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MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No.

280

Press

Mis.

Dated

10-3-

1882.

Not to be folded or roughly handled

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—again G.O., dated 14th December 1881, No. 3610-A, Revenue.

READ—also the following letter from Surgeon-Major G. BIDIE, M. B., Superintendent, Government Central Museum, to the Secretary to Government, Revenue Department, dated Madras, 24th January 1882, No. 79 :—

I have the honor, with reference to G.O., No. 3610-A, of 14th December 1881, to report that the duty therein specified was completed at Naduvatom on the 13th instant, and that I reached Madras on the morning of the 16th instant.

2. Specimens of bark to the number of 38 have been secured for analysis, and good botanical specimens of the trees from which these were taken were obtained and are being dried. As soon as these are in a state for manipulation, I will examine them and submit a report to Government. It may be stated here that Mr. Cross's identification of the species known to us and elsewhere as *C. Succirubra* is, in my opinion, wrong.

READ—also the following letter from Surgeon-Major G. BIDIE, M. B., Superintendent, Government Central Museum, to the Secretary to Government, Revenue Department, dated Madras, 3rd March 1882, No. 199 :—

In continuation of my letter No. 79, of the 24th January 1882, and with reference to G.O., No. 3610-A, of 14th December 1881, I have the honor to submit the following report to the Right Honorable the Governor in Council.

2. The instructions given to me were—

(a.) To enquire into Mr. Cross's assertions regarding the identity of the plant known on the estates as the Red-bark tree.

(b.) "To have a careful collection made of leaf, flower, seed and bark of all the different kinds of Chinchona now growing in the plantations at Naduvatom, for the purpose of being sent to England for examination and analysis."

3. On meeting Mr. Cross at Naduvatom, I found that his views regarding the species of Chinchona on the Government plantations were as follows :—

1st.—That the plant hitherto termed *Chinchona succirubra* is *C. micrantha* :

2nd.—That the tree known on the estates as "McIvor's Hybrid" and "Pubescens" is the true *Chinchona succirubra* :

3rd.—That the plant designated "Magnifolia" is the *Pata de Gallinazo* of the Red-bark regions of South America.

4. With reference to the assertion that the tree called by us *Chinchona succirubra* is a grey bark, *C. micrantha*, my first act was to show Mr. Cross exact reproductions of Fitches' plates of the two species* but without any names attached, and as he hesitated about giving an opinion as to which was the Red bark, I did not then push the enquiry further. Subsequently, while collecting botanical and bark specimens, I was in daily intercourse with Mr. Cross, but found that he was

*From Howard's "Nueva Quinologia of Pavon."

immovable from his assumption, that a mistake had been committed as regards the identity of the Red bark tree (i). I

(i.) His Excellency the Governor on his visit to the estates at once saw Mr. Cross's error and pointed it out to him, but he still adhered pertinaciously to his assertion.

attach no importance to this however, for, notwithstanding his presumed familiarity with the botanical characters of the Red barks, he took nearly a year to

arrive at this conclusion, and never even hinted at the possibility of such an error when in constant communication with a botanical expert like Colonel Beddome. In my opinion there can be no doubt that the tree known as the *Red bark* on the Government Plantations is the *Chinchona succirubra*—Pav., and it does not seem necessary to occupy the time of Government in offering proofs that such is the case, although for my own satisfaction I went carefully through all the botanical evidence on the subject.

5. As regards Mr. Cross's identification of the plant hitherto known as "McIvor's Hybrid," or "Pubescens," I have no hesitation in saying that it is not the true *Chinchona succirubra* as asserted by him. In fact the opinion that it is so seems to have been recently acquired, as in paragraph 44, page 8 of the Report in G.O., No. 1280, of 29th August 1881, Colonel Beddome states that Mr. Cross considered "Pubescens" and "Magnifolia" to be "the same species and scarcely distinguishable," being the plant known to the Caxarilleros of the slopes of Chimbo-razo as *Pata de Gallinazo*. It also appears that Mr. Cross assumed the distinction of being the discoverer of this plant in South America, as he has induced Colonel Beddome in the same paragraph to write that Dr. Spruce, the distinguished botanist, who was employed in the Red-bark region to collect *Chinchona* plants and seeds, "could never have seen the trees," viz., those of *Pata de Gallinazo*. Now the real facts are that Dr. Spruce saw and described the plant in 1859,* a year before he was joined by Mr. Cross as gardener assistant. These circumstances are mentioned chiefly to show, how little reliance can be placed on Mr. Cross's reminiscences of past transactions, and of things he may have seen.

6. In various points the "Pubescens" of Naduvatom has, judging from Spruce's brief description, a strong likeness to a *Chinchona* known in the bark regions of Ecuador as *Cuchicara*. The *Cuchicara*, as already stated, was first seen and described by Spruce in 1859, and as he sent specimens to Kew† it is very desirable that the Nilgiri plant should be compared with these. The *Cuchicara* is a *Cascarilla serrana* or hill bark, and was found by Spruce in the forests of Llalla, at the foot of the mountain Asuay. Writing in 1861, immediately after his return from the *Chinchona* forests, he observed: "Were I to be guided by the description in De Candolle's Prodrum, I should consider the *Cuchicara* only a variety (and a very slight one) of *C. condaminea*." I lay great stress on this remark, inasmuch as the characters of our "Pubescens" are such, that they led Mr. McIvor to regard it as a hybrid between Crown bark and Red bark. In fact the *Pubescens* appears to be closely related to both the Crown and Red bark, and if in any character it differs from the one species it will be found in this to approach the other. Subsequently Spruce referred the *Cuchicara* doubtfully to *Chinchona erythrantha*—Pav., but this identification is not likely to be sustained. On the whole the facts at my disposal seem to show, that the "Pubescens" of the Nilgiris will prove identical with Spruce's pubescent *Cuchicara* of Llalla.

7. With reference to Mr. Cross's identification of our "Magnifolia" as the "Pata de Gallinazo," referred to by Spruce, this will probably prove correct, although the name is unfortunate, inasmuch as it has been applied to no less than two kinds of Grey bark and to four other kinds of *Chinchona*. Spruce first mentions this plant in the description of his visit to the Quitenian Andes in 1859,* in which he refers to it as one of two kinds of *Chinchona* found by him at Llalla, viz., *Cuchicara* and *Pata de Gallinazo*. Unfortunately in this account both plants are referred to very briefly, there being no botanical characters given that would suffice

* Journal of the Linnean Society, volume iv, page 189.
† Spruce's Report on the expedition to procure seeds and plants of the *Chinchona succirubra*, page 109.

for their identification. In a subsequent memoir,* however, he enters more into detail, and refers to them as specimens gathered "under the name of *Cascarilla cuchicara*," and says that "they consist of two forms, the one with nearly glabrous, the other with densely pubescent leaves." The latter is the form which, in paragraph 6, I have presumed to be identical with our "Pubescens." The other, viz., the smooth-leaved *Cuchicara*, was subsequently, according to Howard,† considered by Spruce to be the same as the species figured as *Chinchona coccinea* in the "Nueva Quinologia of Pavon." I am not disposed to place much weight on this, however, as Spruce's original description‡ of the *Cuchicara*, written in 1861 when fresh from the *Chinchona* forests, differs from that of the *Chinchona coccinea* as given by Howard. It has also to be observed that the "Magnifolia" of the Nilgiri plantations does not resemble the figure of the *Chinchona coccinea* of Pavon. It does, however, in its characters agree sufficiently close with Spruce's brief definition to induce me to believe that it is the smooth-leaved *Cuchicara* or *Pata de Gallinazo*, which he saw when exploring the Red-bark forests. In many respects, it also has a strong family likeness to the Crown barks, much more so than the "Pubescens," and there is reason to believe that, in some cases, plants of it were regarded by Mr. McIvor as varieties of *Chinchona officinalis*.

8. Briefly then the outcome of my examinations of "Pubescens" and "Magnifolia" is, that the former is probably Spruce's *Cuchicara* with the under surface of the leaves pubescent, and that "Magnifolia" is, as Mr. Cross affirms, the *Pata de Gallinazo*, or smooth-leaved *Cuchicara* referred to by Spruce. At the same time it is very desirable that the Nilgiri specimens should be compared with those at Kew, as the materials at my command do not admit of more explicit definitions.

9. The numbers of *Chinchonas* having the appearance of hybrids that have sprung up on the Government estates seem to show that cross-breeding between varieties, if not between species, is very common. The *dimorphic* structure of the flowers also favours this view as we know, that it is intended to prevent self and to promote cross fertilisation. Colonel Beddome§ thinks that natural hybridisation could scarcely occur in the *Chinchonas*, as he found that the anthers burst and shed their pollen before the flower is fairly open. In such cases, however, the flowers are usually *protandrous*, that is to say, the female organs are not ripe when the male are at maturity, so that self-fertilisation is prevented and the crossing even of species rendered possible. Mr. McIvor whose experience was very extensive fully believed in the occurrence of *natural* and *artificial* hybrids amongst the *Chinchonas*; and as the varieties now existing on the estates support his view, we are, it appears to me, bound to accept it until it has been experimentally proved to be wrong. In the case of the famous "pubescens," which is also termed "lanosa," Mr. McIvor seems to have had doubts as to whether it was a hybrid or distinct species, and stated latterly, in a private letter to Mr. Howard, that he would not trust to its coming true from seed. On the other hand, the fact remains that on a private estate in which he had an interest the plant was very extensively propagated from seed and the seedlings permanently planted out.

One thing is greatly to be regretted in connection with this variety, viz., the destruction of the solitary typical "pubescens" tree at Naduvatom, from which the bark was taken, that yielded such wonderful results in the hands of Mr. Howard and Dr. DeVrij. I wished on my present visit to compare it with the ordinary "pubescens" scattered over the estates, but found it had disappeared.

10. Although the Yellow-bark trees do not generally thrive well at Naduvatom and have mostly died out, still it is astonishing how many varieties with perfectly distinct characters are to be found there. As it is very important that the value of these should be ascertained,|| I made a very complete collection of their barks, and it

* Report on the expedition to procure seeds and plants of the *Chinchona succirubra*, page 109.

† Weddell's "Notes on the Quinquinas," page 23, and G.O., Revenue Department, No. 1105, of 25th July 1881, page 2.

‡ Report on the expedition to procure seeds and plants of the *Chinchona succirubra*, &c., page 110.

§ In paragraph 44 of his Report recorded in G.O., No. 1280, of 29th August 1881.

|| See paragraph 48 of G.O., No. 1280, of 29th August 1881.

will be found that this includes 15 varieties. Some of these will no doubt be found worthless, but others are sure to prove valuable. To the general delicacy of the *Calisaya* family at Naduvatom there is one signal exception in a tree, of which a few specimens are to be found scattered over the estates, and which has hitherto been regarded as a hybrid. The tree in question grows vigorously, attains a large size and is, apparently, quite hardy. The leaves are light green and, except on very young shoots, quite destitute of that beautiful velvety gloss, so characteristic of the *Calisaya* stirps. It has, however, the lax few-flowered panicles, the clavate flower buds, the ribbed-white corolla, and the characteristic calyx and small fruit of a yellow bark. The leaves also, although unusually large, are of the typical *Calisaya* form. This plant is No. 6 of my collection.

11. In making the collections of bark and botanical specimens the following procedure was observed:—

- With three exceptions the specimens were all taken from trees previously unbarked and unmossed. The results of analysis will therefore be of great interest and value, both from a botanical and practical point of view.
- Each tree from which specimens were taken was marked by me with a small zinc plate, bearing an indelible number written on it with a chemical. This label was attached to the tree at an elevation well out of the way of accidental injury and secured with copper wire. At the same time the Superintendent marked the trunk of the tree with white oil paint.
- Each herbarium and bark specimen was also carefully labelled, the label bearing the same number as that of the tree from which the specimen was taken.
- A register was kept of every specimen collected, and the whole of the specimens were attended to by myself and dried under my own eye, so as to avoid all risk of confusion.

Should it be necessary therefore to refer to any of the trees hereafter there ought to be no difficulty in finding them, unless the zinc labels be wilfully damaged or removed.

12. The total number of specimens of bark collected by me, with corresponding herbarium specimens, amounts to 38.

The collection includes Crown barks, Red barks, "Pubescens," "Magnifolia" or Pata de Gallinazo, Grey barks, Yellow barks and one of Pahudiana.

13. The specimens will be kept ready for packing and despatch on receipt of the orders of Government.

The following is a list of specimens:—

1 Number on Specimen.	2 Number of Plot in which the Tree was growing and Year of planting.	3 Species or variety to which the Plant belongs.
No. 1 ...	No. 7 plot planted in 1864, D.	"Pubescens"
" 2 ...	" 6 " " 1864, C.	"Pubescens."
" 3 ...	" 2 " " 1862, B.	Pata de Gallinazo.
" 4 ...	" 1 " " " A.	Do.
" 5 ...	" 1 " " " A.	"Pubescens."
" 6 ...	" 1 " " " A.	Chinchona calisaya (large vigorous variety).
" 7 ...	" 1 " " " A.	Chinchona succirubra.
" 8 ...	" 1 " " " A.	Chinchona micrantha.
" 9 ...	" 1 " " " A.	Do.
" 10 ...	" 1 " " " A. (Barked before on lower part of stem)	Chinchona succirubra.

1 Number on Specimen.	2 Number of Plot in which the Tree was growing and Year of planting.	3 Species or variety to which the Plant belongs
" 11 ...	No. 14 plot planted in 1866 B.	Chinchona succirubra.
" 12 ...	" 29 " Calisaya planted in 1870, C.	Chinchona calisaya (Flowers white).
" 13 ...	Do. do. ...	C. Calisaya.
" 14 ...	Do. do. ...	(Flower greenish externally, internally white).
" 15 ...	Do. do. ...	C. Calisaya.
" 16 ...	Do. do. ...	Do.
" 17 ...	Do. do. ...	(Flowers deep pink externally, internally paler).
" 18 ...	Do. do. ...	C. Calisaya.
" 19 ...	Do. do. ...	(Flowers large white).
" 20 ...	Do. do. ...	C. Calisaya.
" 21 ...	Do. do. ...	(Flowers pink externally, internally white. Tube of corolla bent).
" 22 ...	Do. do. ...	C. Calisaya.
" 23 ...	No. 29 plot, grass land planted in 1870, C.	(Flowers pink externally).
" 24 ...	" 29 " planted in 1870, C.	C. Calisaya.
" 25 ...	" 23 " " 1869, F.	(Flowers pale pink externally).
" 26 ...	(Barked before on lower part of stem) " 20 " grass land planted in 1869, C.	C. Calisaya.
" 27 ...	" 20 " " " " D.	(Flowers greenish externally).
" 28 ...	" 21 " " " " D.	C. Calisaya.
" 29 ...	" 22 " " " " E.	C. Officialis.
" 30 ...	" 21 " " " " D.	Do.
" 31 ...	" 22 " planted " " E.	C. Micrantha.
" 32 ...	" 21 " " " " D.	Pata de Gallinazo.
" 33 ...	" 21 " " " " D.	Chinchona succirubra.
" 34 ...	" 23 " " " " F.	Pata de Gallinazo.
" 35 ...	" 12 " " 1865, C.	Chinchona succirubra.
" 36 ...	" 3 " " 1863 ...	Chinchona nitida.
" 37 ...	" 1 " " 1862, A.	Chinchona calisaya.
" 38 ...	(Barked before on lower part of stem). No. 1 plot planted in 1862, A.	(Flowers pale pink).
		Chinchona calisaya.
		C. Calisaya.
		C. Officialis (narrow-leaved <i>Angustifolia</i> type).
		Pata de Gallinazo.
		Chinchona Pahudiana
		(growing low down the ghât and of bushy habit, not nearly so luxuriant as at Dodabetta).
		Chinchona succirubra.
		Chinchona succirubra.

It has to be observed that the barks were not in their best condition at the period at which I had to collect them, and in some instances they were removed with difficulty.

READ—also the following letter from Surgeon-Major G. BIDIE, M.B., Superintendent, Government Central Museum, to the Secretary to Government, Revenue Department, dated Madras, 15th March 1882, No. 235:—

In preparing the Chinchona specimens for packing, of which a list is attached to my letter No. 199, of the 3rd. March 1882, it has occurred to me to add a few notes regarding the barks of "Pubescens" and "Pata de Gallinazo."

2. That of "Pubescens" is a thick bark, and when dry resembles our Red bark very much in fracture, colour, aroma and taste. In fact were its botanical

origin not known, it would probably be commercially classed as a superior-looking Nilgiri Red-bark.

3. One peculiarity of the "Pata" tree, noticed at Naduvatom, was the abundance of sap that escaped on cutting into the bark. This juice at first clear changed immediately on exposure to a brick-red colour, so that in handling the fresh bark my hands got stained red. Other Chinchonas yield a red juice on being wounded, but none to such an extent and of the same remarkable red colour as the "Pata." On examining the dried bark it is found to have characters so distinct as to separate it not only from the "Pubescens," but also from all other varieties of Nilgiri-grown bark. It resembles Crown bark more than any other, but is thicker and not so dark in colour or so rough to the touch externally. The "Pata" bark occurs in quills more or less perfect covered with a brown epidermis, which is sometimes wrinkled longitudinally and always beset with transverse cracks. The inner side is of a brick-red colour, and has a striated satiny appearance. When broken it has a pleasant aroma, and a short fracture showing fibres on the inner side. In taste it is pleasantly bitter with a little astringency.

4. The superior alkaloid-yielding properties of "Pata" bark have been referred to in paragraph 7 of Colonel Beddome's letter recorded in G.O., No. 1280, of 29th August 1881.

The results of analyses may be briefly stated as follows:—

	Quinine.	Quinidine.	Chinchoni- dine.	Chincho- nine.	Amorphous Alkaloids.	Crystallised Sulphate of Quinine.
DR. PAUL'S RESULTS.						
<i>Naduvatom.</i>						
Renewed	3.61	0.64	1.03	0.27	0.49	4.99
Unmossed	2.30	0.16	2.30	0.72	0.40	3.10
<i>DoJabatta.</i>						
Natural (?)	2.12	Trace.	4.77	0.22	0.28	2.86
Mossed	1.78	0.07	2.72	0.58	0.24	2.40
Renewed	3.03	0.12	1.71	0.24	0.20	4.03
MR. HOWARD'S RESULTS.						
Natural	2.27	0.00	3.21	3.17	0.93	...

ORDER—dated 10th March 1882, No. 280, Revenue.

Miscellaneous.

The Right Honorable the Governor in Council is indebted to Dr. Bidie for his careful and instructive report which quite satisfies Government on the question raised by Mr. Cross.

2. The specimens which have been prepared should be at once packed and despatched to the Right Honorable the Secretary of State for India, to whom the papers on the subject will now be forwarded.

(True Extract.)

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

To the Superintendent, Government Central Museum.
,, Conservator of Forests.

Exd. W. H. French.

60 Copies.

Original

Govt. of (1882) Madras.
REVENUE.

6503/82

Letter no 7 of 27th March
to Secy to Govt. Revenue

Order, dated 10th March 1882, No. 280.

Chinchona Plantations—at Naduvattam, Nelli-
giris.—Dr. Bidie's report on the —. Passing
orders on —.

10th March 1882, No. 280
Regd. - Govt. of Madras
No. 79
Government Central Museum
Madras 24th January 1882.

Letter From

Surgeon Major G. Bidie M.B.
Super^r Government Central Museum

To
The Secretary to Government
Revenue Department
Fort Saint George.

Sir,

I have the honour with reference
to Government Order No. 3610-A of
14th December 1881 to report, that the duty
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Sir,
Your Most Obedient Servant

Edw. M. Surgeon Major

Super. Government Central Museum

Edw

Flu: 1214/82

Revenue (1882) Department

No 381

From

Surgeon Major G. Bidie M.B.
Superintendent Government
Central Museum
Madras

No 79

Dated 24th }
Received 24th } January 1882

No

Subject

Informing that a report
will be submitted on the
Specimens of Cinchona bark
and good Botanical Specimen
procured at Naderattam.

Recorded

C. 31.1.82 P. 3.2.82
C. 4.3.82 P. 10.3.82

No 199

Government Central Museum
Madras 3rd March 1882.

From

Surgeon Major George Bidie M.B.
Superintendent Government Central
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* Journal of the Linnæan Society Vol IV p. 189

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was

* Journal of the Linnean Society Vol IV. P. 189.

9 Report on the Expedition to procure seeds & plants
of the Cinchona succirubra P. 109.

was subsequently, according to Howard,^{*} considered by Spruce to be the same as the species figured as Cinchona Coccinea in the Flora Quinologica of Pavon? I am not disposed to place much weight on this, however, as Spruce's original description[†] of the Enchicara, written in 1861 when fresh from the Cinchona forests, differs from that of the Cinchona Coccinea as given by Howard. It has also to be observed, that the "Magnifolia" of the Nilgiri plantations does not resemble the figure of the C. Coccinea of Pavon. It does, however, in its characters agree sufficiently close with Spruce's brief definition to induce me to believe, that it is the smooth leaved Enchicara or Pata de Gallinazo, which he saw when exploring the Red-bark forests. In many respects, it also has a strong family likeness to the Crown-barks, much more so than the "Pubescens"; and there is reason to believe, that, in some cases, plants of it were regarded by Mr. McIvor as varieties of Cinchona officinalis.

8/ Briefly then the outcome of my examinations of "Pubescens" and "Magnifolia" is, that the former is probably Spruce's Enchicara with the under surface of the leaves pubescent, and that "Magnifolia"

^{*} Weddell's "Notes on the Quinquinas" page 23, 74. G. Revenue Dept. No. 1105 of 25 July 1881 page 2.

[†] Report on the Expedition to procure seeds & plants of the Cinchona Saccubra Vol. II.

19 5
is, as Mr. Cross affirms, the Pata de Gallinazo or smooth leaved Enchicara referred to by Spruce. At the same time it is very desirable, that the Nilgiri specimens should be compared with those at Kew, as the materials at my command do not admit of more explicit definitions.

9/ The numbers of Cinchonas having the appearance of hybrids that have sprung up on the Government Estates seem to show, that cross-breeding between varieties, if not between species, is very common. The dimorphic structure of the flowers also favours this view as we know, that it is intended to prevent self and to promote cross fertilisation. Col. Beddome[†] thinks that natural hybridisation could scarcely occur in the Cinchonas, as he found, that the anthers burst and shed their pollen before the flower is fairly open. In such cases, however, the flowers are usually protandrous, that is to say the female organs are not ripe when the male are at maturity, so that self-fertilisation is prevented and the crossing even of species rendered possible. Mr. McIvor whose experience was very extensive fully believed in the occurrence of natural and artificial hybrids amongst the Cinchonas, and as the varieties now existing on

[†] In para. 14 of his Report recorded in G.O. No. 1280 of 29th August 1881.

on the estates support his view, we are, it appears to me, bound to accept it until it has been experimentally proved to be wrong. In the case of the famous "pubescens", which is also termed "lanosa", Mr. McIvor seems to have had doubt as to whether it was a hybrid or distinct species, and stated latterly, in a private letter to Mr. Howard, that he would not trust to its coming true from seed. On the other hand the fact remains, that on a private estate in which he had an interest the plant was very extensively propagated from seed and the seedlings permanently planted out.

One thing is greatly to be regretted in connection with this variety viz. the destruction of the solitary typical "pubescens" tree at Naduratum, from which the bark was taken that yielded such wonderful results in the hands of Mr. Howard and Dr. De Vrij. I wished on my present visit to compare it with the ordinary "pubescens" scattered over the estates, but found it had disappeared.

10/ Although the yellow bark trees do not generally thrive well at Naduratum and have mostly died out, still it is astonishing how many varieties with perfectly distinct characters are to be found there. As it is very important that the value of these should be ascertained** I made a very complete collection of

** See para 48 of G. O. No 1280 of 29th August 1881

of their barks, and it will be found, that this includes 15 varieties. Some of these will no doubt be found worthless, but others are sure to prove valuable. To the general delicacy of the calisaya at Naduratum there is one signal exception, in a tree, of which a few specimens are to be found scattered over the Estates, and which has hitherto been regarded as hybrid. The tree in question grows vigorously, attains a large size and is, apparently, quite hardy. The leaves are light green and, except on very young shoots, quite destitute of that beautiful velvety gloss, so characteristic of the Calisaya strips. It has, however, the lax few flowered panicles, the clavate flower buds, the ribbed white corolla, and the characteristic calyx and small fruit of a yellow bark. The leaves also, although unusually large, are of the typical calisaya form. This plant is No 6 of my collection.

11/ In making the collections of bark and botanical specimens the following procedure was observed:-

- a. With these exceptions the specimens were all taken from trees previously unmarked and unmessed. The results of analysis will therefore be of great interest and value, both from a botanical and practical point of view.
- b. Each tree from which specimens were taken was marked by me with a small zinc plate, bearing an indelible number written on it with a chemical. This label was attached to the tree at an

an elevation well out of the way of accidental injury and secured with copper wire. At the same time the Superintendent marked the trunk ^{of the tree} with white oil paint.

c Each herbarium and bark specimen was also carefully labelled, the label bearing the same number as that of the tree from which the specimen was taken.

d A register was kept of every specimen collected, and the whole of the specimens were attended to by myself and dried under my own eye, so as to avoid all risk of confusion.

Should it be necessary therefore to refer to any of the trees hereafter there ought to be no difficulty in finding them, unless the zinc labels be wilfully damaged or removed.

12/ The total number of specimens of bark collected by me, with corresponding herbarium specimens, amounts to 38.

The collection includes Crown-barks, Red-barks, "Pubescens", "Magnifolia" or Pata de Gallinazo, Grey-barks, Yellow barks and one of Sabudiana.

13/ The specimens will be kept ready for packing and despatch on receipt of the orders of Government. The following is a list of specimens:—

1. Number, or Specimen	2. Number of plot in which the tree was growing and year of planting	3. Species or variety to which the plant belongs.
No 1	No 7 plot, planted in 1864, D.	"Pubescens"

No 2	No 6 plot planted in 1864 C	"Pubescens"
No 3	No 2 plot 1862 B	Pata de Gallinazo
No 4	No 1 " " " " A	Do
No 5	No 1 " " " " A	"Pubescens"
No 6	No 1 " " " " A	Cinchona Calisaya (large vigorous variety)
No 7	No 1 " " " " A	Cinchona succirubra
No 8	No 1 " " " " A	Cinchona micrantha
No 9	No 1 " " " " A	Do
No 10	No 1 " " " " A (Barked before on lower part of stem)	Cinchona succirubra
No 11	No 14 plot planted in 1866 B	Do
No 12	No 29 " calisaya planted in 1870 C	Cinchona calisaya (Flowers white)
No 13	Do Do	C. Calisaya
No 14	Do Do	(Flower greenish externally internally white)
No 15	Do Do	C. Calisaya
No 16	Do Do	Do
No 17	Do Do	(Flowers deep pink externally internally pale)
No 18	Do Do	C. Calisaya (Flowers large white)
No 19	Do Do	C. Calisaya (Flowers pink externally internally white. Tube of corolla bent)
No 20	Do Do	C. Calisaya (Flowers pink externally)
No 21	Do Do	C. Calisaya (Flowers pale pink externally)
No 22	Do Do	C. Calisaya (Flowers greenish externally)
No 23	No 29 plot graftland planted in 1870 C	C. officinalis
No 24	No 29 plot planted in 1870 C	Do
No 25	No 23 plot planted in 1869 F (Barked before on lower part of stem)	C. micrantha
No 26	No 20 " graftland planted in 1869 C	Pata de Gallinazo
No 27	No 20 " " " " "	Cinchona succirubra
No 28	No 21 " " " " D	Pata de Gallinazo
No 29	No 22 " " " " E	Cinchona succirubra
No 30	No 21 " " " " D	Cinchona nitida

No 31	No 22 plot planted in 1869 E	<i>Cinchona calisaya</i>
" 32	" 21 " " " D	(Flowers pale pink) <i>Cinchona calisaya</i>
" 33	" 21 " " " D	<i>C. calisaya</i>
" 34	" 23 " " " F	<i>C. officinalis</i> (narrow leaved <i>angustifolia</i> type)
" 35	" 12 " " " 1865 C	Pata de Gallinazo
" 36	" 3 " " " 1863	<i>Cinchona paludiana</i> (growing low down the foot of bushy habit, not nearly so luxuriant as at Padalotta)
" 37	" 1 " " " 1862 A (Barked before on lower part of stem).	<i>Cinchona succirubra</i>
" 38	No 1 plot planted in 1862 A	<i>Cinchona succirubra</i>

It has to be observed that the barks were not in their best condition at the period at which I had to collect them, and in some instances they were removed with difficulty.

I have the honor to be,

Sir,

Your most Obedient Servant,

W. B. Sargent
Superintendent Govt. Central
Museum.

Ms. J. 14.12.84 29 3610 A.
F. 24.8.81 78 418-423

Revenue (1882) Department.

From No 12/4

The Superintendent
Government Central
Museum.

No 199

Dated 3rd Elbareh 1882
Recd 3rd —

No

Subject.

Reporting on the *Cinchona*
Plantations at Kadurvatani recently
visited by him in obedience to G.O.
No 3610 A of 14th December 1881.

C. 4.3.82 R. 10.3.82

No 235

Government Central Museum

Madras 15th March 1882

From

Surgeon Major George Bidie M.B.,
Superintendent Government Central
Museum

To

The Secretary to Government
Revenue Department
Fort Saint George.

Sir,

In preparing the Cinchona specimens for packing, of which a list is attached to my letter No 199 of the 3rd March 1882, it has occurred to me to add a few notes regarding the barks of "Tuboseens" and "Pata de Gallinazo".

2 / That of "Tuboseens" is a thick bark, and when dry resembles our Red-bark very much in fracture, colour, aroma and taste. In fact were its botanical origin not known, it would probably be commercially classed as a superior looking Nilgiri red-bark.

3 / One peculiarity of the "Pata" tree, noticed at Nadurattam, was the abundance of sap that escaped on cutting into the bark. This juice at first clear changed immediately on exposure to a brick-red colour, so that in handling the fresh bark my hands got stained red. Other Cinchonas yield

a red juice on being wounded, but none to such an extent of the same remarkable red colour as the "Pata". On examining the dried bark it is found to have characters so distinct as to separate it not only from the "Pubescens", but also from all other varieties of Nilgiri grown bark. It resembles crown bark more than any other, but is thicker and not so dark in colour or so rough to the touch externally. The "Pata" bark occurs in quills more or less perfect: covered with a brown epidermis, which is sometimes wrinkled longitudinally, and always beset with transverse cracks. The inner side is of a brick-red colour, and has a striated satiny appearance. When broken it has a pleasant aroma, and a short fracture showing fibres on the inner side. In taste it is pleasantly bitter with a little astringency.

4/ The superior alkaloid yielding properties of "Pata" bark have been referred to in para 7 of Col. Beddome's letter recorded in G.O. No. 1280 of 29th August 1881.

The results of analyses may be briefly stated as follows:—

<u>Dr. Paul's results</u> <u>Naduvattam</u>	Quinine	Quinidine	Quinidine	Quinine	Amorphous alkaloids	Crystallized Sulphate of Quinine
Renewed	3.61	0.64	1.03	0.27	0.49	4.99
Unmossed	2.30	0.16	2.30	0.72	0.40	3.10

	Quinine	Quinidine	Quinidine	Quinine	Amorphous alkaloids	Crystallized Sulphate of Quinine
<u>Dodabetta</u>						
Natural (?)	2.12	trace	4.77	0.22	0.28	2.86
Unmossed	1.78	0.07	2.72	0.33	0.24	2.40
Renewed	3.03	0.12	1.71	0.24	0.20	4.08
<u>Mr. Howard's results</u>						
Natural	2.27	0.00	3.21	3.17	0.93	

I have the honor to be,
Sir,

Your Most Obedient Servant,

Edie Muf Surgeon Major
Superintendent Govt. Central
Museum

Revenue (1882) Department

From

No 1471

The Superintendent
Government Central
Museum.

No 235

Dated 15th March 1882
Received 15th —

No

Subject

Adding a few notes regarding
the banks of "Pukseeno" and "Pita"
de Gallinazo at Vidunattam in
continuation of No 199 of 3rd March 1882.

Revenue Department

Confidential

Draft G.O. No 280 of 10th March 1882

Read again G.O., 14th Decem-
ber 1881, No 3610 A.

C Nos: 381 and 1214/82

and 15th

and 235.

Read also letters from
the Superintendent, Govt Central
Museum, dated 24th January
and 3rd March 1882, Nos 79,
and 199 respectively.

The Right Honorable
the Governor in Council
is indebted to Dr. Bidie
for his careful and in-
structive report which
satisfactorily disposes of
the question raised by
Mr. Cross.

The Specimens which
have been prepared should
be at once packed and
despatched to the Right
Honorable

Honorable the Secretary
of State for India to
whom the papers on the
subject will now be
forwarded.

P/11

2 To the Dept. of Central Museum
3 To the Conservator of Forests
4 To the Secy. of the Govt. of India

By 7/2/1882
The Secretary of State
for India.

My Lord Marquis,

Adverting to
paragraphs 3 and 4 of
our despatch No 3, dated
11th ultimo (Revenue &
Department, Forests)
we have now the honor
to forward the papers
recorded in our Pro-
ceedings of this date
on the subject of the
exact

* G.O. dated

Despatch No 3

Forwarding to Bidie's
report on the Chinchorro
Plantations at Madras

d/26 January 1882

Exact Species of Chinchorro
grown at Madras
and to solicit your
Lordship's attention to
the valuable report which
has been drawn up by
Bidie in whose conclusions
we entirely agree. When
the specimens reach the
India Office we trust
that they may be placed
in the most competent
hands for examination
and analysis as well
as comparison with those
already at Kew.

We append extract
(paras 9 and 10) of a
Minute recorded by His
Excellency the Governor, after
a tour recently made,
bearing upon the
subject

Fort George
March/82

Drafty & cold
leaf at 1, in D. B. B. B.
In part on B. B. B. B.
Plants at B. B. B.
-vations.

Print
10/3/82