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MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No.	286 Revenue	Press Mis.
Dated	2nd March	1874.

Not to be folded or roughly handled

*Proceedings of the Madras Government, Revenue Department,
2nd March 1874.*

No. 25. Read the following despatch from the Right Honourable the Secretary of State for India:—

Revenue,
No. 25.

INDIA OFFICE, LONDON,
16th December 1873.

My LORD,—I have received and considered in Council your Excellency's despatches noted in the margin on the subject of the cultivation of the Cinchona plants and the analysis and sale of bark.

July 11th (No. 18), 1873.

July 31st (No. 21),

September 12th (No. 24), 1873.

September 26th (No. 30),

October 10th (No. 32), 1873.

2. I observe, with satisfaction, that a statement of the outturn as well as of the expenditure of the Cinchona plantations now appears in the tabular return, and that the figures have been rather under-estimated. The receipts from the 25,000 lbs. of bark, the despatch of which you announced in your letter of September 12th (No. 24), 1873, were estimated at 2,500*l*. The sale took place on the 11th ultimo, and the sum realized was 3,490*l*, the average price secured being 2*s*. 10*d*. per lb., while one parcel was sold at the very unusual price of 5*s*. 9*d*. per lb. Something like this average may be applied to the 33,000 lbs. of dry bark used by Mr. Broughton in the manufacture of amorphous quinine, which will place its value at not less than 3,300*l*.; and, judging from the same promises, the additional 50,000 lbs. of bark to be harvested this year will be worth 6,700*l*. Thus, the total income from the plantations in 1873 will have been 13,490*l*., which should increase in future years. I consider this to be a satisfactory interest on the whole outlay, and it entirely removes Cinchona cultivation from the category of experiments.

3. The question between the coppicing and mossing systems of taking the crops of bark is deservedly receiving very careful attention. It would appear that, under scientific and skilled management, the trees which are treated with the mossing process can be made to yield three times as much bark in the same time as the same number when coppiced. This at least is the deduction of Mr. Cockerell, the Commissioner. It must, however, be borne in mind that the mossing process is not likely to be successful, unless skilled scientific management is available, and that, under other circumstances, an ordinary cultivator must resort to coppicing. It is, therefore, desirable that both systems should continue to receive attention on the Government plantations.

4. The means of supplying the Cinchona febrifuge to the people of India in a cheap form, and in sufficient quantity, is a question which must always be considered as paramount in the conduct of the plantations. The object is to be attained in two ways, which must supplement each other: first, the manufacture from bark on the spot; and, second, for some years to come at least the purchase of the febrifuge in the cheapest available form in Europe.

5. As regards the first way, I observe that the Quinologist was supplied with 33,000 lbs. of dry bark during the current year for the manufacture of so-called "amorphous quinine." I shall be glad to receive information respecting the quantity of this form of the febrifuge that is annually issued, the quantity that has been used in the Medical Departments, and the quantity that has been sold to the

public, with the price, and the judgment that has been formed with respect to its efficacy. It would also be useful if some details could be furnished to me with reference to the cost of the manufacture, the prospect of reducing it if the demand increases, and the probable extent of such increase.

6. I perceive from a return that has been prepared in the Store Department of this Office that latterly the indents for quinine and other Cinchona alkaloids from your Presidency have been very considerably smaller than those from Bombay. From 1869 to 1873 the indents for quinine from Bombay amounted to 3,382 lbs., while during the same period those for quinine and all other Cinchona alkaloids from Madras only amounted to 2,275 lbs. It will be interesting to ascertain whether this smaller demand from a larger Presidency is due to Mr. Broughton's local manufacture, and to what extent.

7. With reference to the second means of supplying the people of India with the febrifuge, namely, the purchase of the cheaper, though equally efficacious, alkaloids in this country, I am surprised to find that the valuable reports of the Cinchona Commission appointed by your Government five years ago should have borne so little fruit. It was the unanimous opinion of the medical men, who, investigated the question with praiseworthy care and diligence, that the three other Cinchona alkaloids that were supplied to them were almost, some thought quite, as efficacious as quinine. Yet Cinchonine, Cinchonidine, or quinidine, have only been indented for in very small quantities by your Government since the date of the report of the Commission.

8. Mr. Howard, the eminent quinine manufacturer, has been consulted on the subject, and I herewith transmit 20 copies of his letter*. You will see that he particularly points out the value of Cinchonidine as likely, from its efficacy

* Dated 21st October 1873.

and cheapness, to supply the means of enabling us to bring the Cinchona febrifuge within the reach of the mass of the people. Another very important advantage that will be derived from the extensive use of the febrifuge in the form of Cinchonidine is that it will extend the cultivation, and increase the value of *C. succirubra*, the species which, while producing that particular alkaloid in very considerable quantities, also grows more readily and over a wider range than any other in the hill districts of your Presidency.

9. I request that the suggestions contained in Mr. Howard's letter may receive the careful consideration of your Excellency's Government, and that you will furnish me with your matured views on the subject.

10. The specimens, in triplicate, of the flowering and fruit-bearing branches and the barks of the species of Cinchona grown on the Nilgiri Hills, referred to in your despatch, dated July 11th (No. 18), 1873, have been duly received. One set has been presented to the Herbarium at Kew, another to the British Museum, and the third will be preserved in this Office.

I have, etc.,
(Signed) ARGYLL.

His Excellency the Right Honourable
the Governor in Council, Fort St. George.

CINCHONA CULTIVATION.

USE OF CINCHONA AS A FEBRIFUGE.

INDIA OFFICE,
17th October 1873.

Sir,—I am directed by the Secretary of State for India in Council to convey to you his best thank for the valuable assistance you have frequently given, both by advice and by performing difficult and laborious analyses, in the promotion of Cinchona cultivation in British India. The important and costly works you have published on the Cinchona genus have been of essential use both to those who collected plants and seeds of various species in South America and to the cultivators in India. Your analyses, and the valuable remarks with which they are illustrated, have furnished excellent guides to those who are in charge of the plantations; and the numerous occasions, during a course of years, on which you have given advice and assistance of various kinds have furthered the progress of the undertaking very materially. His Grace desires me to assure you that the services which you have so zealously and constantly rendered are fully appreciated, and that your aid is considered by Her Majesty's Government to have furthered, in no small degree, the success of this undertaking, which will hereafter be most beneficial to the people of India.

With regard to the present supply of Cinchona alkaloids for India, a question has been submitted for the consideration of the Secretary of State, with reference, on the one hand, to a sensible reduction of the cost of that supply, and, on the other, to increasing the value of the red bark species, by supplementing the quinine supplied to India with cinchonidine. I am to request that you will be so good as to furnish His Grace with your views on this point, and with any details that are likely to be useful in the consideration of the question.

I am, etc.,
(Signed) C. B. MARKHAM.

J. E. Howard, Esq.

No. 96A, Revenue.

TOTTENHAM,
21st October 1873.

Sir,—In reply to the communication received from you, dated the 17th instant, conveying to me the thanks of the Secretary of State for India in Council, I beg that, in the first place, you will transmit in return the expression of the lively satisfaction with which I receive the said acknowledgment. In the next place, I wish to assure Her Majesty's Government that I shall esteem it a like a duty and a pleasure to give, to the best of my ability, the assistance required on the present occasion.

I feel that I cannot do better than by prefacing my reply to the question now submitted to me, by a reference to the observations* of His Excellency the Duke of Argyll on the report of the Committee of medical officers appointed to examine the febrifuge properties of Cinchona alkaloids other than quinine.

His Excellency the Secretary of State remarks that quinine, though one of the most indispensable medicines used in India, is also one of the most expensive, and that it is very desirable that the results of the above inquiries should bear fruit. "The Cinchona febrifuge alkaloids should now be made available in India to a much larger extent than has hitherto been practicable, and thus save, to a considerable extent, the expense of quinine."

The lapse of four years since the above recommendation was issued have; only served to demonstrate its importance. The price of quinine has advanced, and also that of the most important

*Proceedings of the Madras Government, Revenue Department,
2nd March 1874.*

barks from which it is extracted; and from the gradual exhaustion of the South American supply of these, coupled with the increasing demand for quinine, there is quite a possibility of a still higher point being reached.

Owing to the high price, the stocks appear to have been kept low, so that the outburst of the Burdwan fever came upon a medical staff unfurnished with the requisite supplies to meet the emergency.*

It is impossible to doubt that many lives might have been saved if the above recommendation had been acted on.

In the meantime, the demand for cinchonine has so largely increased in all quarters of the world that I do not suppose the present low price will be long maintained, and the limited amount of its production leaves abundant room for cinchonidine as the alkaloid suited to meet the need of the Government of India.

At home the increased confidence in cinchonidine and its consequent use, is very marked, most especially and satisfactorily in our large hospitals; I am inclined to suppose that it is found in most cases not inferior to quinine, though it is probable the latter medicine is resorted to in the most serious and difficult cases. I have reason to believe, however, that there are instances in which the therapeutic action of cinchonidine is preferable to that of quinine.†

There is great reason to suppose that it contributed to the cure of the Countess of Chinchon, as the Loxa barks abound in this alkaloid, and not, as has been erroneously stated, in cinchonine; and I see no reason why this particular medicine should not eventually be made to fulfil the benevolent desires of Her Majesty's Government, and so diffuse health and cure through the vast Native population of India.

For the supply of the cinchonidine-producing material will shortly become, in a practical sense, unlimited, and this cannot be said of the other alkaloids, so that it would appear the price may always be kept at a reasonably low rate. A great quantity of bark is imported from South America, at prices scarcely remunerative, containing this alkaloid, and all the red bark, the produce of *Cinchona succirubra*, may be ranked in the same class. I had hoped that by skilful management the tree might have been led to form quinine instead of cinchonidine; but this expectation does not seem likely to be realized. Nothing can be better for pharmaceutical purposes than the beautiful red bark now sent home from Ceylon, to say nothing of other sources of supply; but even in the skilful hands of Mr. McIvor the renewed red bark, such as I now have before me, is not cured of the above tendency. Mr. McIvor informs me that he hopes to send home bark of this description containing 3 per cent. of sulphate of quinine and 2 per cent. of sulphate of cinchonidine. I think it much more probable that the proportions will be reversed.

In an account which I have just received of the cultivation in Java, I find, from the analysis of M. Moens, that the proportion there of cinchonidine to quinine in the red bark is as 6.36 per cent. of cinchonidine to about 2 per cent. other alkaloid.

It follows, as a matter of course, that it is a point of immense importance to the success of the Cinchona plantations in India, that Her Majesty's Government should follow up those steps which have been so judiciously taken by encouraging the consumption of the sulphate of cinchonidine. This is needed especially to give the Native practitioners confidence in the medicine which cannot be said as yet to be introduced into India.

It is, perhaps, not too much to say that such a measure might increase the value of those plantations which consist exclusively of red bark to a degree varying from 10 to 50 per cent., according to circumstances.

I am afraid, considering the quality of some of the bark sent over, that the higher proportion would be attained only by those who have attended to the directions given as to the height above

* See the "Calcutta Gazette" of July 30th, 1873.

† In confirmation of this opinion I refer especially to the mature opinion of Dr. Bensley, that cinchonidine has "secured for itself a position perhaps the most exalted of all" the alkaloids. See No. 507, 29th October 1868, "Properties of the Cinchona Alkaloids," Government of India, Home Department.

*Proceedings of the Madras Government, Revenue Department,
2nd March 1874.*

the sea-level (and so forth) of their plantations.* I wish that the cultivators could be induced to re-place a portion of the red bark trees they are now cutting down with the sort of *Calisaya* which is giving such splendid results in the Island of Java. This would, at all events, increase their chances of success, and at the same time augment the supply of quinine-producing bark for the future.

I will now endeavour to answer the question as to supplementing the quinine supply to India by cinchonidine. I am glad that rather *supplementing* than *superseding* is looked to, as I believe that it requires time before the medical practitioner would willingly consent to be deprived altogether of quinine. I should certainly recommend, however, that in supplementing the supply, cinchonidine should be largely resorted to. I suppose that sulphate of cinchonidine could be obtained by public tender at about one-third the price of sulphate of quinine at the present moment, but a sudden and new demand might at once increase the price to some small extent, though not permanently.

I see by the "Times" of this morning that the Burdwan fever has again broken out, and I shall, therefore, have to consider the question of the possibility of a very large demand occurring under similar circumstances. I do not suppose that this could be at once supplied, but that it would require time and due notice to the manufacturers. The apparatus used is always costly, and the staff highly paid; and I should not like to find the Government placed in any difficulty as to the supply owing to the unwillingness of the quinine manufacturers to turn their trade into another channel. This is supposing that the quantity demanded should be so large as to require the extraction of the cinchonidine from bark bought for the purpose. All this *could* and *would* be done, but it cannot all be effected in a day.

I understand that Her Majesty's Indian Government desire that every Native druggist's shop in India should be supplied with this febrifuge remedy at the price of one rupee per ounce, and that thus fever should be comparatively banished from the land.

It is a magnificent conception, and I see no reason why it should not eventually be realized, I do not say by quinine, but by the cheaper alkaloids. I do not recommend Her Majesty's Government to purchase quinine, because the supply is so limited that the price already approximates to quinine. I have no objection to recommend cinchonine, but it will not so much benefit the Indian plantations; but I do recommend the sulphate of cinchonidine as the very best means within my knowledge of carrying out the benevolent intentions of Her Majesty's Government.

There is, as I have intimated, so very large a supply of the material from which this particular alkaloid is obtained, that it would be impossible for the manufacturers eventually to keep up the sulphate of cinchonidine beyond a moderate price. At present the barks from South America, rich in this product, come in at so low a price that from some particular parcels it is possible the medicine might be procured even at the very figure above indicated.

In conclusion, I may say that I am deeply impressed with the importance of the subject now under the consideration of Her Majesty's Indian Government. It is, I believe, the one thing needed to place the Cinchona plantations on the vantage ground of certain and ascertained success. It exactly meets and removes the difficulty which I pointed out on the occasion of the first analysis of the Indian *Cinchona succirubra*. It will, moreover, be of signal advantage on the score of economy if only the present amount of febrifuge alkaloid is required; or if considerations of the public good should prevail to enlarge the supply, it would extend the benefit to three times the number of individuals; it would, moreover, be the means of commending to the whole world a medicine which needs only to be known to be preferred even to quinine in certain cases. It should not be forced upon the medical practitioners, but introduced gradually and with discretion.

I think that the present is a very favourable time for the Government, if they resolve upon the matter, to issue tenders for the first supply.

I have, etc.,

(Signed) JOHN ELIOT HOWARD.

Clements R. Markham, Esq., C.B., F.R.S., &c.

*Proceedings of the Madras Government Revenue Department,
2nd March 1874.*

STATEMENT showing Quantities of Quinae Sulphas Cinchonine, Cinchonidine, and Quinidine supplied to India from 1867 to 1873, and price for the same.

	Quantity.	Price.		Quantity.	Price.
BENGAL.			BOMBAY.		
1867.			1870.		
Quinae, Sulphas...	1,083	0 4 0 per oz.	Quinae, Sulphas...	700	4 17 6 per lb.
1868.			Ditto ...	810	4 13 9 "
Quinae, Sulphas...	500	0 3 11 "	1871.		
Ditto ...	1,617	3 10 8 per lb.	Cinchonine...	3	1 4 0 "
1869.			Quinae, Sulphas...	400	5 18 6 "
Cinchonine, Sulphas...	150	0 12 0 "	1872.		
Cinchonidine "	150	2 8 0 "	Quinae, Sulphas...	722	5 12 0 "
Quinidine "	150	2 8 0 "	MADRAS.		
Quinae, Sulphas...	1,090	4 4 0 "	1867.		
Litto ...	1,068	4 3 6 "	Quinae, Sulphas...	200	0 4 3 per oz.
Cinchonine, Sulphate of...	850	0 9 6 "	Quinae ...	67	0 4 0 "
Cinchonidine ...	350	2 10 0 "	Quinae, Sulphas...	401	0 4 0 "
Quinidine ...	350	2 10 0 "	1868.		
1870.			Quinidine, Sulphate of ...	133	0 5 0 "
Quinae, Sulphas...	1,160	4 19 8 "	Cinchonidine "	133	0 5 0 "
Ditto ...	1,200	5 3 4 "	Cinchonine "	133	0 1 6 "
Quinae, Sulphas...	1,100	4 2 9 "	Quinae, Sulphas...	645	3 18 8 per lb.
1871.			1869.		
Quinae, Sulphas { 850 {	1,696	5 5 10 "	Quinae, Sulphas...	150	4 4 0 "
and			Quinidine, Sulphate of ...	150	2 4 0 "
Cinchonidine, Sulphas' ...	220	2 0 0 "	Cinchonine	61	0 10 0 "
Quinidine ...	160	2 14 0 "	Quinae, Sulphas "	200	4 10 8 "
1872.			1870.		
Quinae, Sulphas...	500	6 0 0 "	Quinae, Sulphas...	130	5 6 8 "
Quinine "	500	5 10 2 "	Cinchonine, Sulphate of...	140	0 12 0 "
Quinae "	760	4 18 8 "	Cinchonidine	208	2 0 0 "
Quinine, Neutral, Sul-			Quinidine	195	2 8 0 "
phate of ...	60	4 6 0 "	1871.		
Quinae, Sulphas...	950	4 18 8 "	Quinae, Sulphas...	360	5 6 6 "
Quinine, Neutral, Sul-			Cinchonine, Sulphate of...	20	1 0 6 "
phate of ...	40	4 6 0 "	Quinae, Sulphas, bleached.	15	0 8 8 per oz.
1873.			" " unbleach-		
Quinine, Sulphate of	60 10	0 7 10 per oz.	ed ...	25	0 7 3 "
Quinae, Sulphas...	2,546	6 16 0 per lb.	1872-73.		
BOMBAY.			Quinae, Sulphas...	300	5 0 0 per lb.
1867.			Quinae "	183 6	6 16 0 "
Quinae, Sulphas...	500	0 4 2 per oz.	Cinchonine, Sulphate of...	48 8	} Not yet ordered.
Quinae, " ...	200	0 4 6 "	Cinchonidine, "	10 9	
1868.			Quinidine	71 14	
Quinae, Sulphas...	760	4 1 4 per lb.			
1869.					
Quinae, Sulphas...	750	4 3 0 "			

*Proceedings of the Madras Government, Revenue Department,
2nd March 1874.*

3. The Government are already in receipt of a communication from the Quinologist regarding the manufacture of Amorphous quinine, but, in order that full information on the subject may be placed before the Secretary of State in a compact form, they will be glad to be supplied, by Mr. Broughton, with a statement showing the quantity of this febrifuge that has been made, the cost of the labour and apparatus employed in the manufacture, and the amount and description of bark used, with its value locally and in England. The statement should be accompanied by such remarks, explanatory or otherwise, as the Quinologist may desire to record.

4. The Government also desire to receive Mr. Broughton's views on the subjects discussed in Mr. Howard's letter.

(True Extract.)

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

To the Board of Revenue.
,, the Commissioner of the Nilgiris.
,, the Government Quinologist.
,, the Sanitary Commissioner.
,, the Surgeon-General, Indian Medical Department.

No. 21. ORDER THEREON, 2nd March 1874, No. 286.

Miscellaneous.

Surgeon-General, I. M. D.
Sanitary Commissioner.
Commissioner, Nilgiris.
Government Quinologist.

COMMUNICATED, with copies of its enclosure, to the Board of Revenue and the officers noted in the margin.

2. Dr. Balfour will furnish, at an early date, full information, as far as his department is concerned, on the points raised by the Secretary of State in paragraphs 5, 6, 7, and 8, of his despatch, and will obtain and forward, with his own observations, the opinions of such medical officers of experience as he may think fit to consult, regarding the suggestions made by Mr. Howard.

Exd. F. R. Bantleman.

CHINCHONA CULTIVATION.

USE OF CHINCHONA AS A FEBRIFUGE.

India Office,
17th October 1873.

Sir,

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I am, &c.,
(Signed) C. R. MARKHAM.

J. E. Howard, Esq.

No. 96A, Revenue.

Tottenham,
21st October 1873.

Sir,

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The lapse of four years since the above recommendation was issued have only served to demonstrate its importance. The price of quinine has advanced, and also

* Dated 4th March 1869. "Return" ordered to be printed 9th August 1870, page 269.

Uick 2/12 849/74
Nile 2/12 849/74
7/12 1377/74

5-5-55

Oct. of 1874

To

REVENUE.

THE BOARD OF REVENUE.

&c., &c., &c.

Dated March 2nd.

Recd.

Ind.

G. O., 2nd March 1874, No. 286

MARCH.

Nos. 20-21.

Sale of Chinchona bark and use of Alkaloids other than Quinine.—Communicates to Revenue Board and the officers specified Home despatch regarding —; directs Surgeon-General, Indian Medical Department, to furnish full information on certain points raised by Home Government, and to report on the suggestions made by Mr. Howard; and calls on the Quinologist to submit further information on the subject of the manufacture of Amorphous quinine.

that of the most important barks from which it is extracted; and from the gradual exhaustion of the South American supply of these, coupled with the increasing demand for quinine, there is quite a possibility of a still higher point being reached.

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For the supply of the chinchonidine-producing material will shortly become, in a practical sense, unlimited, and this cannot be said of the other alkaloids, so that it would appear the price may always be kept at a reasonably low rate. A great quantity of bark is imported from South America, at prices scarcely remunerative, containing this alkaloid, and all the red bark, the produce of *Chinchona succirubra*, may be ranked in the same class. I had hoped that by skilful management the tree might have been led to form quinine instead of chinchonidine, but this expectation does not seem likely to be realized. Nothing can be better for pharmaceutical purposes than the beautiful red bark, now sent home from Ceylon, to say nothing of other sources of supply, but even in the skilful hands of Mr. McIvor the renewed red bark, such as I now have before me, is not cured of the above tendency. Mr. McIvor informs me that he hopes to send home bark of this description containing 3 per cent of sulphate of quinine and 2 per cent. of sulphate of chinchonidine. I think it much more probable that the proportions will be reversed.

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It follows, as a matter of course, that it is a point of immense importance to the success of the Chinchona plantations in India, that Her Majesty's Government should follow up those steps which have been so judiciously taken, by encouraging the consumption of the sulphate of chinchonidine. This is needed especially to give the Native practitioners confidence in the medicine, which cannot be said as yet to be introduced into India.

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success, and at the same time augment the supply of quinine producing bark for the future.

I will now endeavour to answer the question as to supplementing the quinine supply to India by chinchonidine. I am glad that rather *supplementing* than *super-seding* is looked to, as I believe that it requires time before the medical practitioner would willingly consent to be deprived altogether of quinine. I should certainly recommend, however, that in supplementing the supply, chinchonidine should be largely resorted to. I suppose that sulphate of chinchonidine could be obtained by public tender at about one third the price of sulphate of quinine at the present moment, but a sudden and new demand might at once increase the price to some small extent, though not permanently.

I see by the "Times" of this morning that the Burdwan fever has again broken out, and I shall therefore have to consider the question of the possibility of a very large demand occurring under similar circumstances. I do not suppose that this could be at once supplied, but that it would require time and due notice to the manufacturers. The apparatus used is always costly, and the staff highly paid, and I should not like to find the Government placed in any difficulty as to the supply owing to the unwillingness of the quinine manufacturers to turn their trade into another channel. This is supposing that the quantity demanded should be so large as to require the extraction of the chinchonidine from bark bought for the purpose. All this *could* and *would* be done, but it cannot all be effected in a day.

I understand that Her Majesty's Indian Government desire that every Native druggist's shop in India should be supplied with this febrifuge remedy at the price of one rupee per ounce, and that thus fever should be comparatively banished from the land.

It is a magnificent conception, and I see no reason why it should not eventually be realized, I do not say by quinine, but by the cheaper alkaloids. I do not recommend Her Majesty's Government to purchase quinine, because the supply is so limited that the price already approximates to quinine. I have no objection to recommend chinchonine, but it will not so much benefit the Indian plantations; but I do recommend the sulphate of chinchonidine as the very best means within my knowledge of carrying out the benevolent intentions of Her Majesty's Government.

There is as I have intimated, so very large a supply of the material from which this particular alkaloid is obtained, that it would be impossible for the manufacturers eventually to keep up the sulphate of chinchonidine beyond a moderate price. At present the barks from South America, rich in this product, come in at so low a price that from some particular parcels it is possible the medicine might be procured even at the very figure above indicated.

In conclusion, I may say that I am deeply impressed with the importance of the subject now under the consideration of Her Majesty's Indian Government. It is, I believe, the one thing needed to place the Chinchona Plantations on the vantage ground of certain and ascertained success. It exactly meets and removes the difficulty which I pointed out on the occasion of the first analysis of the Indian *Chinchona succirubra*. It will, moreover, be of signal advantage on the score of economy if only the present amount of febrifuge alkaloid is required; or if considerations of the public good should prevail to enlarge the supply, it would extend the benefit to three times the number of individuals; it would, moreover, be the means of commending to the whole world a medicine which needs only to be known to be preferred even to quinine in certain cases. It should not be forced upon the medical practitioners, but introduced gradually and with discretion.

I think that the present is a very favourable time for the Government, if they resolve upon the matter, to issue tenders for the first supply.

I have the honour to be,

Sir,

Your obedient Servant,

(Signed) JOHN ELIOT HOWARD.

Clements R. Markham, Esq., C.B., F.R.S., &c.

STATEMENT showing Quantities of Quinae Sulphas Chinchonine, Chinchonidine, and Quinidine supplied to India from 1867 to 1873, and price for the same.

BENGAL.		Quantity.	Price.
1867.		Lbs.	£ s. d.
Quinae, Sulphas	-	1,083	0 4 0 per oz.
1868.			
Quinae, Sulphas	-	500	0 3 11 "
Ditto	-	1,617	3 10 8 per lb.
1869.			
Chinchonine, Sulphas	-	150	0 12 0 "
Chinchonidine "	-	150	2 8 0 "
Quinidine "	-	150	2 8 0 "
Quinae, Sulphas	-	1,000	4 4 0 "
Ditto	-	1,068	4 3 6 "
Chinchonine, Sulphate of	-	350	0 9 6 "
Chinchonidine "	-	350	2 10 0 "
Quinidine "	-	350	2 10 0 "
1870.			
Quinae, Sulphas	-	1,160	4 19 8 "
Ditto	-	1,200	5 3 4 "
Quinae, Sulphas	-	1,100	4 2 9 "
1871.			
Quinae, Sulphas	[850]	500	5 5 10 "
Chinchonidine, Sulphas	-	220	5 5 2 "
Quinidine	-	160	2 0 0 "
1872.			
Quinae, Sulphas	-	500	6 0 0 "
Quinine "	-	500	5 10 2 "
Quinae "	-	760	4 18 8 "
Quinine, Neutral, Sulphate of	-	60	4 6 0 "
Quinae, Sulphas	-	950	4 18 8 "
Quinine, Neutral, Sulphate of	-	40	4 6 0 "
1873.			
Quinine, Sulphate of	-	lbs. oz.	
Quinae, Sulphas	-	60 10	0 7 10 per oz.
	-	2,546	6 16 0 per lb.
BOMBAY.			
1867.			
Quinae, Sulphas	-	500	0 4 2 per oz.
Quinae "	-	200	0 4 6 "
1868.			
Quinae, Sulphas	-	760	4 1 4 per lb.
1869.			
Quinae, Sulphas	-	750	4 3 0 "
1870.			
Quinae, Sulphas	-	700	4 17 6 "
Ditto	-	810	4 13 9 "
1871.			
Chinchonine	-	3	1 4 0 "
Quinae, Sulphas	-	400	5 18 6 "
1872.			
Quinae, Sulphas	-	722	5 12 0 "

MADRAS.		Quantity.	Price.
1867.		Lbs.	£ s. d.
Quinae, Sulphas	-	200	0 4 3 per oz.
Quinae	-	67	0 4 0 "
Quinae, Sulphas	-	461	0 4 0 "
1868.			
Quinidine, Sulphate of	-	133	0 5 0 "
Chinchonidine "	-	133	0 5 0 "
Chinchonine "	-	133	0 1 6 "
Quinae, Sulphas	-	645	3 18 8 per lb.
1869.			
Quinae, Sulphas	-	150	4 4 0 "
Quinidine, Sulphate of	-	150	2 4 0 "
Chinchonine "	-	61	0 10 0 "
Quinae, Sulphas	-	200	4 10 8 "
1870.			
Quinae, Sulphas	-	130	5 6 8 "
Chinchonine, Sulphate of	-	149	0 12 0 "
Chinchonidine "	-	208	2 0 0 "
Quinidine "	-	195	2 8 0 "
1871.			
Quinae, Sulphas	-	360	5 6 6 "
Chinchonine, Sulphate of	-	20	1 0 6 "
Quinae, Sulphas, bleached	-	15	0 8 3 per oz.
" " unbleached	-	25	0 7 3 "
1872-73.			
Quinae, Sulphas	-	300	5 0 0 per lb.
Quinae	-	lbs. oz.	
Chinchonine, Sulphate of	-	183 6	6 16 0 "
Chinchonidine "	-	48 8	} Not yet ordered.
Quinidine "	-	10 9	
	-	71 14	

India Office,
London, 16th December 1873.

Revenue,
No. 25.

To His Excellency The Right Honourable The Governor
in Council, Fort St. George.

MY LORD,

Para. 1. I have received and considered in Council your Excellency's Despatches noted in the margin,* on the subject of the cultivation of the Chinchona plants, and the analysis and sale of bark.

* July 11th (No. 18) 1873.
July 31st (No. 21) "
September 12th (No. 24) 1873.
September 26th (No. 30) "
October 10th (No. 32) 1873.

2. I observe, with satisfaction, that a statement of the out-turn as well as of the expenditure of the Chinchona Plantations now appears in the tabular return, and that the figures have been rather under estimated. The receipts from the 25,000 lbs. of bark, the despatch of which you announced in your Letter of September 12th (No. 24) 1873, were estimated at 2,500*l*. The sale took place on the 11th ultimo, and the sum realized was 3,490*l*, the average price secured being 2*s*. 10*d*. per lb., while one parcel was sold at the very unusual price of 5*s*. 9*d*. per lb. Something like this average may be applied to the 33,000 lbs. of dry bark used by Mr. Broughton in the manufacture of amorphous quinine, which will place its value at not less than 3,300*l*.; and, judging from the same premises, the additional 50,000 lbs. of bark to be harvested this year will be worth 6,700*l*. Thus, the total income from the plantations in 1873 will have been 13,490*l*., which should increase in future years. I consider this to be a satisfactory interest on the whole outlay, and it entirely removes Chinchona cultivation from the category of experiments.

3. The question between the coppicing and mossaing systems of taking the crops of bark is deservedly receiving very careful attention. It would appear that, under scientific and skilled management, the trees which are treated with the mossaing process can be made to yield three times as much bark in the same time as the same number when coppiced. This, at least, is the deduction of Mr. Cockerell, the Commissioner. It must, however, be borne in mind that the mossaing process is not likely to be successful unless skilled scientific management is available, and that, under other circumstances, an ordinary cultivator must resort to coppicing. It is, therefore, desirable that both systems should continue to receive attention on the Government Plantations.

4. The means of supplying the Chinchona febrifuge to the people of India in a cheap form, and in sufficient quantity, is a question which must always be considered as paramount in the conduct of the plantations. The object is to be attained in two ways, which must supplement each other; first, the manufacture from bark on the spot; and second, for some years to come at least, the purchase of the febrifuge in the cheapest available form in Europe.

5. As regards the first way, I observe that the quinologist was supplied with 33,000 lbs. of dry bark during the current year, for the manufacture of so-called "amorphous quinine." I shall be glad to receive information respecting the quantity of this form of the febrifuge that is annually issued, the quantity that has been used in the Medical Departments, and the quantity that has been sold to the public, with the price, and the judgment that has been formed with respect to its efficacy. It would also be useful if some details could be furnished to me with reference to the cost of the manufacture, the prospect of reducing it if the demand increases, and the probable extent of such increase.

6. I perceive from a return that has been prepared in the Store Department of this Office, that, latterly, the indents for quinine and other Chinchona alkaloids from your Presidency have been very considerably smaller than those from Bombay. From 1869 to 1873 the indents for quinine from Bombay amounted to 3,382 lbs., while during the same period those for quinine and all other Chinchona alkaloids from Madras only amounted to 2,275 lbs. It will be interesting to ascertain whether this smaller demand from a larger Presidency is due to Mr. Broughton's local manufacture, and to what extent.

7. With reference to the second means of supplying the people of India with the febrifuge, namely, the purchase of the cheaper, though equally efficacious, alkaloids in this country, I am surprised to find that the valuable reports of the Chinchona Commission appointed by your Government five years ago should have borne so little fruit. It was the unanimous opinion of the medical men who investigated the question with praiseworthy care and diligence, that the three other Chinchona alkaloids that were supplied to them were almost, some thought quite, as efficacious as quinine. Yet chinchonine, chinchonidine, or quinidine have only been indicated for very small quantities by your Government since the date of the Report of the Commission.

8. Mr. Howard, the eminent quinine manufacturer, has been consulted on the subject, and I herewith transmit 20 copies of his letter. You will see that he particularly points out the value of chinchonidine as likely, from its efficacy and cheapness, to supply the means of enabling us to bring the Chinchona febrifuge within the reach of the mass of the people. Another very important advantage that will be derived from the extensive use of the febrifuge in the form of chinchonidine is that it will extend the cultivation and increase the value of *C. succirubra*, the species which, while producing that particular alkaloid in very considerable quantities, also grows more readily and over a wider range than any other in the hill districts of your Presidency.

* Dated 21st
Oct. 1873.

9. I request that the suggestions contained in Mr. Howard's letter may receive the careful consideration of your Excellency's Government, and that you will furnish me with your matured views on the subject.

10. The specimens in triplicate of the flowering and fruit-bearing branches and the barks of the species of Chinchona grown on the Nilgiri Hills, referred to in your Despatch dated July 11th (No. 18) 1873, have been duly received. One set has been presented to the Herbarium at Kew, another to the British Museum, and the third will be preserved in this Office.

I have the honour to be,

My Lord,

Your Lordship's most obedient, humble Servant,

No 10.

Revenue
16th Decr 1873The
Letter to Mr. George
No 25.

S.O. No 286 - 2 March 1874

Dated 16th Decr 1873Received 10th Jan 1874

Intimating receipt of
Despatches noted within on the sub-
ject of the cultivation of the Cinchona
plants and the Analysis & sale of
bark & forwarding 20 copies of Mr.
Howard's letter & requesting that the
suggestions therein contained may
receive careful consideration of the
Madras Govt. that he may be furnished
with their matured views on
the subject.

Revenue Department.

No. 286

PROCEEDINGS of the MADRAS GOVERNMENT.

Under date the 2nd March 1874.

• READ the following Despatch from the
Right Honorable the Secretary of
State for India.

Intimating receipt of Despatches
on the subject of the cultivation of the
Cinchona plants and the analysis and
sale of bark, & forwarding 20 copies of
Mr. Howard's letter & requesting that
his suggestions may receive careful
consideration &c

H. E. 16th December 1873 N^o 25.

Surgeon General - J. D. S.
Sanitary Commissioner
Commissioner, Nilgiris
Government Quislogit.

Communicated, with
copies of its enclosure, to the
Board of Revenue, and the
Officers noted in the margin.

2. Mr. Balfour will
furnish, at an early date, full
information, as far as his depart-
ment is concerned, on the points
raised by the Secretary of State
in paras 5, 6, 7 and 8 of his
Despatch, and will obtain and
forward, with his own observations,
the opinions of such medical
officers

MS
27/2

11-12
Officers of experience as he may
think fit to consult, regarding
the suggestions made by Dr.
Howard.

3. The Government are
already in receipt of a commun-
-ication from the Quinologist
regarding the manufacture of
Amorphous Quinine, but, in order
that full information on the
subject may be placed before
the Secretary of State in a
compact form, they will be
glad to be supplied, by Dr.

Broughton, with a statement
showing the quantity of this
febrifuge that has been made,
the cost of the labor and ap-
-paratus employed in the
manufacture and the amount
and description of bark used,
with its value locally and in
England. The statement
should be accompanied by
such remarks, explanatory
or otherwise, as the ^{Quinologist} may desire
to record.

4. The Government

217
also desire to receive Dr. Broughton's
views on the subjects discussed
in Dr. Howard's letter.
Lat

Deposited in U.S. to
J. V. Dunslop with
copies of 2 Incl: 2-3-74

60
6

13 1/2 lbs. of Quinine
2 1/2 lbs. of Pulvis
1 1/2 lbs. of Quinologist
5 to Sanitary Com.
5 to Surge Genl. Dis. H. S. } Dec. 12. 3. 74

Completed

20-21

c 16 June 194