

- (1) பக்கங்களின் எண்ணிக்கை 28
(2) புதுக்கித் திருப்பிய நாள் 12.9.88
(3) ஆதரங்குறிப்பவர் சுருக்கொப்பம் 10/2

தமிழ்நாடு ஆவணக் காப்பகம்.

தமிழ்நாடு அரசு

அருவாய் துறை

அரசாணை எண். <u>80. (206-207)</u> மு. கோப்புத் தாள் எண்.	அச்சகம் பலவகை
நாள் : <u>13.1.1879.</u>	198

80

மடிக்கலோ கண்டபடி கையாளலோ கூடாது

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

13th January 1879, No. 80.

Read the following paper:—

No. 206. Proceedings of the Government of Bengal in the Financial Department, (Agriculture), dated Calcutta, 16th December 1878.

Read the following papers:—

From GEORGE KING, Esq., M.B., F.L.S., Superintendent, Royal Botanic Garden, Calcutta, and of Government Cinchona Cultivation in Bengal, to the Secretary to the Government of Bengal, Revenue Department, dated near Darjeeling, 18th October 1878, No. 84-C.

I HAVE the honor herewith to submit the Annual Report on the Government Cinchona Plantations in Bengal for the year ending 31st March 1878.

Sixteenth Annual Report on the Government Cinchona Plantation in British Bikanir, by GEORGE KING, Esq., M.B., F.L.S., Superintendent of the Royal Botanic Garden, Calcutta, and of Cinchona Cultivation in Bengal.

The past year has on the whole been a successful one. During it the plantation has been increased by 253 acres; 26,800 trees have been planted on land from which old trees had been uprooted in taking the crop; 311,225 lb. of dry bark have been harvested; and the whole plantation has been kept in good order. The weather during the year was favorable, and the plantation looked at the end of the cold season quite as well as ever I recollect to have seen it.

2. *Details of the year's Planting.*—During the year over seven hundred thousand red bark trees were planted out. These were slotted as follows:—

	Plants.	Acres.
Planted in Mangrove on new land	253,800	97 3/4
Do. in Sittong on do.	414,000	152 1/2
Do. in Rangbhee and Rishap on land from which old plants had been uprooted	26,800	...
Total	794,600	250

In addition to these red barks, 8,370 plants (equal to 3 1/4 acres) were put out in Sittong of a hybrid variety, which yields an excellent bark, and which altogether promises to be a valuable sort. All these plants were put out at distances of 4 feet apart, so that each has an area of 16 square feet of soil. Planted in this way an acre carries 2,722 trees. This plan of close planting has great advantages. In the early stages the young plants benefit much by the shade and protection which they quickly begin to afford each other. Moreover, as soon as they begin to press each other some of the plants can be thinned out, and thus at a comparatively early age a plantation begins to yield a crop of bark. During the year our endeavors to multiply the best varieties of cinchona calycata were continued. Government are aware that calycata is the source of the yellow bark of commerce, the most valuable of all the medicinal sorts. As has been explained in former reports, this species is liable to vary in a most perplexing way; and while a few of its varieties yield a bark of wonderful richness, the majority yield bark which is by comparison poor in alkaloids. For some years past our efforts have

drug. The proper dose of the febrifuge is, moreover, found to be about the same as, or even less than, the dose of quinine.

13. The supply during the year of 8,011 lb. of febrifuge to the Medical Depot at Calcutta indicates a greatly increased consumption in Government dispensaries and hospitals, the consumption of the two previous years jointly having amounted to only 1,942 lb. Four hundred pounds were also indented for during the year by the Medical Depot at Bombay, and 2,096 lb. were sold at the Botanical Garden Office. Quinine during the whole year was very high in price, and in Calcutta it for some time stood at Rs. 20 per ounce, a sum for which 16 ounces of the febrifuge were always obtainable. The saving to Government by the substitution of cinchona febrifuge for quinine in their hospitals and dispensaries has already been considerable. I have not as yet been able to get the exact figures from the Examiner of Medical Accounts, but I calculate that at a moderate estimate it amounts to over three lakhs of rupees (£30,000 sterling).

14. In conclusion I have to acknowledge the continued good service of Mr. Gamble, who has been in charge of the plantation and factory during the year. I have also to acknowledge the good work done by Messrs. Hermann, Jaffray, and Lister, each of whom, for part of the year, acted as Mr. Gamble's assistant.

15. The usual tabular returns (four in number) are appended.

(Signed) GEORGE KING.

Table showing the Number and Distribution of Cinchona Plants in the Government Plantations, Mungpoo Division, on the 1st April 1878.

Names of Species of Cinchona.	Number in permanent plantation on 1st April 1877.	Uprooted during the year 1877-78.	Planted during the year 1877-78.	Number in permanent plantation on 1st April 1878.	Number of stock plants for propagation.	Number of seedlings or rooted cuttings in nursery beds for permanent plantations.	Number of rooted plants in seed or beds.	Number of cuttings on 1st April.
C. new variety	21,000	..	..	21,000	10,000	None	None	19,500
C. succirubra	2,451,000	112,000	232,600	2,631,600	None	220,000	160,000	..
C. calisaya	351,500	..	..	351,500	6,000	None	None	20,000
C. micrantha	60,000	30,000	..	20,000	None	..	..	..
C. officinalis and varieties ..	25,000	..	..	25,000	..	..	..	..
C. pahuliana	5,092	..	..	5,092	..	..	..	..
Total ..	2,909,592	142,000	232,600	3,060,192	16,000	220,000	160,000	39,500

Table showing the Number and Distribution of Cinchona Plants in the Government Plantations, Sittong Division, on the 1st April 1878.

Names of Species of Cinchona.	In permanent plantation on 1st April 1877.	Planted during the year 1877-78.	Number in permanent plantation on 1st April 1878.	Number of stock plants for propagation.	Number of seedlings or rooted cuttings in nursery beds for permanent plantations.	Number of rooted plants in cutting beds.	Number of cuttings during the month.	Total number of plants, cuttings, and seed.
C. new variety	..	6,870	6,870	None	3,400	..	..	12,270
C. succirubra	237,400	414,000	651,400	..	273,000	..	..	924,400
C. calisaya	..	..	..	..	..	..	..	..
Total ..	237,400	422,870	658,270	None	276,400	..	..	936,670

Accounts of Dry Succirubra Bark collected during Season 1877-78.

	Year of planting.	Distance apart of planting.	Original number of plants.	Approximate area in acres.	Totals.			
					Root.	Stem.	Branch.	Totals.
Lower Kishap—								
Uprooted	1877-68	5 x 6	172,000	22.5	85,300	51,600	29,100	176,000
Upper Kishap—								
Coppicing 32 acres (first trees left for seed) ..	1868-69	6 x 6	..	32.0	..	18,472	11,182	29,654
Thinning	1869-70	6 x 6	..	..	18,042	18,704	31,001	67,747
Mungpoo Ridge—								
Uprooted	1872	4 x 4	..	..	3,165	4,160	3,100	10,425
Rongpoo—								
Coppicing 20 acres (first trees left for seed) ..	1867-68	6 x 6	..	20.0	..	13,357	16,878	30,235
Thinning	1868	6 x 6	..	..	..	8,200	7,000	15,200
Totals—								
Coppicing 8 acres	1872	4 x 4	..	8.0	..	5,064	1,840	6,904
Thinning	..	4 x 4	..	..	1,960	2,835	3,851	8,746
Total ..	..	..	..	..	88,747	148,117	104,206	341,070

(Signed) J. GAMBLE.

Table showing the Produce of the Government Cinchona Plantations in British Sikkim.

	Pounds.
Dry bark collected by pruning and thinning during 1869-70 ..	2,400
Do. do. do. 1870-71 ..	12,500
Do. do. do. 1871-72 ..	39,000
Do. do. do. 1872-73 ..	Nil
Do. do. do. 1873-74 ..	16,000
Do. do. do. 1874-75 ..	39,400
Crop of 1875-76	211,931
Do. 1876-77	207,781
Do. 1877-78	344,225
Total ..	873,242

From C. H. WOOD, Esq., Government Quinologist, to the Secretary to the Government of Bengal, Financial Department, dated Darjeeling, 17th October 1878, No. 48.

I HAVE the honor herewith to submit the Annual Report of the Quinologist for the year ending 31st March 1878.

QUINOLOGIST'S REPORT FOR 1877-78.

A CONSIDERABLE extension of the temporary factory at Mungpoo has been made during the past year, and a permanent drying-house has been constructed at a cost of Rs. 2,000. The total quantity of febrifuge manufactured in the twelve months was 5,162 lb. The following statement shows the cost of its production:—

	RS.	A.	P.
Acid, 13,481½ lb., @ Annas 3-6	2,949	6	9
Carriage of do. to Kurseong	2,286	9	6
Packing and carriage of empty jars	1,156	15	6
Caustic soda, 14,000 lb., @ Annas 1-5½	1,250	8	4
Carriage of do.	984	5	0
Charcoal, 700 maunds, @ Annas 6-6	2,34	6	0
Labor	1,510	2	6
Sundry expenditure	899	6	3
Quinologist	5,200	0	0
Carriage of febrifuge to Calcutta	641	4	0
Tins for febrifuge	973	7	0

	ES.	A.	P.
Advertisement charges	857	14	6
Building dry-house	2,011	8	3
Bark used, 220,639 lb., @ Annas 2-8 1/2%	21,008	7	7
	40,818	15	5
	61,827	7	0
Febrifuge produced, 5,162 lb., @ Rs. 11-14-1 1/2%	61,827	7	0
or per pound of febrifuge—			
Manufacturing expenses	4	1	1 1/2%
Bark	7	12	11 1/2%
	11	14	1 1/2%

2. This is the cost of the febrifuge without any interest on capital, the price of the bark being got by dividing the year's expenditure on the plantation by the weight of the bark crop. The difference between this cost and selling price therefore represents the amount available for paying interest on the constituted capital; that is to say, the sale of each pound of febrifuge will yield Rs. 4-9-11 of "pro fit" towards interest on capital.

It will be seen that the entire cost of the drying-house (Rs. 2,014-8-3) has been charged to the manufacturing expenses of this year. The selling charges, amounting altogether to Rs. 2,478-2-6, are also included in the account. If these two items be deducted, the actual cost of manufacture is only Rs. 16,521-5-19, or Rs. 2-3-24 per pound of febrifuge; including the selling charges it amounts to Rs. 3-10-19 per pound. It will be understood that the febrifuge is now sold by Dr. King at the Provincial Gardens in tin canisters holding 1 lb. each, and the minimum price has been raised from Rs. 16 to Rs. 16-5-0 to cover the carriage to Calcutta, the rest of the time, &c.

4. During the year 5,477 lb. 14 oz. of fabric have been disposed of as follows:—

	1877	1878
Sold to the public	2,028	2
Do. Medical Depot, Calcutta	3,011	5
Do. do Bombay	400	0
Samples given away	2	0
	<u>5,441</u>	<u>7</u>

5. The revenue collected from the sale of furniture and bark has amounted to Rs. 97,079-1-0, and has therefore exceeded the total expenditure on the plantations and the factory by Rs. 11,599-2-7, as shown in their accompanying statement:-

[illegible]

6. In addition to the profit of Rs. 11,530-2-7 in cash, it will be seen that the stock in the Quinologist's charge has been increased in value by Rs. 3,755-14-7. In this account the whole expenditure on the plantation is charged to the Quinologist, who receives in return the entire bark crop and is credited with all the revenue. By adopting this system there need be only one capital account for the whole undertaking, including all that has been spent in cultivation and manufacture from the commencement. The "profit" in the Quinologist's account then represents the interest that could be paid each year on this capital. Assuming that the capital with compound interest at 4 per cent. from the commencement in 1861 to the period when all increases stops will reach ten lakhs of rupees, the minimum profit which the Quinologist's account must then show, in order to put the undertaking on a satisfactory financial footing, will be Rs. 40,000.

7. By simply continuing the present somewhat imperfect method of manufacture this result will be attained when the sale of febrifuge reaches about 8,000 lb. annually. The revenue from this would be Rs. 1,30,000. The expenditure and profit would be as follows :—

	Rs.	A.	P.
Manufacturing expenses, 7,882 lb., @ Rs. 3-10-10½ ...	29,000	0	0
Plantation expenses, yielding 366,000 lb. of bark, @	60,000	0	0
Re 0-2-7½ ...	41,053	0	0
Profit, 4 per cent. on 10 lakhs ...			
7,882 lb. febrifuge, @ Rs. 16-8-0 ...	1,30,053	0	0

8. As the year now under notice (1877-78) was the first in which the febrifuge entered into general use in the Government dispensaries or was available to the public, and as, nevertheless, 5,400 lb. were disposed of, there is every reason to believe that the consumption will very soon reach the required amount. If means could be devised for facilitating its sale, through the agency of the police or some other Government department, to the native population in all feverish districts, a much larger quantity than that indicated would no doubt soon be in demand.

9. At the commencement of the year the Surgeon-General ordered cinchona febrifuge to be substituted for three-fourths of the quantity of quinine sanctioned in all indents of officers attached to native military charges, so that these officers received one-fourth of the allowance of quinine, the remaining three-fourths being replaced by febrifuge. At the Surgeon-General's recommendation the Government of Bengal ordered the same course to be pursued with all indents for sadder dispensaries, jail and police hospitals. The change was initiated by a circular memorandum, No. 4, of 4th April 1877, from the Surgeon-General, the first paragraph of which ran as follows:—

"The date for the submission of the annual indents for Europe medicines on account of native military charges being now close at hand, the Surgeon-General desires most earnestly to impress upon indenting officers that the extensive experiments carried out during last autumn in every circle of the Presidency with the cinchona febrifuge, manufactured at Rangbee, have left no shadow of doubt of that drug being a perfectly safe and efficient substitute for quinine in all cases of ordinary intermittent fever, and he sincerely hopes that medical officers will show their freedom from prejudice on the one hand, and their earnest desire to lessen expenditure on the other, by confining themselves in their ensuing indents to one-quarter of the sanctioned quantity of quinine, taking the balance in the locally manufactured article, the high therapeutic value of which may now be considered as having been placed beyond all reasonable discussion."

Extensive experiments were also made with the febrifuge in Bombay, and as the result the Surgeon-General of that Presidency has ordered it to be substituted for quinine in the same proportion as that adopted in Bengal. The demand thus created for Government purposes will probably amount to between 3,000 or 4,000 lb. annually.

10. In the ensuing year some improvements will be introduced in the method of manufacture, and a farther extension in the rate of production will be made if the demand increases. The following statement shows the total quantity of febrifuge hitherto manufactured :—

								LP.	OZ.
1874-75	...	...	...	...	...	...	...	48	10
1875-76	...	...	...	...	...	...	...	1,940	6
1876-77	...	...	...	...	...	...	...	3,750	12
1877-78	...	...	...	...	...	...	...	5,162	0
								10,901	12

11. In conclusion, I would beg to acknowledge the valuable assistance which Mr. Gammie has rendered in the superintendence of the manufacture. The efficient working of the Mungpoo factory is mainly attributable to the skill and energy of this officer.

Resolution.—The Cinchona Plantation consists of two parts—the older portion at Rangbee, Rishap and Mungpoo, in the valley of the Rungja; and the newer on the Sittong spur and in the adjoining valley of the Ryang. The working of the plantation during the year 1877-78 was, on the whole, very satisfactory. The Sittong Plantation was increased by 152½ acres, and the older plantation by 97½ acres. The total area of the former is now 242 acres, and of the latter nearly 2,000 acres. The Sittong Plantation is still too young to yield a crop, but the crop from the older portion was 344,225 lb. of dry bark.

2. During the year under review 706,600 red bark trees (*Cinchona succirubra*) were planted out, viz., 26,800 in Rangbee and Rishap, to replace the old plants uprooted in taking the bark crop, and 679,800 on new land—265,800 on Mungpoo and 414,000 on Sittong. In addition to the red barks, 8,870 trees of a hybrid variety were planted on the Sittong Division; this variety yields an excellent bark and promises to be very valuable. Efforts have been made to increase the cultivation of the yellow bark tree (*C. calisaya*), which produces the most valuable of all the medicinal barks; but owing to the difficulty of propagating the best varieties by seed, progress has been slow. The result of the year's operations with these plants has been only to increase the stock in the nurseries by 2,000 plants. The question of selecting other localities, where the climatic conditions are more favorable for the propagation of this plant than in Sikkim, has been separately submitted by Dr. King, and is under the consideration of Government.

3. The crop of the year consisted of 344,060 lb. of red bark and 3,165 lb. of grey bark, or 344,225 lb. in all of dry bark, against 297,781 lb. in 1876-77 and 211,391 lb. in 1875-76. The bark yielded in former years, viz., from 1869-70 to 1876-77, amounted in the aggregate to 5,22,917 lb., so that there has been taken from these plantations since their commencement no less than 5,73,242 lb. of dry bark.

4. The red bark crop was taken by the three methods of harvesting usually followed, viz., uprooting, coppicing, and thinning:—

	lb.
Uprooting	176,925
Coppicing	67,151
Thinning	97,274
Total	344,000

Ninety-two and-a-half acres of trees planted at distances of 6 feet by 6 were uprooted and 176,925 lb. of bark thus obtained, being at the rate of 1,900 lb. per acre. The land on which these trees were grown was not well suited for cinchona cultivation, and the outturn given above does not include bark obtained in part years by thinning and pruning. The experience gained on the plantation is sufficient to show that complete coppicing, viz., cutting close to the ground all but a few trees, is a perfectly safe way in Sikkim of taking the bark crop. Trees from four to six years of age coppice better than older trees, but the method of partial coppicing results in failure with trees of every age.

5. The total expenditure on the plantation amounted to Rs. 62,110-10-3, of which Rs. 13,716 was on account of establishment for the two divisions, Rs. 10,703-4-0 on account of working expenses of the old plantation, and Rs. 7,891-2-3 on account of capital charges for the Sittong Division, which has not yet come into bearing. Putting aside the last-mentioned sum and the proportion of establishment for the Sittong Division (Rs. 2,225-11-3), the working expenses of the old plantation came to Rs. 57,893-2-1.

6. The febrifuge, to the production of which the bark is now devoted, is manufactured in the factory at Mungpoo, which was considerably extended during the year, and to which a permanent dry-house was added at a cost of Rs. 2,014-8-0. The total quantity of bark taken during the year was made over to the Quinologist and 232,630 lb. were used in the manufacture of febrifuge. The total quantity of febrifuge produced was 5,162 lb., the cost being Rs. 61,327-7-0, or at the rate of Rs. 11-14-1 per pound. The quantity in store on the 1st April 1877 was 3,720 lb. 2 oz., so that the total quantity at the disposal of the Superintendent during the year was 8,882 lb. 2 oz., which was thus distributed:—

	LB.	OZ.
To Medical Store Department, Calcutta	3,011	5
To do do, Bombay	490	0
Sold to public	2,033	9
Samples given away	28	0
	5,477	14
In store on 31st March 1878	3,404	4
	8,882	2

7. To simplify the accounts, the entire crop of the year was made over to the Quinologist, to whose account also was debited the entire working expenses of the plantation. As stated in paragraph 5 above, the expenditure on the plantation during the year, excluding the Sittong Division, was Rs. 57,898-8-9, and the Quinologist's expenditure was Rs. 27,641-5-8, making a total of Rs. 85,539-14-5. The revenue derived from the sale of febrifuge to the public was Rs. 35,193-14-0, and the amount debited against the Medical Departments of Bengal and Bombay for febrifuge and bark supplied was Rs. 61,876-13-0, making a total sum of Rs. 97,070-1-0. The excess of receipts over expenditure was therefore Rs. 11,530-2-7. This being the first year in which the febrifuge entered into general use in the Government dispensaries, or was available to the public, the financial result is satisfactory. The saving to Government by the substitution of the febrifuge for quinine in the Government hospitals and dispensaries is calculated to exceed three lakhs of rupees a year. The consumption is increasing, and the question of providing greater facilities for the sale of the febrifuge throughout the province is now under the consideration of Government. The public generally have not yet realized that a febrifuge practically as efficient as quinine can be procured in almost any quantity at 1 Rupee the ounce, while quinine is selling at 20 Rupees the ounce. Pending the final orders of Government on the question, the Superintendent should place himself in communication with the officers in charge of the districts in which fever has lately been very prevalent, such as Dinagepore, Rungpore, Jessore, Hooghly, and Bardwan, with a view to supplies of the febrifuge being made available to the people within easy reach of their homes.

8. In the Resolution on the report for the year 1876-77 it was stated that a committee had been appointed to ascertain whether the febrifuge could be improved by eliminating any of its constituents. The committee has not yet concluded its investigations, but increased experience in the use of the drug during the year under review has produced such confidence in its efficacy as a remedy for fever as to warrant its substitution for a large portion of the quinine hitherto supplied to Government institutions.

9. The maps of the plantation prepared by the Survey Department have proved of great use in facilitating its systematic working, and arrangements will now, if possible, be made for mapping the portion planted since 1875.

10. The acknowledgments of Government are due to Dr. King and Mr. Wood for their services during the year, and the Lieutenant-Governor has noticed with satisfaction the commendation bestowed on Mr. Gammie, the resident manager of the plantations and factory, and on his assistants, by Dr. King.

Ordered that a copy of this Resolution, and of the Reports referred to, be submitted to the Government of India, in the Department of Revenue, Agriculture, and Commerce, and that a copy of the Resolution be forwarded for the information of Dr. King and Mr. Wood.

Ordered, further, that a copy of the Resolution, and of the Reports, be forwarded to the Judicial (Medical) Department of this office, and also to the Government of Madras for information.

(By order of the Lieutenant-Governor of Bengal.)

(Signed) D. BARBOUR,
Offg. Secy. to the Govt. of Bengal.

No. 5,629.

Copy forwarded to the Government of Madras for information.

(By order of the Lieutenant-Governor of Bengal.)

CALCUTTA,
10th December 1878.

(Signed) RAJANDRA NETHI MITRA,
Asst. Secy. to the Govt. of Bengal.

No. 207.

ORDER THEREON, 13th January 1879, No. 80.

Miscellaneous.

COMMUNICATED to the Board of
Revenue, Conservator of Forests, Com-
missioner of the Nilgiris, and Resident
in Travancore.

(True Extract.)

(Signed) H. S. THOMAS,
Acting Secretary to Government.

To the Board of Revenue.
„ the Conservator of Forests.
„ the Commissioner of the Nilgiris.
„ the Resident in Travancore and Cochin.

13th - 2nd Nov 1877, 1878.
 Read the following report -
 No. 840 Proceedings of the Govt of Bengal, Calcutta
 dated Calcutta 10th November 1877
 Read the following report -

No. 840., dated near Darjeeling, the 18th October 1878.

From—GEORGE KING, Esq., M.B., F.L.S., Superintendent, Royal Botanic Garden, Calcutta, and of Government Cinchona Cultivation in Bengal,
 To—The Secretary to the Government of Bengal, Revenue Department.

I HAVE the honor herewith to submit the annual report on the Government cinchona plantations in Bengal for the year ending 31st March 1878.

Sixteenth Annual Report on the Government Cinchona Plantation in British Sikkim. By GEORGE KING, Esq., M.B., F.L.S., Superintendent of the Royal Botanic Garden, Calcutta, and of Cinchona Cultivation in Bengal.

The past year has on the whole been a successful one. During it the plantation has been increased by 253 acres; 26,800 trees have been planted on land from which old trees had been uprooted in taking the crop; 344,225lb of dry bark have been harvested; and the whole plantation has been kept in good order. The weather during the year was favourable, and the plantation looked at the end of the cold season quite as well as ever I recollect to have seen it.

2. Details of the year's planting.—During the year over seven hundred thousand red bark trees were planted out. These were allotted as follows:—

	Plants.	Acres.
Planted in Mungpoo on new land ...	265,800	97 $\frac{1}{2}$
" in Sittong on ditto ...	414,000	152 $\frac{1}{2}$
" in Rungbee and Rishap on land from which old plants had been uprooted ...	26,800	.....
Total ...	706,600	250

In addition to these red barks, 8,870 plants (equal to 3 $\frac{1}{2}$ acres) were put out in Sittong of a hybrid variety, which yields an excellent bark, and which altogether promises to be a valuable sort. All these plants were put out at distances of four feet apart, so that each has an area of 16 square feet of soil. Planted in this way an acre carries 2,722 trees. This plan of close planting has great advantages. In the early stages the young plants benefit much by the shade and protection which they quickly begin to afford each other. Moreover, as soon as they begin to press each other some of the plants can be thinned out, and thus at a comparatively early age a plantation begins to yield a crop of bark. During the year our endeavours to multiply the best varieties of *cinchona calisaya* were continued. Government are aware that *calisaya* is the source of the yellow bark of commerce, the most valuable of all the medicinal sorts. As has been explained in former reports, this species is liable to vary in a most perplexing way; and while a few of its varieties yield a bark of wonderful richness, the majority yield bark which is by comparison poor in alkaloids. For some years past our efforts have been confined to the propagation of the best varieties, but these do not come true to seed, and can be propagated with certainty only by artificial means. Their multiplication in this way is, however, difficult and slow; and the net result of our efforts during the year has only been to increase the stock plants in the nurseries by two thousand. Of the other species of cinchona which were originally introduced here, one (*micrantha*) contains no quinine; while our experience with the other (*officinalis*) was not very encouraging. Nothing has therefore been done lately in the way of propagating either.

3. Details of the year's crop.—The Sittong plantation being as yet too young to yield, the whole of the year's crop was taken from the old plantations of Rungbee, Rishap, and Mungpoo. The crop amounted to 344,225lb of dry bark, the whole of which (with the exception of 3,165lb of grey) is red bark. Up to the end of the financial year 1876-77 the plantation had yielded 529,017lb; the total yield to date has therefore been 873,242lb. According to the plan which, for the greater simplification of accounts, has been arranged between the quinologist and myself, the entire crop of the year has been made over to the quinologist, to whose account are also debited the entire working expenses of the plantation for the year. The crop

Original

was taken by one of the three methods of uprooting, coppicing, or thinning. Ninety-two and a half acres of trees planted at distances of six feet by six feet in 1867-68 were uprooted, and 176,625lb of dry bark were thus obtained, being at the rate of 1,909lb per acre. These 92 acres formed a continuous piece, the patchy and irregular appearance of which prior to uprootal afforded an excellent example of the capriciousness of growth of cinchona, which has been frequently alluded to in former reports. The outturn just mentioned does not include bark obtained in past years by thinning and pruning the trees, and it falls short by only one hundred pounds per acre of the amount which in my last year's report I estimated as the average yield on uprootal of trees from seven to ten years old. The uprooted area consists of land which, as experience has shown, is not well suited for cinchona, and I therefore do not propose to replant it. Coppicing was done on three pieces of the plantation. A tract in Rishap, measuring 32 acres, planted with red barks six feet apart during 1868-69, was coppiced, and the yield was 29,601lb, being at the rate of 928lb per acre. A second piece in Rungbee, 20 acres in extent, planted during the same year and with the trees at a like distance apart, yielded, when coppiced, 30,633lb, or 1,532lb per acre. These figures still further illustrate the uncertainty of the yield of red barks, an uncertainty which makes it impossible to form very detailed plans for the future working of the plantation. A third area of red barks, 8 acres in extent, planted four feet apart in 1872, was coppiced on the Tukdo ridge of the Mungpoo plantation, the yield of which was 6,924lb, or at the rate of 835lb per acre. The remainder of the crop (as will be seen by the tabular statement given as an appendix to this report) was taken by thinning in situations where the trees had begun to get overcrowded.

Our experience of complete coppicing (i.e., cutting close to the ground all except a few seed trees) has now been sufficient to warrant the conclusion that in Sikhim this is a perfectly safe way of taking the bark crop. If the trees are healthy, coppice shoots are formed on the stumps, and these shoots grow with far greater vigour than seedling plants. A certain proportion of the stumps no doubt fail to shoot, but the vacancies so caused can easily be filled up by planting seedlings. It may be further considered as established that trees from four to six years of age coppice better than older trees, and that the method of partial coppicing results in failure with trees of every age, as not only do a large number of the stumps die, but the shoots of those which do throw coppice are, by reason of the shade and drip of the standards above them, invariably feeble and sickly.

4. *Expenditure for the year.*—The budget allotment for the year was Rs. 70,625, but the total expenditure amounted to only Rs. 68,110-10-9, of which sum Rs. 13,716 were spent on establishment and the remainder on labour and contingent charges. The only part of this total which is chargeable against capital is the expenditure on the young plantation at Sittong, which has not yet come into bearing, and of which the accounts have since its commencement been kept separate from those of the older plantations. The year's expenditure is thus divisible as follows:—

Capital expenditure on Sittong.

	Rs.	A.	P.
Expended on Sittong during 1877-78	7,886	6	9
Proportion of establishment	2,325	11	3
Total	10,212	2	0

Working expenses of old plantation.

	Rs.	A.	P.
Cultivation and up-keep of the old plantations of Rungbee, Rishap, and Mungpoo	46,508	4	0
Proportion of establishment	11,300	4	9
Total	57,808	8	9

The expenditure on the Sittong plantation during the two previous years of its existence amounted (inclusive of interest at 4 per cent.) to Rs. 10,939. It now covers 242 acres; so that the cost per acre to date has been only about Rs. 89.

5. *Cost of the crop.*—The working expenses of the year were Rs. 57,898, and the crop consisted of 344,225lb. If the crop be set against the working expenses, the cost of each pound of bark stands at 2 annas 8-295 pies. If, however, interest, calculated on the whole plantation expenditure from the beginning until now, be added to the working expenses, the cost of the bark is raised to a fraction above four annas (six pence sterling) per pound.

6. *Manuring.*—The experiments in manuring, begun some years ago, have been continued, with the result of proving that plants treated with castor-oil cake and ammonia sulphate are considerably more luxuriant than those treated with guano, and that the latter are only slightly better than unmanured plants.

7. *Distribution of seed.*—During the year about 12lb of seed have been distributed to various applicants, chiefly in Ceylon.

8. *Land rent.*—The rents raised from settlers within the reserve have been paid into the Darjeeling treasury as usual.

9. *Forest within the reserve.*—When cinchona cultivation was first begun in 1862, a considerable tract of land was allotted as a cinchona reserve. Much of this land was covered with forest, for the conservancy and management of which the Superintendent of the plantation was made responsible. With the formation of a special Forest Department this arrangement ceased to be advantageous, and accordingly some eight or nine years ago the greater part of the forest within the reserve was made over to the Forest Department. A considerable area of forest, however, still remained attached to the plantation, and during the past year arrangements have been made for the transfer of a portion of this to the Conservator of Forests, on the understanding that (subject to the usual departmental regulations) the Superintendent of the cinchona cultivation shall be allowed to cut free of charge such building timber and fuel as may be required for the plantation. The portion thus to be transferred will be marked off during the ensuing cold season by boundary pillars.

10. *Survey of the plantation.*—Two years ago the Survey Department prepared an excellent map of the plantation as it stood in 1875, and this map has proved of great use in facilitating the systematic working of the plantation. In fact, without such a map it would be impossible to work for crop in any but a haphazard way a forest plantation so large as this has now become. The area planted since 1875 remains unmapped, but I trust it may soon be convenient for Government to depute a surveyor to make a map of that also.

11. *Estimated crop of 1878-79.*—In taking next year's crop I propose to be guided by the requirements of the quinologist, who in turn will be guided by the demand for the product which he manufactures. I think it likely that a crop of from 200,000 to 250,000lb will be sufficient.

12. The quinologist will in his report give the financial and other results of the manufacture of the bark made over to his factory during the year. As already stated (paragraph 3), the quinologist has been debited with the entire working expenses of the plantations (excluding Sittong), and has received in return the entire bark crop. His account therefore will include both plantation and factory expenditure; it will also show the entire revenue derived from the sale of the cinchona products. The adoption of this plan will bring into one statement of account the whole financial result of the year's working. The actual distribution of the manufactured product is, however, managed by me, and it may therefore not be inappropriate if I offer a few remarks regarding it. *Cinchona febrifuge* (as the product is called) is, as Government are aware, a non-crystalline, nearly white, powder, and is composed of the medicinal alkaloids of red bark in the proportions in which they naturally occur in that bark, these alkaloids being uncombined with any acid. Medicinal "quinine" on the other hand, consists of one only of the cinchona alkaloids, combined, however, with about a fourth of its weight of sulphuric acid (familarly known as *oil of vitriol*) and water. The cinchona febrifuge is intended as a substitute for medicinal quinine. When first issued, it was assumed by many medical men and others that because cinchona febrifuge is much cheaper than quinine it must therefore be much weaker, and very large doses of it were accordingly

given. In a proportion of cases these large doses produced nausea, vomiting, and like unpleasant effects. (Similar effects, be it remembered, would have followed from equally large doses of quinine.) But in addition to the unfavourable impression against it which was caused by these early mistakes in its administration, the febrifuge had to encounter the usual amount of prejudice with which most new remedies are received simply on account of their novelty. Increased experience in the use of the new medicine during the past year has, however, served to establish a large amount of confidence in it. Complaints of its nauseating are now rarely heard, and many medical practitioners of experience affirm that instead of being less potent in the cure of fever than quinine, the cinchona febrifuge is quite equal, if not superior, to the more expensive drug. The proper dose of the febrifuge is, moreover, found to be about the same as, or even less than, the dose of quinine.

13. The supply during the year of 3,011lb of febrifuge to the medical depot at Calcutta indicates a greatly increased consumption in Government dispensaries and hospitals, the consumption of the two previous years jointly having amounted to only 1,942lb. Four hundred pounds were also indented for during the year by the medical depot at Bombay, and 2,096lb were sold at the Botanical Garden Office. Quinine during the whole year was very high in price, and in Calcutta it for some time stood at Rs. 20 per ounce, a sum for which 16 ounces of the febrifuge were always obtainable. The saving to Government by the substitution of cinchona febrifuge for quinine in their hospitals and dispensaries has already been considerable. I have not as yet been able to get the exact figures from the Examiner of Medical Accounts, but I calculate that at a moderate estimate it amounts to over three lakhs of rupees (£30,000 sterling).

14. In conclusion I have to acknowledge the continued good service of Mr. Gammie, who has been in charge of the plantation and factory during the year. I have also to acknowledge the good work done by Messrs. Biermann, Jaffray, and Lister, each of whom, for part of the year, acted as Mr. Gammie's assistant.

15. The usual tabular returns (four in number) are appended.

GEORGE KING.

Table showing the Number and Distribution of Cinchona Plants in the Government Plantations, Mungpoo Division, on the 1st April 1878.

Names of species of Cinchona.	Number in permanent plantation on 1st April 1877.	Uprooted during the year 1877-78.	Planted during the year 1877-78.	Number in permanent plantation on 1st April 1878.	Number of stock plants for propagation.	Number of seedlings or rooted cuttings in permanent plantations.	Number of rooted cuttings in seed beds.	Number of cuttings on 1st April.
C. new variety	21,600			21,600	10,000	None	None	10,500
C. succirubra	2,454,000	112,000	232,600	2,574,600	None	220,000	150,000	370,000
C. calisaya	854,000			854,000	8,000	None	None	20,000
C. intersancta	50,000	30,000		20,000	None	None	None	None
C. officinalis and varieties	25,000			25,000	None	None	None	None
C. peltandra	5,000			5,000	None	None	None	None
Totals	2,965,532	142,000	232,600	3,056,132	18,000	220,000	150,000	390,500

Table showing the Number and Distribution of Cinchona Plants in the Government Plantations, Sittong Division, on the 1st April 1878.

Names of species of Cinchona.	In permanent plantation on 1st April 1877.	Planted during the year 1877-78.	Number in permanent plantation on 1st April 1878.	Number of stock plants for propagation.	Number of seedlings or rooted cuttings in permanent plantations.	Number of rooted cuttings in seed beds.	Number of cuttings made during the month.	Total number of plants, cuttings, and seedlings.
C. new variety								
C. succirubra	237,400	8,870	8,870	None	8,400			12,270
C. calisaya	1,000		651,400	None	273,000			654,400
Totals	237,400	8,870	660,270	None	281,400			936,870

Accounts of Dry Succirubra Bark collected during season 1877-78.

	Year of planting.	Distance apart of planting.	Original number of plants.	Approximate area in acres.	TOTALS.			
					Root.	Stem.	Branch.	Totals.
		Feet.			lb	lb	lb	lb
Lower Eishap—								
Uprooted ...	1867-68	6 x 6	112,000	92.5	65,580	81,935	29,440	176,955
Upper Eishap—								
Coppicing 32 acres (finest trees left for seed) ...	1868-69	6 x 6	.....	32.0	.....	14,472	11,132	25,604
Thinning ...	1869-70	6 x 6	.....	.....	18,012	18,704	31,041	67,757
Mungpoo Ridge—								
Thinning ...	1873	4 x 4	.....	.....	8,165	4,100	3,180	15,445
Bunkoo—								
Coppicing 26 acres (finest trees left for seed) ...	1867-68	6 x 6	.....	26.0	.....	13,987	16,473	30,460
Thinning ...	1868	6 x 6	.....	.....	.....	3,200	7,020	10,220
Takdo—								
Coppicing 8 acres ...	1873	4 x 4	.....	8.0	.....	5,084	1,840	6,924
Thinning ...	"	4 x 4	.....	.....	1,400	2,885	3,851	8,136
Total	.....	.....	.....	.....	83,747	145,117	104,168	332,992

J. GAMMIE.

Table showing the Produce of the Government Cinchona Plantations in British Sikkim.

	Pounds.
Dry bark collected by rimping and thinning during 1869-70 ...	2,400
Ditto ditto ditto 1870-71 ...	12,500
Ditto ditto ditto 1871-72 ...	39,000
Ditto ditto ditto 1872-73 ...	NIL.
Ditto ditto ditto 1873-74 ...	16,000
Ditto ditto ditto 1874-75 ...	39,405
Crop of 1875-76	211,931
Ditto 1876-77	207,781
Ditto 1877-78	344,225
Total	873,242

No. 48, dated Darjeeling, the 17th October 1878.

From—O. H. Wood, Esq., Government Quinologist,

To—The Secretary to the Government of Bengal, Financial Department.

I HAVE the honor herewith to submit the Annual Report of the Quinologist for the year ending 31st March 1878.

QUINOLOGIST'S REPORT FOR 1877-78.

A considerable extension of the temporary factory at Mungpoo has been made during the past year, and a permanent drying-house has been constructed at a cost of Rs. 2,000. The total quantity of febrifuge manufactured in the twelve months was 5,162lb. The following statement shows the cost of its production:—

	Rs.	A.	P.
Acid, 13,481½lb, @ annas 3-6	2,949	0	9
Carriage of ditto to Kurseong	2,286	9	6
Packing and carriage of empty jars	1,156	15	6
Caustic soda, 14,000lb, @ annas 1-5½	1,250	8	4
Carriage of ditto	984	5	0
Charcoal, 700 maunds, @ annas 6-6	284	6	0
Labour	1,510	2	6
Sundry expenditure	899	6	3
Quinologist	5,200	0	0
Carriage of febrifuge to Calcutta	641	4	0
Tins for febrifuge	973	7	0
Advertisement charges	857	14	6
Building dry-house	2,014	8	3
	21,608	7	7
Bark used, 239,680lb, @ annas 2-8½	40,318	15	5
	61,327	7	0
Febrifuge produced, 5,162lb, @ Rs. 11-14-1½	61,327	7	0
or per pound of febrifuge—			
Manufacturing expenses	4	1	1½
Bark	7	12	11½
	11	14	1½

2. This is the cost of the febrifuge without any interest on capital, the price of the bark being got by dividing the year's expenditure on the plantation by the weight of the bark crop. The difference between this cost and selling price therefore represents the amount available for paying interest on the consolidated capital; that is to say, the sale of each pound of febrifuge will yield Rs. 4-9-11 of "profit" towards interest on capital.

3. It will be seen that the entire cost of the drying-house (Rs. 2,014-8-3) has been charged to the manufacturing expenses of the year. The selling charges, amounting altogether to Rs. 2,472-9-6, are also included in the account. If these two items be deducted, the actual cost of manufacture is only Rs. 16,521-5-10, or Rs. 3-3-2½ per pound of febrifuge; including the selling charges it amounts to Rs. 3-10-10½ per pound. It will be understood that the febrifuge is now sold by Dr. King at the Botanical Gardens in tin canisters holding 1lb each, and the minimum price has been raised from Rs. 16 to Rs. 16-8 to cover the carriage to Calcutta, the cost of the tins, &c.

4. During the year 5,477lb 14 ozs. of febrifuge have been disposed of as follows:—

	lb	ozs.
Sold to the public	2,038	9
Ditto Medical Depot, Calcutta	3,011	5
Ditto ditto, Bombay	400	0
Samples given away	28	0
	5,477	14

5. The revenue derived from the sale of febrifuge and bark has amounted to Rs. 97,070-1-0, and has therefore exceeded the total expenditure on the plantations and the factory by Rs. 11,530-2-7, as shown in the accompanying statement:—

EXPENDITURES—1877-78.			RECEIPTS—1877-78.		
	Rs.	A. P.		Rs.	A. P.
Cash drawn from treasury	14,557	15 3	For febrifuge sold—		
Share of quino-logist's pay	5,200	0 0	Cash paid into Bank of		
Soda from England	6,553	5 8	Bengal	35,193	4 0
Pans, tin plate, &c., from England	1,030	0 9	Credit from Medical Depot,		
Expenditure on plantation	57,898	8 9	Calcutta	49,740	12 0
	85,530	14 5	Ditto ditto, Bombay	6,616	0 0
Profit	11,530	2 7	For bark sold—		
	97,070	1 0	Credit from Medical Depot,		
			Calcutta	5,523	0 0
				97,070	1 0
Value of stock, 31st March 1877.			Value of stock, 31st March 1878.		
	Rs.	A. P.		Rs.	A. P.
Soda	3,043	0 0	Soda and stores	9,679	3 1
Febrifuge, 3,720lb @ Rs. 16-3-11	60,251	11 1	Bark	16,930	5 2
	63,294	0 1	Febrifuge, 3,104lb @ Rs. 11-14-10-3-5	40,444	6 5
Increase in value of stock during 1877-78	3,755	14 7			
	67,049	14 8			
				67,053	14 8

6. In addition to the profit of Rs. 11,530-2-7 in cash, it will be seen that the stock in the quino-logist's charge has been increased in value by Rs. 3,755-14-7. In this account the whole expenditure on the plantation is charged to the quino-logist, who receives in return the entire bark crop and is credited with all the revenue. By adopting this system there need be only one capital account for the whole undertaking, including all that has been spent in cultivation and manufacture from the commencement. The "profit" in the quino-logist's account then represents the interest that could be paid each year on this capital. Assuming that the capital with compound interest at 4 per cent. from the commencement in 1861 to the period when all increases stops will reach ten lakhs of rupees, the minimum profit which the quino-logist's account must then show, in order to put the undertaking on a satisfactory financial footing, will be Rs. 40,000.

7. By simply continuing the present somewhat imperfect method of manufacture this result will be attained when the sale of febrifuge reaches about 8,000lb annually. The revenue from this would be Rs. 1,30,000. The expenditure and profit would be as follows:—

	Rs.	A.	P.
Manufacturing expenses, 7,882lb, @ Rs. 3-10-10 1/2	29,000	0	0
Plantation expenses, yielding 366,000lb of bark, @ Re. 0-2-7 1/2	60,000	0	0
Profit, 4 per cent. on 10 lakhs	41,053	0	0
7,882lb febrifuge, @ Rs. 16-8-0	1,30,053	0	0

8. As the year now under notice (1877-78) was the first in which the febrifuge entered into general use in the Government dispensaries or was available to the public, and as, nevertheless, 5,400lb were disposed of, there is every reason to believe that the consumption will very soon reach the required amount. If means could be devised for facilitating its sale, through the agency of the police or some other Government department, to the native population in all feverish districts, a much larger quantity than that indicated would no doubt soon be in demand.

9. At the commencement of the year the Surgeon-General ordered cinchona febrifuge to be substituted for three-fourths of the quantity of quinine sanctioned in all indents of officers attached to native military charges, so that these officers received one-fourth of the allowance of quinine, the remaining three-fourths being replaced by febrifuge. At the Surgeon-General's recommendation the Government of Bengal ordered the same course to be pursued with all indents for sudder dispensaries, jail and police hospitals. The change

was initiated by a circular memorandum, No. 4, of 4th April 1877, from the Surgeon-General, the first paragraph of which ran as follows:—

"The date for the submission of the annual indents for Europe medicines on account of native military charges being now close at hand, the Surgeon-General desires most earnestly to impress upon indenting officers that the extensive experiments carried out during last autumn in every circle of the Presidency with the cinchona febrifuge, manufactured at Rungbee, have left no shadow of doubt of that drug being a perfectly safe and efficient substitute for quinine in all cases of ordinary intermittent fever, and he sincerely hopes that medical officers will show their freedom from prejudice on the one hand, and their earnest desire to lessen expenditure on the other, by confining themselves in their ensuing indents to one-quarter of the sanctioned quantity of quinine, taking the balance in the locally manufactured article, the high therapeutic value of which may now be considered as having been placed beyond all reasonable discussion."

Extensive experiments were also made with the febrifuge in Bombay, and as the result the Surgeon-General of that Presidency has ordered it to be substituted for quinine in the same proportion as that adopted in Bengal. The demand thus created for Government purposes will probably amount to between 3,000 or 4,000lb annually.

10. In the ensuing year some improvements will be introduced in the method of manufacture, and a further extension in the rate of production will be made if the demand increases. The following statement shows the total quantity of febrifuge hitherto manufactured:—

	lb	ozs.
1874-75	48	10
1875-76	1,940	6
1876-77	3,750	12
1877-78	5,162	0
	10,901	12

11. In conclusion, I would beg to acknowledge the valuable assistance which Mr. Gamnie has rendered in the superintendence of the manufacture. The efficient working of the Mungpoo factory is mainly attributable to the skill and energy of this officer.

FINANCIAL DEPARTMENT.

AGRICULTURE

CALCUTTA, THE 10TH DECEMBER 1878.

RESOLUTION.—/ 902/80

READ—

Letter from the Superintendent of the Royal Botanical Garden, Calcutta, and of the Government Cinchona Cultivation in Bengal, No. 84C, dated 18th October 1878, submitting the annual report of the Government Cinchona Plantation in British Sikkim for the year 1877-78.
Letter from the Government Quinologist, No. 48, dated 17th October 1878, submitting his annual report for the year 1877-78.

The Cinchona Plantation consists of two parts—the older portion at Rungbee, Rishap and Mungpoo, in the valley of the Rungjo; and the newer on the Sittong spur and in the adjoining valley of the Ryang. The working of the plantation during the year 1877-78 was, on the whole, very satisfactory. The Sittong Plantation was increased by 152½ acres, and the older plantation by 97½ acres. The total area of the former is now 242 acres, and of the latter nearly 2,000 acres. The Sittong Plantation is still too young to yield a crop, but the crop from the older portion was 341,225lb of dry bark.

2. During the year under review 706,600 red bark trees (*Cinchona succirubra*) were planted out, namely, 26,800 in Rungbee and Rishap, to replace the old plants uprooted in taking the bark crop, and 679,800 on new land—265,800 on Mungpoo, and 414,000 on Sittong. In addition to the red barks, 8,870 trees of a hybrid variety were planted on the Sittong division; this variety yields an excellent bark and promises to be very valuable. Efforts have been made to increase the cultivation of the yellow bark tree (*C. calisaya*), which produces the most valuable of all the medicinal barks; but owing to the difficulty of propagating the best varieties by seed progress has been slow. The result of the year's operations with these plants has been only to increase the stock in the nurseries by 2,000 plants. The question of selecting other localities, where the climatic conditions are more favourable for the propagation of this plant than in Sikkim, has been separately submitted by Dr. King, and is under the consideration of Government.

3. The crop of the year consisted of 341,000lb of red bark, and 3,165lb of grey bark, or 344,225lb in all of dry bark, against 207,781lb in 1876-77 and 211,391lb in 1875-76. The bark yielded in former years, i.e., from 1869-70 to 1876-77, amounted in the aggregate to 529,917lb, so that there has been taken from these plantations since their commencement no less than 873,242lb of dry bark.

4. The red bark crop was taken by the three methods of harvesting usually followed, namely, uprooting, coppicing, and thinning:—

	lb.
Uprooting	176,625
Coppicing	67,161
Thinning	97,274
Total	341,060

Ninety-two and a half acres of trees planted at distances of six feet by six were uprooted and 176,625lb of bark thus obtained, being at the rate of 1,909lb per acre. The land on which these trees were grown was not well suited for cinchona cultivation, and the outturn given above does not include bark obtained in past years by thinning and pruning. The experience gained on the plantation is sufficient to show that complete coppicing, viz. cutting close to the ground all but a few trees, is a perfectly safe way in Sikkim of taking

the bark crop. Trees from four to six years of age coppice better than older trees, but the method of partial coppicing results in failure with trees of every age.

5. The total expenditure on the plantation amounted to Rs. 68,110-10-9, of which Rs. 13,716 was on account of establishment for the two divisions, Rs. 46,508-4 on account of working expenses of the old plantation, and Rs. 7,886-6-9 on account of capital charges for the Sittong division, which has not yet come into bearing. Putting aside the last-mentioned sum and the proportion of establishment for the Sittong division (Rs. 2,325-11-3), the working expenses of the old plantation came to Rs. 57,898-8-9.

6. The febrifuge, to the production of which the bark is now devoted, is manufactured in the factory at Mungpoo, which was considerably extended during the year, and to which a permanent dry-house was added at a cost of Rs. 2,014-8. The total quantity of bark taken during the year was made over to the Quinologist and 239,680lb were used in the manufacture of febrifuge. The total quantity of febrifuge produced was 5,162lb, the cost being Rs. 61,327-7, or at the rate of Rs. 11-14-1 per pound. The quantity in store on the 1st April 1877 was 3,720lb 2 oz., so that the total quantity at the disposal of the Superintendent during the year was 8,882lb 2 oz., which was thus distributed:—

	Rs.	oz.
To Medical Store Department, Calcutta	3,011	5
To Medical Store Department, Bombay...	400	0
Sold to public	2,038	9
Samples given away	28	0
	5,477	14
In store on 31st March 1878	3,404	4
	8,882	2

7. To simplify the accounts, the entire crop of the year was made over to the Quinologist, to whose account also was debited the entire working expenses of the plantation. As stated in paragraph 5 above, the expenditure on the plantation during the year, excluding the Sittong division, was Rs. 57,898-8-9, and the Quinologist's expenditure was Rs. 27,611-5-8, making a total of Rs. 85,539-14-5. The revenue derived from the sale of febrifuge to the public was Rs. 35,193-14, and the amount debited against the Medical Departments of Bengal and Bombay for febrifuge and bark supplied was Rs. 61,876-13, making a total sum of Rs. 97,070-1. The excess of receipts over expenditure was therefore Rs. 11,530-2-7. This being the first year in which the febrifuge entered into general use in the Government dispensaries, or was available to the public, the financial result is satisfactory. The saving to Government by the substitution of the febrifuge for quinine in the Government hospitals and dispensaries is calculated to exceed three lakhs of rupees a year. The consumption is increasing, and the question of providing greater facilities for the sale of the febrifuge throughout the province is now under the consideration of Government. The public generally have not yet realized that a febrifuge practically as efficient as quinine can be procured in almost any quantity at one rupee the ounce, while quinine is selling at 20 rupees the ounce. Pending the final orders of Government on the question, the Superintendent should place himself in communication with the officers in charge of the districts in which fever has lately been very prevalent, such as Dinagore, Rungpore, Jessore, Hooghly, and Burdwan, with a view to supplies of the febrifuge being made available to the people within easy reach of their homes.

8. In the resolution on the report for the year 1876-77, it was stated that a committee had been appointed to ascertain whether the febrifuge could be improved by eliminating any of its constituents. The committee has not yet concluded its investigations, but increased experience in the use of the drug during the year under review has produced such confidence in its efficacy as a remedy for fever as to warrant its substitution for a large portion of the quinine hitherto supplied to Government institutions.

9. The maps of the plantation prepared by the Survey Department have proved of great use in facilitating its systematic working, and arrangements

will now, if possible, be made for mapping the portion planted since 1875.

10. The acknowledgments of Government are due to Dr. King and Mr. Wood for their services during the year, and the Lieutenant-Governor has noticed with satisfaction the commendation bestowed on Mr. Gammie, the resident manager of the plantations and factory, and on his assistants, by Dr. King.

Ordered that a copy of this Resolution, and of the Reports referred to, be submitted to the Government of India, in the Department of Revenue, Agriculture, and Commerce, and that a copy of the Resolution be forwarded for the information of Dr. King and Mr. Wood.

Ordered, further, that a copy of the Resolution, and of the Reports, be forwarded to the Judicial (Medical) Department of this office, and also to the Government of Madras for information.

By order of the Lieutenant-Governor of Bengal,

D. BARBOUR,

Offg. Secretary to the Government of Bengal.

No. 5629.

Copy forwarded to the Government of Madras for information.

By order of the Lieutenant-Governor of Bengal,

Alfreda Latt Centre
Asst. Secretary to the Govt. of Bengal.

CALCUTTA,

The 10th December 1878.

Cons of 13th Jan 1879
Revenue (1878) Dept^l
No 5635.

From

The Assistant Secy
to the Govt of Bengal

Dated 10 Dec^r 1878
Recd 23rd do

Encl 2.

Forwarding
Copy of Resolutions
of Govt of Bengal
revising reports
on Govt of India on a
cultivation in
Bengal.

No 80

Communicated to the
Board of Revenue for revision
of the Commission of Revenue
and Revenue of Bengal.

15 January 1879

To the Secy of the
the Commission of Revenue
the Commission of Revenue
the Commission of Revenue

Nos 206 + 207