retaining these plantations.

14 Mr Cross remarks (under "the Calisaya Bark") upon the effect of grafting deserve careful perusal.-

I would invite attention to his statement regarding the compa- rative value of trunk and branch barks, in connection with the views I have advanced in para 7 supra

15 The concluding remarks in the enclosures sufficiently ex- =plain themselves.- I will only say that the question of the advisability of retaining the "Wood and "Hooker" Estates may finally be now considered —

I have the honor to be
sir,
your most obedt Servt

Lt Cuppage
Ag Commissioner

dl

No 53
Revenue Govt Dept
D

From No 2241.
The Commissioner
Nilgiris

To
The Secretary
to Government
Revenue Department
Ootacamund

Dated 28th
Despatched 28th } April 1881
Received 28th

Enclosure 1

Chinchona

Submitting Commissioners remarks on Mr Cross' Report on the —— plantations Nilgiris —

C 29-4-81.
R 9-5-81.
C 13-5-81.
R 14-5-81

Government Garden
Ootacamund 11 April 81

No

From The Superintendent
Govt Botl Gardens

To

Major R. T. Lays
Dy Conservator of Forests
in charge Chin. Plants
Ootacamund

Sir,

With reference to your letter No 8 of the 6th instant, I have the honor to inform you that I am quite willing to undertake the care of the Chinchona Santa Fe plants, at present in Mr Robert Cross's charge until they are sufficiently established and increased in number to be handed over to the Head Quarters Dodabetta Plantations.

I have &c
1881 A. Jamieson
Superintendent

True Copy
A. T. Lays Major
Dy Cons of Forests
in charge

Ceylon Govt Gardens
Peradeniya 11 April 1881

No. 14

From The Superintendent
Govt Botanic Gardens

To

Major R. S. Sage
Dy Com. of Forests
in charge Chem. Plants
Oatacamund

Sir,

In reply to your letter No. 7 of the 6th inst I have the honor to inform you that the Chinchona Carthagena plants are in a healthy and satisfactory condition. The stock at present consists of 5 Robusta plants and eighteen cuttings, some of which will be rooted in a few days, and the others by the end of the current month.

I have &c

(Sgd) A. Jansen
Superintendent

(True Copy)

R. S. Sage Major

Dy Com. of Forests
in charge

Rec'd 21 April 81.

Rec 3/2133 of 81

Government Gardens
7 April 1881

59

Santa Fe

Major Lays &c &c
Dy Conservator of Forests

Sir,

In reply to Communication with date of 6 of this Month - received this morning - I beg to state that the original three Santa Fe plants are doing very well and making quite satisfactory growth. Besides these there are 12 cuttings several of which are rooted & remainder in course of rooting. Some of these cuttings are of unusually small and possibly there may be one or two Casualties among them but I have no doubt the majority will with care become plants.

The collection of plants just as they are would be regarded as perfectly safe in a London Nursery. At the same time it might be well for me to look after them for 5 or 6 months longer.

I beg however to state that even with treble the number of plants grown up and planted in the plantation I would hesitate to pronounce the Santa Fe plants as supremely perfectly safe. This simply owing to the way cattle have been allowed to roam about in the Plantation.

In all portions of forests in

South

South America inhabited by the finer species of Cinchona trees to which cattle obtain access the young bark plants and saplings disappear in the most amazing and unaccountable manner.

Sam to

1890 / Robert Cross

/ Jun Copy /

R. S. Sage Major
Dy Conser of Forests
in charge

Rev'd / 21339 / 81.

Office of Govt
Cinchona Department
Ootacamund 13th April 1881

No 22

61

From

Majr R. S. Sage
Dy Conservator of Forests
in charge Chn. Plantations

To

Col. R. H. Beddome
Conservator of Forests
Ootacamund

Sir,

With reference to G. O. No 328 dated 21st February 1881 I have the honor to enclose copy of a letter from Mr Cross reporting on the condition of the C. Succ. Ji plants. A copy of Mr Jamieson's report on the C. Carthagena plants is also enclosed.

2 As the sanction accorded by Government in the above order to the retention of Mr Cross' services expires on the 8th instant, I have the honor to request that you will be good enough to obtain the early orders of Government as to whether his services are to be retained any longer.

3 You will perceive from the enclosed copy of Mr Jamieson's letter that he is willing to take charge of the Santa Fé plant. Should Government decide to relieve Mr Cross of the charge.

I have the honor to be

Sir

Your most Obt. Servant

R. V. Pope major

Dy Conservator of Forests

in Charge

Chinchona (1881) Despatches

To

Lieut: R. H. Beddome
Conservator of Forests
Coimbatore

Dated 13th April 1881
Received

No. 22

Subject

Encloses copies of certain letters and requests to obtain sanction to Government to the further retension of Mr. Cross' services.

Paid

Rec'd 21 April 1881

No. 62

Officiating Secretary to Government
Ootacamund, 21st April 81.

No 2561 Sir,

Lieut. Colonel R. H. Beddome,
Conservator of Forests.

I. C. G. Master Enquire,
Secretary to Government,
Revenue Department.
Ootacamund.

Sir,

In forwarding the enclosures noted in the margin, I have the honor to request that you will be good enough to move the Government to sanction the retention of Mr. Cross' services for a further period of one year from the 1st proximo.

1. Letter from Mr. Cross to the Conservator dated 19th April 81.
2. — Do. — from the Collector of Nilgiris to Government No. 14 dated 11th April 81.
3. — Do. — from the Collector of Nilgiris to Mr. Cross dated 11th April 81.
4. Letter from Mr. Cross to the Collector of Nilgiris dated 5th April 81.

Mr. Cross' services have been found very valuable in the Cinchona Plantations, and I am desirous of retaining him for the present year.

Mr. Cross' salary is fixed at Rupees 300 per mensem.

I have the honor to be,
Sir,
Your most obedient servant,

in connection with the Cinchona.

I have the honor to be
Sir
Your most obed. Servt.
Herbert Stone Colonel,
Conservator of Forests.

Rec'd 21 Feby/81 No. 294-95

Rev. 1881-82 Dept 4/4

Revenue Forests

From No 2133
The Conservator of Forests

To The Secretary
to Government B.D.

Dated 21st April 1881
Received 24th

No. 62.

Encs Corres. 4.

Subject

Mr Cross - In forwarding the enclosed correspondence, informs that, as the Santa Fé & Cartagena Cinchona plants are well established it can hardly be necessary to retain the services of —

C 23-4-81. R 23-4-81.
C 25-4-81. R 29-4-81.
R 27-4-81 R 9-5-81.
C 13-5-81. R 16-5-81.

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REVENUE DEPARTMENT.

No. 2133.

From Conservator of Forests,
Dated 21st April 1881.

FOR ORDERS.

C. 21st February 1881,
No. 328, B.D.

Mr. Cross's services were retained having elapsed that gentleman reports that the collection of Santa Fé plants brought out by him and the subsequent cuttings are doing well and would be regarded as perfectly safe in a London nursery.

2. He suggests that perhaps he might be retained for 5 or 6 months longer to look after them.

3. The Conservator of Forests thinks this hardly necessary the plants are well established and Major Jago reports that Mr Jamieson is willing to take

take charge until they are finally handed over to the Chinchona Department.

4. Colonel Beddome adds I am not aware whether it is contemplated to employ Mr. Cross on any other duty or to give him any charge in connection with the Chinchona

5. The report of Mr. Cross's inspection of the Chinchona plantations which was in Mr. Rowsell's possession more than 2 months ago has not yet reached Government nor have they been made acquainted with the result of Mr. Cross's visit to Nilambur.

6. The question now is whether Government wish

* Letter in Gl. No. 228, 21st February 1861

wish to retain Mr. Cross here any longer.

Gl. C.

Certainly I do not think Mr. Cross's services should be dispensed with. I fear it is owing to the suggestion of this gentleman that the Plantations are not further extended. I think it would be very desirable to keep Mr. Cross in the Nilgiris for the present. The charge given to him is of a nature that it could be done by a native Assistant if we had a sufficient number of them. I think it would be very desirable to keep Mr. Cross in the Nilgiris for the present. The charge given to him is of a nature that it could be done by a native Assistant if we had a sufficient number of them.

Mr. Cross is in charge of the Nilgiris Chinchona Plantations and his services are invaluable. Should he be withdrawn from the Nilgiris, which I trust will not be the case, I fear the Plantations will be neglected.

W. B. 30/4/61

[illegible] this interesting report from [illegible] this time from 13 Jany. to 28 April. [illegible] [illegible]. His remarks are [illegible] valuable.

Mr. Cross's report [illegible] [illegible] the Rev. Dept. [illegible]

Copy [illegible] to the Cons. of F. for [illegible] remarks [illegible] to the [illegible] instructions [illegible] the necessary [illegible] for carrying out Mr. C.'s suggestions. On the whole the report [illegible] the Cinchona plants are scarcely [illegible] favourable as [illegible] hoped [illegible] receive. But still there is much [illegible] that is encouraging.

C 23-4-81 R 29-4-81
C 23-4-81 R 2-5-81
R 25-4-81 C 13-5-81
R 27-4-81 R 16-5-81

9017-5-81 781

FOR ORDERS.

[illegible]

two

Mr Cross's reports confirms me in my opinion that we should retain him as long as we can, at all events till after the monsoon. The least neglect or carelessness might deprive us of the [illegible] plants & I am not so impressed with the order neatness or general management of the [illegible] Gardens as to desire to place them in charge of the Superintendt. The Report should be printed and the suggestions contained in it should be attended to and carried out [illegible] as regards Cinchona [illegible]

W. A. H[illegible]

Recirculated with copies of Mr Cross's Reports obtained from Com. Nilgiris & Col. Beddome

[illegible]

I think Mr Cross's [illegible] is much [illegible]

25

Rev: Dept. 73

Draft G.O. No. 781 d/ 17 May 1881

Letters from the Conservator of Forests and the Commissioner of Nilgiris, dated 21st and 28th April 1881, Nos. 62 and 53 respectively.

C. No. 2133 & C. No. 2241.

1\. The Right Honble the Governor in Council regrets that Mr. Cross's interesting report on the Government Cinchona Plantations should have been detained so long in the Commissioner's office. The paper will be forwarded without further delay to the Secretary of State and copy will be

be furnished at the
same time to the Con-
=servator of Forests for
information and for
any remarks he may
wish to offer. Colonel
Beddome will take the
necessary steps for carry-
=ing out Mr. Cross's
suggestions.

2. The reports on
the Chinchona Plan-
=tations are scarcely so
favorable as the Govern-
ment had hoped to
receive, but still there
is much in them that
is encouraging.

3. Adverting to the
Conservator's letter re-
corded above, His Excellency
in Council does not think
it desirable to dispense
with Mr. Cross's ser-
vices at present. The
least neglect or careless-
ness might prove fatal
to the C. Santa Fé Plants,
and the Government
accordingly resolve to
retain Mr. Cross on the
same terms as heretofore
till after the South-West
Monsoon is over. The
change of season is so
great that every pre-
caution is desirable in
regard to plants which
have been obtained
at such cost of trouble
and money.

The

4. The Commis-
=sioners' attention will
be drawn to Mr. Cross's
=remarks upon the pro-
=pagating houses attach-
=ed to the Government
Gardens. Their condition,
as described, is very dis-
=creditable and should
be at once remedied.

Encl.

Inclosure to the Commissioners of
Crown Lands & Public Works
No. 1
Sydney
Nov. 1879

Rec'd 17/5

17/5

C/2-5-81
R/16-5-81

255-257