M.R.O. 1—27,000—8-6-37.

(1) Number of pages 132

(2) Date of repair 2 . 8 . 38

(3) Initials of the Referencer

MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No. 1513 Press / Mis.

Dated 12-10-1887.

Not to be folded or roughly handled

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

12th October 1881, No. 1513.

READ THE FOLLOWING PAPER:—

No. 167. From Colonel R. H. BEDDOME, Conservator of Forests, to the Secretary to Government, Revenue Department, dated Ootacamund, 3rd October 1881, No. 619:—

I HAVE the honor to inform you that I have lately paid a short visit to Ceylon in connection with Chinchona.

2. ROUTE PURSUED.—I was only able to spare a fortnight, so that my visit was rather hurried; but I was able to see a good many estates at different elevations and with different soils. I also obtained much information from Dr. Trimen, who accompanied me from Pèràdeniya through some of the estates in Kotamalè and Dimbulla as far as Nuwara Eliya, whence he was obliged to return. I afterwards visited the Government plantation and nursery at Hackgalle, estates about Nuwara Eliya, Condapolla and Uva Pussellàwa, and returned to Peràdeniya through some of the estates in the Ramboda and Pussellàwa Districts.

3. THE PATA.—I was much interested to find the "Pàtà de gallinazo" of Mr Cross, the species hitherto known here as "Magnifolia," about which I have written so much, widely distributed in the island, chiefly amongst the "Succirubra" trees, between 3,000 and 5,000 feet elevation and maintaining its uniform character and strong rapid growth. This species is in Ceylon generally known as "Hybrid" though it has other names, and is sometimes called "Condaminea." Most planters appeared easily to recognize all their different individuals of it as one and the same plant and always spoke of them as their "hybrids," but were delighted at a reaction against the hybrid theory and to think it a distinct species which could be propagated from seed, as many of them think with me that it is probably, within certain elevations, the Chinchona of the future; some planters were inclined to look upon each individual tree of this as a separate hybrid, and all distinct one from the other, though all most uniform in appearance. In one estate in Lindula, known as Agrakanda, I found that the analysis of the bark of three different trees of this "Pàtà" had been reported on by Mr. Howard. It was as follows:—

No.	Quinine.	Chinchonidine.	Quinidine.	Chinchonine.
IV	6·77	1·84	trace	trace
V	3·66	4·06	Do.	Do.
VII	4·08	2·84	Do.	Do.

4. These were all large, strong, healthy trees. No. VII, the largest, was a little over 29 feet high and 2 feet in girth, breast high. I do not think correct data as to age was available, but they appeared to be not less than 10 years.

5. This analysis is most interesting, as showing what a very large percentage in quinine some of this species can give, and also as showing how variable the yield is from different individuals, which is, as far as I can see, equally the case with all the other species of the genus.

6. I found Dr. Trimen exceedingly interested in this species, and he had been cautioning the planters against the hybrid theory. I believe that he is now fully convinced that it is a perfectly distinct species and an undescribed one; and he intends, I believe, to describe and figure it in his Journal of Botany.

7. PUBESCENS.—I also saw trees of our "Pubescens" (or the downy variety of the "Pàtà") particularly in Pussellàwa, but they do not appear so abundant as the glabrous species.

8. RED BARK.—The growth of "Succirubra" is exceedingly good in many parts that I visited, and I often saw it growing well in deserted coffee, where the soil must have terribly deteriorated. If all old deserted coffee plantations can be planted up with "Succirubra" it will be a great thing for both India and Ceylon; except at the lower elevations, however, the "Pâtâ" grows even better than the "Succirubra," and is the tree to plant at any rate anywhere above 4,000 feet.

9. CROWN BARK.—I was not fortunate in seeing any good "Officinalis" plantations of any age or size. I was not however able to go to Haputale or Uva, the two best districts, I believe, as far as soils and climate go. I saw both at Nuwara Eliya and in Condapolla, and elsewhere large plantations of "Officinalis" of very young growth looking exceedingly healthy (when sufficiently protected by an eastern exposure), but the soils everywhere much inferior to what we have on the Nilgiris, often very shallow or with a clayey sub-soil which induces early decay, chiefly from canker; and the planters do not look to longevity for "Officinalis" in these soils, but they uproot at 4 or 5 years of age and replant. We have nothing of this sort in India, and I trust it may never be necessary, but the whole conditions of soil and climate are different. We have not planted any tracts with a sub-soil of impervious clay, and we have a period of drought which, I think, will turn out to be beneficial to "Officinalis" (though probably not for some other species) and antagonistic to canker; whilst in Ceylon, in addition to a very heavy monsoon with often no sunshine for very long periods, they have rain all the year round, which induces early maturity and the too early flowering of the trees. So profitable is the Crown bark at present prices that even in face of this early maturity and early decay the planters are making large profits. On one estate which I visited on upper Ramboda, called Frotoft, 45 acres of "Officinalis" had been uprooted at $4\frac{1}{2}$ years of age, and the trees had yielded 25 tons of dry bark which was sold at 4*s.* per lb. (=£11,200), and it was said that 1*s.* per lb. would even have paid. There is, of course, much doubt how often soils like this can be replanted; but uprooting in this case was imperative as the trees were all beginning to go out even at this early age from canker, and this is said to be generally the case, and that coppicing even cannot be resorted to, as it is generally the root canker. I was even told in several estates that whole nurseries had gone out from this cause. This must, I think, be simply the damping or rotting off of the roots of the seedlings from the use of too rich or damp soil in the beds and the want of silver sand. On another estate called Lool Condura (in the same vicinity), which I did not visit, I heard that two crops had already been taken off by the same method of uprooting, with very favorable results financially, and that the estate had been planted up a third time. All these estates are considerably below 5,000 feet and consequently at an elevation much below what we grow "Officinalis" at, and this early decay may possibly be averted at the higher elevations about Nuwara Eliya, &c; the growth there is all very young at present. On one estate called, I think, Thallipody not far from Nuwara Eliya, I found that all the "Officinalis" trees had been shaved (Java method) before they were barely three years old! The proceeds were said to have cleared the estate of all expenditure, and the trees, small as they were, were certainly nearly all renewing their bark! In another estate in this locality I saw "Officinalis," which had been put down as close as $2\frac{1}{2} \times 2\frac{1}{2}$, growing very well. However there is an opinion amongst some of the planters that close planting can be overdone and so cause unhealthy growth from an early age that may not be easily rectified by subsequent thinnings; it is a question on which actual experience is much required.

10. BELTS OF TREES AS BREAK-WINDS.—Near Nuwara Eliya, I saw an "Officinalis" plantation in a high, bleak, exposed situation, which was exceedingly interesting on account of the systematic way in which belts of *Eucalyptus globulus* had been planted as a break-wind. At a chain apart throughout the plantations, single rows of these trees, each tree at 6 feet apart, had been put down at the same time as the Chinchona; they had been topped when young, and grown out with a bushy habit, and the Chinchona was growing, comparatively, exceedingly well, where there could have been nothing but most wretchedly-stunted growth without this protection.

I think this plan can with great advantage be introduced into several portions of our plantations on Dodabetta and at Naduvatam and Pykara, and I would draw the attention of Chinchona planters generally to the great importance and value of these or similar break-winds, and I know of no tree that would answer better than the Blue-gums at high elevations.

11. CALISAYAS.—I had no opportunity of seeing any good plantations of Calisaya such as, I believe, exist in Maskeliya and other parts of the island, which I had not time to visit; however, I saw some fine trees mixed with other Chinchonas and Coffee in different estates at low elevations. Considering the fine appearance and growth of one that I saw growing on the estate called Agrakanda in Lindula (about 4,000 feet), I think it probable that finer Calisaya will be grown in Ceylon than in India, and that with this species the moist climate of the island has the advantage against our droughts; but I have had very little experience with Calisaya. The analysis of this tree by Mr. Howard had given 5·64 per cent. of quinine, 1·22 of chinchonidine, ·44 of chinchonine, and only a trace of quinidine. Two miles from Nuwara Eliya, at the head of the Ramboda pass, I saw a most remarkable plantation of what were called "hybrid Calisaya." The elevation is too high, I should think, for the species, being about 6,000 feet, and the trees are all quite shrubs, 4 to 6 feet high, densely branched from the base. The plantation is, however, looked upon as one of great value by some experienced planters. I recognized our var. Javanica, but there were quite a crowd of other forms that I have not seen in our plantations (we probably had some of them and they have died out) and which would completely puzzle any botanist. It is quite possible that we have here only a single species, a very protean one, producing all these varieties from the same seed; but it is, I think, more likely that there are many really different species mixed, species which have not as yet been worked out by a botanist; either of these views are, I think, preferable to the hybrid theory. On the subject of classification Dr. Trimen has written the following valuable remarks (*vide* Mr. Owen's "Chinchona Planter's Manual"):—

"The genus Chinchona presents us with a very well-marked and striking instance of a clearly-defined natural group, in which the individuals composing it, instead of as usual being with more or less facility thrown into different sets marked out by clear distinctive characters, (and thus forming the 'species' of the naturalist), offer themselves as a crowd of forms closely connected in different directions, but showing only trifling modifications of structure, of a sort usually regarded as of but little systematic value. Such genera are not very uncommon, and the botanist of Europe is but too familiar with cases in *Salix* (willows), *Rubus* (blackberries), and *Rosa* (wild roses).

"This state of things is natural, and has not arisen under cultivation. In 'Chinchona,' the great majority of the described forms have been found in the Andes themselves, where the genus has a range of over 2,000 miles from north to south, and at altitudes from 2,600—11,000 feet, but chiefly between 5,000 and 8,000 feet. It would appear that every district of this extensive area has its own peculiar Chinchonas, and very few species are known to range widely through it; none to occur throughout. A very similar statement might be made with regard to the fruticose *Rubi* in Europe."

12. Really careful experiments with the seed of each marked variety or species would be exceedingly interesting and would probably clear up the doubt whether they are distinct species or all forms of one very protean species; but if the latter be proved to be the case, the botanist will have a most difficult task in the classification of the genus. Analysis is all important in a plantation of this sort, if profit is to be looked to, and the same may be said of the ordinary form of Calisaya or of Javanica or any other of its forms, as it has been proved that forms apparently quite similar in every way may in some individuals be very rich in quinine and in others have no trace of it. The planter has therefore to be cautioned against any indiscriminate growth of "Yellow barks" at this stage of our knowledge, as not only is this an established fact, but we at present know little about the elevation or climate adapted for these species.

13. LEDGERIANA.—Dr. Trimen informs me that both he and Mr. Moens of Java consider this species as quite a distinct one and not as hitherto supposed only a variety of "Calisaya," and that he has lately described it as such in his

"Journal of Botany." He also pointed out to me that the flower pedicels always have a drooping habit not seen in "Calisaya," and that the flower buds want the knob-like apex characteristic of "Calisaya."

The enormous profits of the Ledgeriana plantation in Java under Mr. Moens, and the visit last year of that gentleman to Ceylon, have given a great impetus to the planting of this species in Ceylon. I had not an opportunity of seeing the best or oldest grown in Ceylon, but I saw some large trees and many of young growth, and also experiments with Mr. Moens' system of grafting this species on "Succirubra." I however learnt that no analysis of this bark in Ceylon could in any way be compared with that in Java, and it is probable that the deep, rich, volcanic soil in the latter place is the real cause of the wonderful results. Mr. Moens has obtained as much as 13 per cent. of pure quinine from one tree of this species, and Dr. Trimen tells me that he (Mr. Moens) destroys all trees which on analysis do not give a very high yield, and that he grafts from the richest on to "Succirubra," and that he has a small area of these grafts which are giving most surprising results and astonishing every one. Dr. Trimen also informed me that this grafting on "Succirubra" was resorted to owing to the great difficulty of propagating this species by cuttings; but Mr. Grant in the Ouchterlony valley (I was over his establishment lately) has been most successful with cuttings under glass with bottom heat, scarcely having a failure, so I cannot, I confess, see the advantage of the grafting if cuttings can be grown easily in India, and I believe not only Mr. Grant but also Captain Cox has had no difficulty; the grafting process besides could hardly be resorted to for large areas. It is, however, important I think that we should have some experiments on this plan, when we open ground for "Calisaya" and "Ledgers" at a lower elevation. Mr. Moens' plan is described as follows in the Chinchona Manual above referred to:—

"This system has been largely pursued by Mr. Moens in Java for the multiplication of Ledgerianas, with great success. For a description of the method we are indebted to "Viator" and Mr. Kay-Shuttleworth, who visited Java, and there saw the operation performed. Succirubra being the commonest and most rapid-growing Chinchona is chosen for the stock. Succirubra plants about a year old are chosen, and to economise space are stumped at a point six or eight inches above the soil. This is done just above a joint. A flat cut is then made in the stem under the bark, which is not removed, sufficiently deep to make a surface large enough to allow a Ledgeriana shoot (cut through diagonally, the cut being one to one and-a-half inches long), to fit cambium to cambium to the Succirubra, the bark of the Succirubra *overlying* the cut being left intact. The Ledgeriana shoot must be cut just where the hard mature wood ends, and where the branch begins to be tender and succulent from the newness of its growth; it is then fitted carefully into the cut in the Succirubra stem, the flap of bark put over it and the whole bound firmly with Berlin wool. String pulled out of an ordinary sack will do almost equally well. The operation is simpler if the 'Succirubra' has a double stem, one of which is then cut off diagonally at the fork, leaving a flap of bark at the upper end of the cut; the Ledgeriana shoot is then cut so that it shall correspond in shape and size with the cut surface of the Succirubra, but a flap of bark is left hanging from its lower end. The two cut surfaces are then fitted together, the flap of Ledger bark overlying the 'Succirubra' stem, and the flap in the Succirubra overlying the Ledger cutting, and thus giving a better hold to the binding. The pots which contain the grafted plants are then laid on their sides, graft uppermost, in propagating frames, and kept until the bark begins to unite, and new leaves to show, when they are placed upright. The Succirubra is cut off just above the graft as soon as the plants are fairly united, and there is no fear of this further mutilation of the tree injuring the young graft, the bandage being removed at the same time. Four weeks is the time that generally elapses before this can be done. It has been proved that a good graft grows faster than an original Ledgeriana tree, and that the qualities of the stock never in the slightest degree affect the tree it bears.

"A skilled laborer can graft from 200 to 250 Ledger cuttings on 'Succirubra' stems every day, and the operation is therefore evidently not a very expensive one. There can be no doubt as to its advisability in all cases where individual trees of special value are to be propagated from."

14. CRISPA.—I saw abundance of what Dr. Trimen calls the "Crispa variety of Officinalis," and it is the same as we have abundantly represented in the Dodabetta plantations not differing from ordinary "Officinalis" except in its rather smaller leaves and often running into the ordinary form so as not to be distinguishable.

15. URITUSINGA.—I saw no "Uritusinga" in Ceylon amongst the older Crown barks, and I am unable to distinguish this variety from "Officinalis" when they are young.

16. HACKGALLE GOVERNMENT GARDENS.—As a Chinchona plantation these have been utterly neglected; the older trees have almost all died out, or been cut down and the coppice not attended to; they were scarcely worth a visit; there were however numerous nurseries for seedlings of various kinds.

17. GRASS LAND.—I saw scarcely any grass-land planting; unlike the Nilgiris where nearly all the grass land rejoices in an open and gravelly soil, the grass land (or Patenas, as they are called) in the Central Provinces have generally a black peaty soil quite unfit for the growth of Chinchona, and similar to what we have in swampy ravines only. I dare say there may be suitable grass-land soils in parts that I did not visit, but I only saw some small patches; but in these "Officinalis" was growing well where planted, but it was quite young.

18. IMPORTANCE OF ANALYSIS AND OF THE SERVICES OF A CHEMICAL ANALYSER.—My visit to Ceylon and the advantages I have had of discussing matters with Dr. Trimen, and also of hearing Mr. Moens' views through Dr. Trimen, has made me alter my opinions very much with reference to the value of analysis, and I think it now all important that very great attention should be paid to this subject in our plantations, particularly with reference to "Officinalis" and the "Pàtà" (Magnifolia), individuals of which have been proved to differ so one from another in their yield of quinine. We should find out the individuals which give the richest yield and propagate largely from these, and these only, both as to seed and cuttings, continuing the experiment through several generations. Though the experiments might not be altogether satisfactory at first, and though we might find that the seed and even the cuttings of the richest yielders might often give very varied results when planted out over large areas, I feel sure experiments of this sort must be in the right direction, and if persevered in, would ultimately give very good or even startling results, as with Mr. Moens, and we should then be able to distribute the very best (and only the very best) seed and rooted cuttings to the public. This, however, can never be carried out satisfactorily unless we have a qualified Chemical Analyser for our plantations as well as a thoroughly practical gardener; but surely in a question of such importance the expense should not be considered or allowed to interfere.

19. CHINCHONA PLANTER'S MANUAL.—A most excellent little Manual has just been published in Ceylon at the Observer office by Mr. T. C. Owen. It treats most fully upon all subjects connected with Chinchona planting, and has evidently been most carefully compiled from all the books, pamphlets and reports on the subject in this and other countries, and from much personal observation. It is just the book required by the officers in charge of our plantations, and not knowing that anything of the sort was likely to be published, I had intended, as already reported, drawing up a somewhat similar though much briefer pamphlet, after I had had the advantage of some further experience outside our own limited area; this, however, will now be unnecessary. I hope that Government will take a certain number of copies of this Manual, and that the Nilgiri Chinchona office may be supplied with 25 copies. I do not know its price, but it is probably not more than 1 Rupee or 1½ Rupees.

No. 168. ORDER THEREON, 12th October 1881, No. 1513.

Miscellaneous.

THIS account of the visit to the Chinchona Plantations in Ceylon, which the Conservator of Forests has recently made, will be forwarded to the Secretary of State and communicated to the public in continuation of G.O., 29th August last, No. 1280.

2. There is much of interest in the observations which Colonel Beddome has recorded, and the Government are indebted to him for his enquiries and suggestions, to which doubtless effect will be given in the management of the plantations under his charge.

3. The proposal in paragraph 18 will be commended to the attention of the Secretary of State with reference to paragraph 18, G.O., No. 1280.

4. The Government of Ceylon will be requested to obtain and transmit 100 copies of Mr. Owen's Manual, and on receipt 25 copies will be supplied to the Nilgiri Chinchona office as requested in paragraph 19.

(True Extract.)

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

To the Conservator of Forests.
,, the Board of Revenue.
,, the Surgeon-General with the Government of Madras.
,, the Superintendent, Government Central Museum.
,, the Nilgiri Planters' association.
,, the Kotagiri do. do.
,, the Wynád do. do.

Exd. W. H. French.

90 Copies.

Original

Govt. of (1881) Madras.

REVENUE

To

THE CONSERVATOR OF FORESTS,

&c., &c., &c.

Dated October 1881.

Received 27th.

Read. Encl.

G.O., 12th October 1881, No. 1513.

OCTOBER.

Nos. 167-168.

Subject.

Chinchona Plantations, Ceylon—Forest Conservator's report on his visit to the — forwarded to the Secretary of State, &c., with remarks. The Ceylon Government requested to forward 100 copies of Mr. Owen's Manual.

Folio 749/82.

Original

No. 167.

Office of Conservator of Forests

Ootacamund, 3rd October 81.

From

Colonel D. H. Beddome,

Conservator of Forests.

To,

C. G. C. Moxon Esquire,

Secretary to Government,

Revenue Department,

Ootacamund.

Sir,

I have the honor to report that I have left & joined a short visit to Ceylon in connection with Cinchonas.

2. Route pursued. Knowing I could spare a fortnight for my visit was rather hurried, but I was able to see a good many districts & with different soils & aspects which enabled me to form a fair opinion of the Cinchona, which I obtained from Mr. Thwaites, who accompanied me from Peradeniya through some of the cultivated districts & Badulla

- Bucla de Jos pe Ilfov de-
- ga, până la Confluența cu
Jeleșoiu; Despărțământul dintre
the Government plantations and
Crown forest, Badajoz district,
about 4 miles E. from Badajoz
and lies parallel with and close
to Pr. Victoria Railway and
the estates in the Pueblo Badajoz and
Puebla Nueva districts.

8. The Trees. planted
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Pelimago of the Cinchonas, the
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5. This analysis is most interesting, as showing what a very large proportion of the species (nine) and also as showing remarkable [illegible] which is [illegible] I can see equally the case with all the other species of the genus.

6. I found Dr. Spruce's observations singularly inaccurate in this species as he had been [illegible] the plantations against the cupuliferous theory. (I believe) that he is now fully convinced that it has [illegible] perfectly distinct species and [illegible] undescribed one, and he intends to believe to describe and figure it in his Journal of Botany.

Pubescens"

7. Pubescens. I also saw [illegible] of your "pubescens" (or the downy variety of the "jaiva") found in Rio de Janeiro, but they do not appear to be abundant as the glabrous species.

8. Red bark. The [illegible] of "Succirubra" is exceedingly good in many parts that I visited, and I [illegible] for it growing well in [illegible] Coffee, in [illegible] the soil, must have terribly deteriorated; if all old decayed Coffee plantations could be planted with "Succirubra" it will be a great thing for both India and Ceylon; except that the [illegible] "jaiva" grow even better than the "Succirubra", and as the tree is planted at very great altitudes where above 4,000 feet.

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results financially, and that the estate had been planted up a third time; all those advantages Considerably below 2,000 feet and Consequently at an elevation much below what are grown Officinalis at, and this early decay may possibly be averted at the higher elevations about Nuwara Eliya &c. The growth there is all very young, at present; one estate called Alethangoda not far from Nuwara Eliya I found that all the Officinalis trees had been shaved (Java method) before they were handed over! The roots were said to have cleared the estate of all expenditure, and the trees small as they were, were certainly nearly all removing their bark!

In another estate in the locality I saw "Officinalis" which had been pulled down as close as 2½ × 2½ growing very well, however there

is an opinion amongst some of the planters that close planting can be over done and so cause an unhealthy growth from an early age that may not be easily rectified by subsequent thinnings, it is a question which actual experience is much required.

10. Belts of trees as break-winds.

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11. Coffee trees. I had no opportunity of seeing any good plantations of Coffee trees (which would be) exist in Wynaad and other parts of the island, which I had not time to visit,

however

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mixed with Pitton Cinchona and
Coffee in different regular elevations
elevations; considering the fine
appearance and growth of one
that & does growing on the Estate
called Yzabandura in Lindula
(about 4,000 feet) & this is
probably that finer Calisaya
will be grown in Ceylon than
in India and that with the
superior the moist climate
of the Island has the advan-
tage against our drought &
but & have had many little ex-
perience with Calisaya, the
analysis of this tree by Mr.
Howard had given 0.64 per cent
of Quinine, 1.22 of Cinchonidine,
.14 of Cinchonamine, and only
a trace of Quinidine. Two
miles from Nuwara Eliya,
at the head of the Ramboda
pass, I saw a most remarka-
ble plantation of what were
called

called "hybrid Calisaya" the
elevation is so high & should
think for the species, being
about 6000 feet, and the
trees are all quite shrubs be
4 to 6 feet high and only bran-
ched from the base, the
plantation is however looked
upon as one of great value
by some experienced planters
& I recognized our var: Javani-
ca, but there were quite a
crowd of other forms that &
have not seen in our plantat-
tions (we probably had some
of them and they have died
out) and which would com-
pletely puzzle any botanist;
& is quite possible that we
have here only getting two spe-
cies, or very probably one, pro-
ducing all these varieties
from the same seed, but it
would think more likely that
there are many real different
species mixed, species which
have not as yet been worked
out by botanists, either of

these

"Such genera are not very com-
-mon, and the botanist of
"Europe is but too familiar with
"cases in Salix (willows), Rubus
"(blackberries), and Rosa (wild
"roses)."

"This state of things is"
"natural, and has not arisen"
"under cultivation. In "Cin-
-chona", the great majority of"
"the described forms have been"
"found in the Andes them-"
-selves, where the genus has a"
"range of over 2,000 miles from"
"North to South, and at alti-"
-tudes from 2600 — 11,000 feet,"
"but chiefly between 5,000 and"
"8000 feet. It would appear"
"that every district of the wood-"
-lands, area has its own pe-"
-culiar Cinchonas, and very"
"few species are known to range"
"widely through it; none to"
"occur throughout. A very"
"similar statement might"
"be made with regard to the"
"genus Rubus in Europe."

12. Really careful experi-
-ments

-ments with the red of dark
marked variety of the species
would be proceeding by indica-
-ting and would probably
clear up the doubt whether
they are distinct species or
all forms of one very protean
species, but if the latter be
proved to be the case the botan-
-ist will have a most difficult
& delicate task in the classification
of the genus; the case is
all the more important in a practi-
-cal point of view as the species
may be said of the ordinary
form of Caliciya or of Javan-
-ica or any other of the forms
as it has been proved that
forms apparently quite simi-
-lar in every way may in
some individuals be very
rich in quinine and in others
have no trace of it; the
planter has therefore to be
cautioned against any
indiscriminate

indiscriminate growth of
"yellow barks" at this stage of
our knowledge, as not only is
this an established fact, but
we at present know little about
the elevation or climate adapt-
-ed for these species.

13. Ledgerianæ. Dr. Trimen
informs me that both he and
Mr. Moens of Java consider
this species as quite a distinct
one and not at all liable to vari-
-ation and that he has labelled des-
-cribed it as such in the "Jour-
-nal of Botany"; he also pointed
out to me that the flower bud
is always borne on a drooping
habit not seen in "Calisaya",
and that the flower buds
and the knob like appear
characteristic of "Calisaya".

The enormous profits
of the Ledgeriana plantations
in Java (under Mr. Moens)
and the visit last year of
Mr. Hasskarl

has given a great impetus to the planting of this species in Ceylon.

The gentleman to Ceylon, I do not anticipate any difficulty in doing the best or oldest grounds in Ceylon, but I saw some large trees and many of young growth, and also experiments with Mr. Moens system of grafting this species on "Succinubra". I have ever learnt that no analysis of this bark in Ceylon could in any way be compared with that in Java and it is probable that the deep rich volcanic soil in the latter place is the real cause of the wonderful results. Mr. Moens has obtained as much as 13 per Cent of pure Quinine from one tree of this species, and Dr. Trimen tells me that he (Mr. Moens) destroys all trees which on analysis do not give a very high yield and that he grafts from the finest on to "Succinubra" and that he has a small area of these grafts

grafts which are giving most surprizing results and astonishing every one. Dr. Trimen also informed me that this grafting on "Succinubra" was rejected owing to the great difficulty of propagating this species by cuttings, but Mr. Graham in the Dickoya valley (Queens, over his estate & elsewhere lately) has been most successful with cuttings under glass with bottom heat, scarcely having a failure, so I cannot, I enjoy, see the advantage of the grafting if cuttings can be grown easily in India, and I believe not only Mr. Graham but also Captain Cox has had no difficulty, the grafting for ease besides could hardly be resorted to for large areas. It is however important I think that we should have some experiments on this plan, when we start ground for "Calisaya" and Ledgers at Java

elevation

elevation. "10". Moore's plan
is described as follows in the
Cinchona. Manual above re-
ferred to:-

"This depth has been
"largely pursued by Mr. Moore
"in Java for the multiplication
"of ledgeriana, with great ad-
"vantage. For a description of the
"method we are indebted to
"Mr. Kay-Shuttleworth,
"who visited Java, and
"there saw the operation performed.
"Excavations being first com-
"menced and made for pit grow-
"ing Cinchona, as chosen for the
"stock. Succinbra planted re-
"bout a year old are chosen,
"and to economise space are
"planted obliquely in a joint above
"eight inches above the soil.
"This joint done just above a joint.
"A flat roof is then made for the
"stem under the bark, which
"is not severed sufficiently
"deep to make a surface large
"enough to allow a ledgeriana
shoot

"shoot (or shoots) originated
"the cultivating one to be used as scion
"(under stock), to fill Succinbra
"to Succinbra, to the succinbra
"the bark of the succinbra pur-
"posing the cut being to stimulate
"the ledgeriana shoot, must be
"cut first where the bark was
"round only, and where the wood
"begins to be tender, just above
"the point of the succinbra
"graft, just below the scion shoot
"is then cut, to shape it like a
"wedge, the ledgeriana shoot
"is then cut to shape and placed
"in the succinbra stock
"with the cut surfaces of the two
"barks"

"Incisa" [illegible] "left hanging" "pruned tower"
"end. The two cut surfaces are
"then fitted together the flap"
"of Ledger bud overlying the"
"Succumbed stem, and the flap"
"in the succumbed overlying the"
"Ledger Cutting, and then giving"
"a better hold to the binding. The"
"flap which contains the grafts"
"should then have put down"
"Ledger graft replacement, and the"
"wrapping finished, and flap"
"to the bud regains its"
"Dynamics to which it"
"they are placed in regards the"
"Succumbed stem of the original"
"the graft and stem and the plant"
"are firmly united, and bound in"
"position of this flap, made"
"Ledging of the bud injuring the"
"young graft, the bandage being"
"removed at the same time. Some"
"buds do at the time that generally"
"Capsules before they can be done."
"If two buds removed that at"

good

"good graft grow together and"
"original Ledgerians buds, and that"
"the qualities of the stock never in"
"the slightest degree affect the"
"two different"

"A shield budding Cannot"
"graft from 200 to 250 Ledger Cut-"
"tings in "Succumbed" stems every"
"day, and the operation is there-"
"fore evidently not a very expen-"
"sive one. More can be, no doubt,"
"put in, if absolutely in a"
"Crisis, where individual trees of"
"special value are to be saved"
"at"

"If Chicago. Some exhaustive"
"experiments of Mr. Lee"
"Chicago, proved of Officinalis and"
"to the same as some have obtain-"
"ed, Sequestered in the Dodo-"
"nella pentandra, not differing"
"upon ordinary Officinalis" except
"in the leaves and buds and"
"by their remaining quite the ordinary"
"form so as not to be distinguish-"
"able."

Weinhaugen

15. Cruciferæ. Plants of the "Cruciferæ" tribe of Ceylon are mostly the older ones and can be distinguished from "Officinalis" when they are young.

16. Backgalle (Parent Parent) Ker a Ceicha and plants taken these have been with Ceighted, the Ceen trees have removed all dead and ex leaves and the Ceptice portions of they were dead and rotten pieces for checking of pairs and Birds.

17. Cinchona. Cinchona are very great and plenty plants like the Officinalis when young as the grass and grows on poor and gravelly soil the grass and (or pasture as they are called) in the Central Provinces and generally a black peaty soil quite unfit for the growth of Cinchona, and similar

to potato are in Nuwara Eliya and Dimbula; Adam's Peak Range and the Horton Plains in parts that are not rich, but on Pedro and some small patches but in those "Officinalis" was growing well and looked healthy and the best were quite young.

18. Importance of analysis and of the services of a Chemical Analyst. My visit to Ceylon and the Cinchona Plantations of Nuwara Eliya and also of Dimbula and Pedro, and through Dr. Steiner has made me better acquainted with the nature of the soil in which the Cinchona grows, and although I am not a Chemist myself, I think it will be useful to this subject in our Plantations if Chemically with reference to Officinalis and the Pitaya (Magnifolia) individuals of both have been found to differ so one from another in their yield of Quinine, but should find not the cultivation of the

give the highest yield and propagate largely from these and those published as to seed and Cuttings, Continuing the experiment through several generations; though the experiments might not be altogether satisfactory at first, and though we might find that the seed and even the Cuttings of the richest yielding trees sometimes failed when carried out over large areas of land, further experiments of this sort must be in the right direction, and if persevered in would undoubtedly find very good reward, starting possibly with the worst trees, and we should thereby be able to distribute the very best (and only the very best) seed and rooted Cuttings to the public, this however cannot be carried out satisfactorily unless we have a qualified Chemical Analyser for our

Plantations, assisted as through by practical gardeners but surely in a question of such importance the expense should not be considered or allowed to interfere.

19. Cinchona Planters Manual.

20. A most excellent little manual has just been published in Ceylon at the Observer Office by J. H. B. Cowan, it treats most fully upon all subjects connected with Cinchona planting, and has evidently been most Carefully Compiled from all the books, pamphlets and Reports on the subject in this and other Countries, and from much personal observation; it is just the book required by the Officers in charge of our plantations, and not knowing that anything of the sort was likely to be published I had intended, as a Record of Reports, drawing up a somewhat similar though much briefer pamphlet, after which I read the

Advantages

advantage of some further
experience, or else our own
limited area, this however
will prove unnecessary.
I hope that Government will
take a certain number of
Copies of this Manual, and
that the Religious Circulars
Office may be supplied with
25 Copies. The net Amount is
small, but it is practically
more than 100 to 12 Rupees.

I have the honour to be
Sir
Your most obedt. Servt.
R. Sathasivam Colmd
Commissioner of Stamps

Revenue 1881 Despatch

No 5346.

Part I

Revenue - Forests

1881-89

From,
The Conservator of Forests

To,
The Secretary to
Government R.D.
Professional

Dated 3rd
Despd. 5th } October 81
Recd. 6th

No: 609

(Inclosure - Nil)

Subject

Erection of Planta-
-tions in Ceylon -
Submitting Report for
the year 1880-81 with letter

Rev Dept.

Draft G.C. No 1519 Dated 12th Octo. 1881

6. No 5346.

Letter from the Conservator of Forests, dated 3rd October 1881 No. 609.

I have received of the most
to the Observations Plantations
in Ceylon, which the Conservator
of Forests has recently made-
will be forwarded to the Secy.
of State and communicated
to the public in continuation
of G.O. 29th August last, No 780.

2. There is much food for
in the observations which Mr Nock
Nock has recorded and
the Govt. are indebted to him
for his enquiries and suggestions.

3. The proposal in para
18 will be communicated to
the attention of the Secy of State
with reference to para 18 G.O.
No 1280.

1 Dft Instructions effect
will be given in the
Management Plans
Plans under
charge.

4. The Government of Ceylon will be requested to obtain and transmit 100 copies of the H.M. Command Memorandum except 25 copies will be supplied to the Religious Institutions Office are requested as per Enclosure 19.

GHC

20 Do. Observations of Insects
24 Do. Odonata of Ceylon
6 Do. Surgeons General Report
2 Do. Dept. Civil Service Lists
1 Do. Religious Institutions
1 Do. Education
1 Do. Agriculture

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