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[Despatch Abstract.]

Recording proceedings, Review,
reviewing the Administration Report
on the Gorkh Cinchona Plantations,
Nalgiris, for the year 1897-88.

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Report on the Administration of the Government Cinchona Department.

Reviewing the — during the year 1897-98.

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—letter from W. M. STANDEN, Esq., Director of Government Cinchona Plantations, Nilgiris, dated 2nd June 1898, No. 23.

ABSTRACT.—Submitting the Annual Administration report on the Government Cinchona Plantations, the Nilgiris, for 1897-98.

READ—also letter from W. M. STANDEN, Esq., Director of Government Cinchona Plantations, the Nilgiris, dated 6th June 1898, No. 25.

ANNUAL ADMINISTRATION REPORT ON THE
GOVERNMENT CINCHONA DEPARTMENT, NILGIRIS,
FOR THE YEAR 1897-98.

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I. SEASON AND RAINFALL.—The comparative failure of the north-east monsoon and the prolonged drought from the beginning of December to the end of March were the chief features of a season which must be described as unfavourable to the well-being of the plants and trees on the plantations. The dry season was one of the hottest and driest on record, the cattle suffered considerably from want of sufficient pasture, and there was an unusual amount of sickness among the coolies. The evil effects of the drought were naturally most felt by the youngest plants on old land, a

large number of which succumbed. The oldest trees suffered little as they are less dependent on surface moisture than young plants. The frosts which were more severe than usual did comparatively little damage to the plantations.

(a) *Dodabetta*.—The total rainfall on this estate was 52.44 inches, compared with 65.52 inches registered during 1896–97. As evidence of the dryness of the season, it may be mentioned that the average rainfall on this estate over a period of ten years—from October to March—has been 22.02 inches, whereas the amount of rain that fell during these months in the year under review was only 9.38 inches.

(b) *Nedivattam*.—On this estate 107.64 inches of rain fell during the year, compared with a fall of 134.06 inches the year before. From November to the end of March there were only ten days on which rain fell.

(c) *Hooker*.—The rainfall on Hooker amounted to 93.90 inches as against 124.78 in the previous year.

II. FINANCIAL.—(a) *Receipts*.—The budget estimate of receipts fixed originally at Rs. 1,00,000 was raised to Rs. 1,15,000 by the Accountant-General and subsequently reduced by Government to Rs. 90,000 in G.O., No. 1010, Revenue, of 4th December 1897. The reduction was made in view of the lowering of the price of quinine supplied to medical stores and hospitals, from Rs. 18 to Rs. 11. The actual receipts for the year amounted to Rs. 98,463-8-2, the details of which are given in statement 2. Of the above total, Rs. 2,867-9-0 represent outstandings due at the end of last year, so that the actual receipts appertaining to the year under review were Rs. 95,595-15-2, while at the close of the year a sum of Rs. 1,949-6-0 was due to the department from Local Fund dispensaries, Municipal hospitals, &c., which, added to the total given above, shows Rs. 97,545-5-2 as the value of the year's transactions.

(b) *Expenditure*.—The budget estimate of expenditure was fixed originally at Rs. 84,700, plus Rs. 100 for "stationery and printing," and was raised to Rs. 1,07,700, plus Rs. 100 by an additional grant of Rs. 23,000 for the purchase of bark from private growers. This was reduced to Rs. 1,02,000, plus Rs. 100 for printing, showing a surrender of Rs. 5,700, which was accepted by Government in G.O., No. 228, Financial, dated 4th March 1898. The actual expenditure for the year amounted to Rupees 95,244-8-7 plus Rs. 55-2-4 under "30. Stationery and Printing," or a total of Rs. 95,299-10-11 compared with Rs. 82,549 during 1896–97. The sum spent on Head office and plantations was Rs. 47,008-10-4, while the expenditure incurred on the purchase of 108,934 lb. bark from private growers and on the manufacture and distribution of alkaloids amounted to Rs. 48,291-0-7. Omitting the sum of Rs. 23,000 paid for bark supplied by private growers, the cost of the manufacture and distribution of quinine and febrifuge was Rs. 25,291-0-7 against Rs. 28,929-12-0 last year. The cost of Head office and plantations which includes Rs. 1,000 spent on new extensions at Hooker, was Rs. 47,008-10-4, compared with Rs. 49,387-15-1 during 1896–97. The net result of the year's operations is an excess of revenue over expenditure of Rs. 3,163-13-3. This figure compares unfavourably with the surplus obtained last year, but in view of the fact that the bulk of the quinine was sold during the year at Rs. 11 per pound instead of Rs. 18 per pound as in the previous year, and that Rs. 23,000 were spent in the purchase of bark, the small surplus may be considered satisfactory. The loss to this department was a gain to the Medical Stores and hospitals which have never before obtained their quinine at so low a figure as Rs. 11 per pound, and the sum of Rs. 23,000 expended on bark obviated the necessity of taking crop of an equivalent value from the plantations. To the figure given above as the total expenditure of the year must be added a sum of Rs. 999-6-5, due by the department for bark supplied so that the total expenditure to be debited against the department for the year amounted to Rs. 96,299-1-4.

(c) *Financial returns*.—The statements dealing with the financial position of the department, viz., Nos. 2, 3, 10, 11 and 12, have been drawn up in the forms approved by Government in G.O., No. 807, Revenue, of 24th September 1897. Statement No. 10, which shows the receipts and charges of the Cinchona department to the close of the year 1897–98, exhibits a surplus of Rs. 14,45,867 which may be

considered satisfactory. In the stock statement No. 11, the quinine and febrifuge in store as well as the bark have been valued at cost price, while the quinine held as stock by Revenue officials and Postmasters has been valued at its selling price. The introduction of this change has necessitated the re-valuing of the stock of quinine and febrifuge in hand on the 31st March 1897, the total value of all stock being reduced from Rs. 1,84,367-6-0 to Rs. 1,39,989-2-4.

III. GENERAL CONDITION.—(a) *Dodabetta*.—The condition of this estate, which has been favourably reported on for many years, continues to be very satisfactory. It is by far the most valuable of the three plantations and is undoubtedly the finest cinchona estate of its size in Southern India. Towards the end of the dry season the want of moisture was felt by trees growing on ridges and in poor soil, but on the whole the estate suffered little from the drought. The beneficial effect of green manuring was well marked on plot 23, and the application of a dressing of lime to plots 17, 19 and 20 caused a decided improvement in the appearance of the trees. The growth of shoots from coppice stools has, in some parts of the estate, been very good, but in other parts the results have not been satisfactory. As stated in the report for last year those stools, which fail to throw up shoots, will be dug up and replaced by seedling plants grown in baskets. The stools in many cases remain dormant without losing their vitality for a considerable time, and it is only when they are found to be actually dead that they are dug out. During the year 47,364 plants were put out to fill vacancies in the old plantation, and a small plot of new land, amounting to about 2 acres, was cleared and planted with plants raised from seed received from Jamaica. The chief reason for opening this small plot was to enable a comparison to be made between the growth of plants on virgin soil and that of plants grown on old cinchona land. At the end of the year, notwithstanding the drought, the plants put out on the new land were looking very well, and the failures amounted to about 4 per cent. only. The difficulty experienced in growing a second crop of cinchonas on land which has been for many years under cinchona cultivation raised the question of the deterioration of Crown bark plants grown from seed taken from the older trees on the plantations, and it was on this account deemed advisable to procure fresh seed from Jamaica. If, however, it can be proved that no deterioration of the plant has occurred, the want of success which attends the replanting of old cinchona land must be due to a deficiency of plant food, or to a change in the physical condition of the soil, or to a combination of these causes. Judging from the fact that the ground which has been replanted with little success in recent years has been liberally treated with cattle manure which contains plant food in abundance and is what is known as a complete manure, the conclusion would seem to be that the change in the physical condition of the soil brought about by years of cultivation and exposure to sun and wash is the chief cause of the difficulty. Such soil is greatly inferior in the power of retaining moisture to virgin land which contains an ample supply of humus, and when it is considered how trying to young plant life is the long period of drought which is characteristic of the climate of the Nilgiris, the importance of the retention of moisture in the soil cannot be over-estimated. A period of fallow, the application of manure, and the planting of shade trees appear to offer the best chance of success in the replanting of old land, and it is proposed to experiment on these lines. The most suitable shade trees are the *Frenella Khomboidia* and the *Grevillia Robusta* which would be dug out and used for fuel after they had served their purpose of protecting the young cinchonas. The shade trees would be planted first and when they had formed sufficient cover to afford protection to the soil, the cinchonas would be planted. Although it is not the intention of Government at present that old cinchona land should be replanted, still it is advisable that experiments which can be conducted at little cost should be made with a view to overcoming, if possible, the difficulties experienced in the past.

(b) *Nedivattam*.—The older trees on this estate have responded well to the more liberal cultivation which they have received during the past two years. Throughout the dry season they retained a healthy, vigorous appearance and, with a few exceptions, showed no signs of suffering from the drought. Perhaps the most vigorous looking trees are those on plot 7 which were coppiced in the year 1879. Many of these trees are now 30 feet to 40 feet high. This plot was originally planted in 1863 and the coppicing was done when the trees were 16 years old. A few of the trees

were re-coppiced some 3 or 4 years ago and are making exceedingly good growth. From the healthy appearance of these trees in their third rotation, there is every reason to suppose that if they are cut down in their 15th year, the shoots will be equal to a fourth rotation. It has yet to be proved whether the cinchona is a long-lived tree on the Nilgiris. The oldest trees on the plantations are now 36 years of age and appear likely to live for many years yet if cultivation is kept up. The largest tree on the Nedivattam estate, a *succirubra*, measures 46 inches in circumference at a height of 3 feet from the ground, and is looking very healthy and vigorous. Plots 14, 23 and 24, which contain young plants growing on old land, were weeded five times during the year. Plots 3, 4, 5, 10, 16 and 26 were weeded twice, and the remaining plots were all deeply dug before the dry weather set in. The number of plants put out during the year to fill vacancies in plots 14, 23 and 24 was 75,216, and 454 plants were planted in a small piece of new land to contrast with those planted on old soil. At the end of the year these latter plants were looking very well. Every possible care was taken with the planting of the vacancies. Each pit was manured, the young plants which had been grown in plant baskets in the nurseries were carefully planted, and immediately after the planting they were shaded with ferns. Notwithstanding these precautions a considerable number succumbed during the dry weather, whereas the plants put out on new land did well. In view of the above facts, it has been decided to spend no more money on the replanting of old land except for the purpose of experimenting on planting with shade.

(c) *Hooker*.—This estate which, on the abolition of the post of Superintendent held by Mr. McFeat, was placed under the charge of Mr. E. Collins, the Superintendent of Nedivattam, on the 1st July 1897, has improved considerably. In the last two administration reports it was mentioned that the trees growing on ridges and on poor soil were not doing well, and during the year it was found necessary to coppice most of these trees. The number of trees thus coppiced amounted to 50,370, which yielded 65,300 lb. of bark. Nearly the whole of this estate is growing a second crop of cinchona and the trees thus grown are inferior in vitality to those planted on virgin land. The whole estate has been well cultivated during the year. Plot 6 was manured with cattle manure, and plot 2 was treated with lime. The trees on plot 14, which were planted on forest land in the year 1879, are looking particularly well and present a marked contrast to trees of the same age growing on land which has previously borne a crop of cinchona. Although the changes in establishment on this estate did not take effect until 1st July, the total expenditure was Rs. 7,372-12-7 against Rs. 10,541-7-11 in 1896-97, the saving effected being Rs. 3,168-11-4.

IV. MANURE.—At Dodabetta 1,525 cart-loads of cattle and stable manure were put out; at Nedivattam 660; and at Hooker 580. On each estate also lime was applied with very good results. The question of manuring cinchonas with a view to increasing the richness of the bark has received attention during the year, and experiments have been started to prove whether or not the cost of the application of chemical manures is recouped by an increased yield of alkaloids. The numerous and valuable experiments made by Mr. D. Hooper on the action of manures in raising the quantity of alkaloids in cinchona barks, conclusively proved the desirability of the application of fertilizers containing nitrogen, potash and phosphoric acid, but although it was shown that, in the case of individual trees, the amount of quinine was increased 50 per cent. and sometimes much more by suitable manures, no steps have hitherto been taken to profit by the conclusions drawn. Various manures, such as fish, bone-meal, nitrate of potash and castor poonac have been applied from time to time, and in every case the improvement in the richness of the bark has been considerable, but the cost of the application was not recorded, nor were the experiments made on a sufficiently large scale to be of much practical use. The experiments started during the past year were conducted as follows:—Of 2,400 trees on the Dodabetta estate, 800 were treated with a mixture of nitrate of soda, nitrate of potash, bone-meal and castor poonac, 800 received super-phosphates, castor poonac and nitrate of potash, and 800 were left unmanured. The stems of all the trees that were manured were covered with grass in view of the fact that the exclusion of light favours the development of alkaloids, and renovation pits were dug among the manured trees. The unmanured trees were left uncovered and will receive no more cultivation than the ordinary

weeding and digging given to the rest of the plantation. At the end of a year the 2,400 trees will be coppiced, and the bark yielded by each plot of 800 trees will be worked up separately in the Nedivattam factory. A careful account will be kept of all expenses incurred on each of the three plots from the time of the application of the manure, and the yield of quinine and febrifuge will be recorded for each plot. In this way it is hoped that it will be possible to prove that when a cinchona estate is worked on a coppice rotation, it is highly profitable to adopt every possible means of enriching the bark before the trees are cut down. The 90 unmanured trees will probably yield 4,000 pound of bark analysing 4 per cent. or 160 lb. of quinine, and it is expected that each plot of manured trees will give 4,000 lb. of bark analysing 6 per cent. or 240 lb. of quinine. Taking the value of quinine at Rs. 10 per lb., the increased yield would be worth Rs. 800, while the total extra expenditure on each of the manured plots will not be much more than Rs. 180. So that there would be a profit of about Rs. 620 per acre if the sulphate of quinine was increased 50 per cent., i.e., from 4 per cent. to 6 per cent. An increase of rather less than $\frac{1}{2}$ per cent. of quinine will, it is estimated, cover the cost of the manure, &c. In the next annual report details of the experiments will be given, and it is hoped that the results will be of interest to planters of cinchona who work their estates on the coppice system. The stimulus given by the manure should be of service in encouraging the growth from the stool when the tree has been cut down, and the application of manure 12 months before coppicing should thus serve a double purpose.

V. NURSERIES.—The nurseries on all the estates were carefully attended to during the year and a large stock of plants was raised to meet the requirements for the new extensions. Two pounds of officialis seed were received from the Director of Public Gardens and Plantations, Jamaica, and were carefully sown in boxes at Nedivattam with the result that 117,070 healthy seedlings were raised. In addition to that received from Jamaica, seed was taken from young vigorous trees on the Hooker Estate and put down in the nurseries at Hooker and Nedivattam. This seed has germinated very well, and there will be an ample supply of plants for the extensions contemplated. The seed collected in recent years was from the oldest trees on Dodabetta and it was thought that the age of the parent trees might be the cause of the plants showing a lack of robustness. The progress of the plants now raised from younger trees will be carefully noted and will be compared with that of the plants raised from Jamaica seed and from the seed taken from old trees.

VI. CROP.—The total quantity of bark harvested during the year was 128,349 lb. as shown in statement 7. The crop on all the estates was obtained by the coppicing of sickly trees and by thinnings. The number of trees thus cut down at Dodabetta was 1,832, at Nedivattam 66,481, and at Hooker 50,370. Of the total number of trees cut down at Nedivattam 63,068 were hybrids growing on replanted land, and all the trees coppiced at Hooker were growing on land which had previously borne a crop of cinchona. It is satisfactory to note that, in the majority of cases, the coppiced stools are throwing up healthy suckers. It should perhaps be mentioned here that the detailed estimate of the amount of bark on the plantations which was forwarded to Government on 15th January 1898 was made after the crop for the past year had been taken. The quantity of bark purchased from private growers during the year was 108,934 lb., and a report showing the prices paid and the amount of alkaloids extracted from this bark was sent to Government on the 21st March 1898. At the close of last year, the stock of bark on hand was 246,751 lb. The additions made during the year by crop and purchase amounted to 237,283 lb., making a total of 484,034 lb. Of this total, 241,895 lb. were used in the factory and sold to Medical Stores, &c., leaving a balance in store of 242,139 lb. as detailed in statement 7.

VII. BUILDINGS.—The total expenditure under this head amounted to Rupees 1,352-7-7 as against Rs. 2,491-4-1 in 1896-97. All necessary repairs were effected and some improvements were made to the factory at Nedivattam.

VIII. FACTORY.—The unfortunate loss at sea on the 8th April of the 15 tons of fusel oil required for the year's manufacture, in addition to 4 tons of sulphuric acid, necessitated the suspension of quinine manufacture for some months. A fresh supply of oil was telegraphed for at once, and a start was made with the making of quinine on the 17th September. From this date to the end of the year the work was carried on continuously and 125,934 lb. of crown bark were worked up which yielded 5,092 lb. quinine and 2,085 lb. febrifuge. It was mentioned in the last annual report that

arrangements would be made to extract febrifuge from the red barks by the acid process, and the importance of carrying on this work was enhanced when it was found that it would not be possible to make quinine until September. A suitable place was found for the manufacture, in the covered verandah of the bark store, water was laid on in piping through the whole length of the verandah, and 180 tubs were made for the bark and acid, liquor, &c. The manufacture of febrifuge from the red barks was started on the 1st June and from that date until the end of the year 114,650 lb. of red bark were used which yielded 4,304 lb. of febrifuge. The cost of the chemicals used per pound of febrifuge extracted from these barks was As. 15-11, while the chemicals and oils used for the extraction of quinine and febrifuge from the crown barks cost Rs. 1-8-1 for each pound of alkaloid. The febrifuge manufactured during the year was of very good colour, and the quinine, a sample of which was sent to the Chemical Examiner, Madras, was reported to contain a little over 5 per cent. of other cinchona alkaloids and 8 per cent. of moisture. The standard of purity for sulphate of quinine laid down by the British Pharmacopœia is that it shall contain not much more than 5 per cent. of other cinchona alkaloids and not more than 15 per cent. of moisture, so that the quinine manufactured at Nedivattam may be considered to satisfy all the requirements of the Pharmacopœia as to purity. The following statement shows the cost of manufacture and distribution during the year:—

	Amount.		Amount.
	RS. A. P.		RS. A. P.
Value of chemicals in store on 31st March 1897.	7,532 5 9	Value of chemicals in store on 31st March 1898.	9,428 4 10
Factory overseer's pay	1,500 0 0	Cost of 11,481 lb. alkaloids	
Laboratory Assistant for 3 months ..	43 8 0	(5,092 lb. quinine and 6,389 lb.	
Factory labour	2,852 5 7	febrifuge including cost of	82,705 4 1
Cost of chemicals, packing and despatching quinine and febrifuge.	20,895 3 0	packing and distributing).	
Cost of 108,934 lb. crown bark purchased from private growers.	23,999 6 5		
Cost of 17,000 lb. crown bark, 1896-97 crop, at As. 4-2-74.	4,492 9 8		
Cost of 114,650 lb. red bark, previous year's crops, at As. 4-3-61.	30,818 2 6		
Total ..	92,133 8 11	Total ..	92,133 8 11

From the above statement it will be seen that the cost of 11,481 lb. alkaloids was Rs. 82,705-4-1 or Rs. 7-3-3 per lb. The cost in 1896-97 was Rs. 8-2-2 per lb. of alkaloid, and, deducting the value of the raw material used, the cost of manufacture and distribution was Rs. 2-0-7 per lb. against Rs. 2-7-7 per lb. last year. The crown barks treated during the year yielded an average of 4.04 per cent. sulphate of quinine and 1.65 per cent. of febrifuge, while the red barks gave 3.75 per cent. of febrifuge. A small proportion of the purchased bark, viz., 8,934 lb., gave the very high outturn of 6.40 per cent. sulphate of quinine and 1.04 per cent. of febrifuge, and the remaining 100,000 lb. averaged 3.74 per cent. sulphate of quinine and 1.75 per cent. febrifuge.

The following table gives the output of quinine and febrifuge since the commencement of manufacture at Nedivattam, and, to avoid misconception, the crown and hybrid barks which yield quinine as well as febrifuge, and the red barks which yield febrifuge alone, are shown in separate columns:—

	Crown and Hybrid barks (quinine and febrifuge barks).	Red barks (febrifuge barks).	Total bark.	Outturn of alkaloids.		
				Sulphate of quinine.	Febrifuge.	Total alkaloids.
	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.
1889-90	6,650	8,600	15,250	234	357	591
1890-91	96,200	..	96,200	2,928	1,050	3,978
1891-92	122,500	22,000	144,500	4,425	3,174	7,599
1892-93	167,771	13,946	171,717	4,933	3,139	8,072
1893-94	52,600	122,400	175,000	2,000	5,775	7,775
1894-95	152,800	43,800	196,600	4,770	1,756	6,526
1895-96	136,000	97,800	233,800	3,600	2,284	5,884
1896-97	237,000	1,100	238,100	7,891	3,350	11,241
1897-98	125,934	114,650	240,584	5,092	6,389	11,481

The rates at which quinine and febrifuge were sold to the Medical Stores, Local Fund dispensaries and municipal hospitals were Rs. 11 per lb. and Rs. 10 per lb., respectively. The former figure is the lowest at which quinine has been supplied by this department, and is the lowest figure ever paid by the Medical Stores, &c., for sulphate of quinine. The price fixed by Government for sale to the public was Rs. 18 per lb. which is the same rate as that fixed for the preceding year.

Quinine.—The stock of quinine at the end of last year was 4,862½ lb. During the year 5,092 lb. were manufactured, making a total of 9,954½ lb. The issues during the year amounted to 6,336½ lb. as detailed below, and the balance in store at the close of the year was 3,618 lb.:—

	LB.
Medical Stores, Madras	400
„ Bombay	2,400
„ Punjaub	750
Mysore Government	420
To the Public	283½
„ the Jails	500
„ Native States	56
„ Local Fund dispensaries and Municipal hospitals	398½
„ Collectors	75
„ Sanitary Commissioner, Hyderabad	65½
„ Post Offices	658½
„ Burmese Government	329
Total ..	6,336½

Febrifuge.—At the close of last year, the stock on hand was 1,226½ lb. During the year 6,389 lb. were manufactured, making a total of 7,615½ lb. The quantity issued was 1,955½ lb. as detailed below and there remained a stock in hand at the close of the year of 5,660:—

	LB.
Medical Stores, Bombay	1,200
Local Fund dispensaries and Municipal hospitals	667½
Native States	57½
The Public	31
Total ..	1,955½

The following table shows the issues of quinine and febrifuge since 1889-90 from which it will be seen that while the demand for quinine continues to increase, there has been a considerable falling off in the demand for febrifuge during the past year. In 1896-97, the Medical Stores of Madras and Bombay took 500 lb. and 2,500 lb. of febrifuge, respectively, while the quantity taken by Bombay during the year under review was 1,200 lb. only and the Madras Stores took none:—

Issues of quinine and febrifuge since 1889-90.

	Quinine.	Febrifuge.	Total alkaloids.
	LBS.	LBS.	LBS.
1889-90	234	7	241
1890-91	1,356	200	1,556
1891-92	3,344	3,017	6,361
1892-93	3,204	2,608	5,812
1893-94	2,536	3,513	6,049
1894-95	3,631	3,956	7,587
1895-96	5,644	2,666	8,310
1896-97	5,908½	3,709½	9,617½
1897-98	6,336½	1,955½	8,292

IX. MISCELLANEOUS—General.—(a) In accordance with paragraph 2 of G.O., No. 223, Revenue, of 30th March 1897, the post of Superintendent of Hooker Estate

was abolished with effect from 1st July. A compensation gratuity of Rs. 340 was granted to Mr. McFeat on his retirement, and the estate was placed under the charge of the Superintendent of Nedivattam. Changes were also made in the staff of the Head office which took effect from the 1st June.

(b) *Issue of quinine packets to Collectors.*—During the year 1,050 packets each containing 100 five-grain powders were issued for sale to Collectors. In 1896-97, the number sent out was 1,385 and in the preceding year 2,399. That there should be a steady decline in the sales of quinine effected by Revenue officials is not surprising when it is remembered that the powders are now on sale at all Post offices. It was suggested in the last Administration Report that it might be advisable in the future to rely solely on the Post offices for the distribution of quinine, but it was decided in G.O., No. 128, Revenue, of 30th March 1898, that it would be premature at present to discontinue the sales by Revenue officials. The price of each packet of 100 five-grain powders was raised during the year from Re. 1 to Rs. 1-8-0.

(c) *Sale of quinine at Post offices.*—As this forms the subject of a detailed report to be submitted to Government on 1st September, it is only necessary here to give a brief summary of the working of this agency for the distribution of quinine. In G.O., No. 1073 of 18th December 1897, the price of each five-grain powder was raised from 2 pies to 3 pies. This change caused considerable pressure of work at the Head office, as it was necessary to collect all the money realized by the sale of quinine at the two-pie rate and to re-adjust the permanent advances held by Postmasters before the close of the year. When the system of selling quinine at Post offices was first introduced, the price fixed for each five-grain powder was 3 pies to correspond with the price charged in Bengal, but in accordance with instructions received from the Government of India, the rate for the Madras powders was reduced to 2 pies, while the Bengal powders continued to be sold at 3 pies. It is too early at present to form any conclusion as to the effect of the enhanced price on the sales, but it is hoped that there will be no falling off in the demand. During the year 425 packets were sent out as permanent advances, i.e., as stock to be held by Postmasters and the number of packets sold, and for which cash was remitted to this office was 8,605.

(d) *Extension of the plantations.*—In view of the increasing demand for quinine and the inadequacy of the existing plantations to meet the requirements of the Medical Stores, &c., it was decided in G.O., No. 140 of 10th March 1898, that, in addition to the purchase of bark from private growers, it was necessary that the plantations should be extended. Sanction was accorded on the 12th February to the opening of 80 acres of forest land within the boundaries of the Hooker Estate, and the work was commenced on the 14th February. By the end of March, the 80 acres of forest had been felled, and the land will be planted during the south-west monsoon. It is proposed to work the new extensions on a fifteen-year coppice rotation. From the 8th to the 15th year there will be small crops from thinnings and prunings, and in the meantime, the crop from the old plantations will be supplemented by the purchase of bark from private growers.

(e) *Supply of cinchona seed from Jamaica.*—As mentioned in paragraph V of this report, two pounds of officinalis seed were received from Jamaica. The growth of the plants raised from the Jamaica seed received in May 1896 has been better than that of the plants raised from Dodabetta seed, and as the number of seedlings required annually will be much larger than was anticipated when the request was made for two pounds of seed to be supplied each year, it is advisable that the quantity be increased if possible to five pounds in future.

(f) *Fusel oil.*—In view of the difficulty experienced in obtaining an adequate supply of fusel oil, it was suggested to Government that, as this oil is a bye-product in the distillation of spirits, a reference might be made to the Board of Revenue to ascertain whether it would be possible to obtain a supply locally. The Deputy Commissioner of Salt, Abkari and Customs Department reported that fusel oil in quantity can only be obtained in the manufacture of spirits from wort prepared from either raw or malted grain which is about 3 to 5 gallons per 10,000 gallons of proof-spirit and that the wort prepared in this country from sugar or molasses yields so small a proportion of feints that the fusel oil is not separated. The price of this oil in the European markets has risen considerably owing, in all probability, to the demand created by the establishment of quinine factories in Java.

(g) *Subordinate staff.*—Mr. H. V. Ryan, the Superintendent of Dodabetta, has worked with his usual zeal and care. Mr. E. Collins, the Superintendent of Nedivattam, whose work has greatly increased now that he has the additional charge of the Hooker Estate and the new extensions deserves much credit for the energetic and efficient way in which he has performed his duties. Mr. Donald Campbell, the Manager of the Head office, has worked very well and Mr. T. Edie continues to give satisfaction as factory overseer.

(h) *Store returns and service books.*—In accordance with G.O., No. 920, Financial, dated the 13th September 1893, an inventory of the stock in the custody of the Superintendents has been made and all the service books have been kept written up to date.

OOTACAMUND,
28th April 1898.

(Signed) W. M. STANDEN,
Director,

No. 1.

STATEMENT showing the Rainfall at the several Government Cinchona Plantations, Nilgiris, during the official year 1897-98.

Months.	Dodabetta.				Nedivattam.				Hooker.			
	1896-97.		1897-98.		1896-97.		1897-98.		1896-97.		1897-98.	
	Rainfall.	Number of wet days.	Rainfall.	Number of wet days.	Rainfall.	Number of wet days.	Rainfall.	Number of wet days.	Rainfall.	Number of wet days.	Rainfall.	Number of wet days.
1	2	3	4	5	6	7	8	9	10	11	12	13
April ..	2.35	8	1.77	7	.30	4	2.06	7	0.32	4	2.69	8
May ..	2.95	9	4.82	10	2.32	10	4.09	8	3.48	9	5.34	11
June ..	14.25	23	8.18	18	43.26	28	26.04	21	36.17	28	23.80	20
July ..	8.52	17	6.36	15	46.90	29	23.36	27	43.72	29	18.34	25
August ..	6.69	21	10.16	21	21.65	28	33.90	24	19.23	29	25.1	25
September ..	12.74	20	11.77	21	10.52	24	9.46	20	11.23	27	7.17	19
October ..	3.87	13	3.13	10	3.47	10	6.88	18	3.47	12	8.29	17
November ..	6.18	14	2.77	10	1.74	8	1.15	8	2.23	11	1.70	9
December ..	5.73	13	2.88	5	1.67	9	0.62	1	2.75	9	1.41	4
January ..	..	..	0.42	2	..	..	..	..	..	..	0.07	2
February ..	2.08	7	0.18	2	1.69	4	0.08	1	1.48	7	0.08	1
March ..	.16	2	..	..	.54	2	..	..	.70	3	..	..
Total ..	65.52	147	52.44	121	134.06	166	107.64	135	124.78	168	93.90	141

No. 2.

STATEMENT showing the Receipts and Expenditure of the Government Cinchona Plantations, Nilgiris, for 1897-98.

Receipts.

Classification.	Budget estimate.	Revised estimate.	Actuals up to the end of the year.
	RS.	RS.	RS. A. P.
Sale of 3,221½ lb. quinine	60,000	59,000	75,082 15 6
Do. of 2,009½ lb. febrifuge	64,000	29,000	20,139 11 9
Do. of 1,311 lb. cinchona bark	400	450	584 0 3
Do. of seed and plants	50	50	..
Do. of 900 lb. Jalap	..	1,000	900 0 0
Miscellaneous	550	500	1,756 12 8
Total ..	1,15,000	90,000	98,463 8 2

Expenditure.

Classification.	A. Conservancy.			B. Establishment.			Total.		
	Budget estimate.	Revised estimate.	Actuals up to the end of the year.	Budget estimate.	Revised estimate.	Actuals up to the end of the year.	Budget estimate.	Revised estimate.	Actuals up to the end of the year.
	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.
Head Office ..	2,641	2,398	2,192 5 1	13,092	9,921	9,782 1 9	15,733	12,319	11,974 6 10
Factory ..	19,400	50,426	43,895 3 0	7,674	1,500	1,543 8 0	27,074	51,926	45,438 11 0
Dodabetta ..	10,569	9,469	9,459 13 4	3,744	3,744	3,744 0 0	14,313	13,213	13,203 13 4
Nedivattam ..	14,531	13,458	13,451 15 2	3,900	3,873	3,858 0 0	18,431	17,331	17,309 15 2
Hooker ..	5,917	5,802	5,801 14 5	3,332	1,509	1,570 14 2	9,249	7,311	7,372 12 7
Total ..	53,058	81,553	74,801 3 0	31,742	20,547	20,498 7 11	84,800	1,02,100	95,299 10 11

No. 3.
STATEMENT showing the Expenditure in detail on account of the Government Cinchona Plantations, Nilgiris, for the official year 1897-98.

Name of Plantation.	Salaries.			Nursery.			Working charges.			Manure.		
	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.
	2	3	4	5	6	7	8	9	10	11	12	13
1												
Head Office and General ..	RS. 13,092	RS. 9,921	RS. A. P. 9,782 1 9	RS. ..	RS. ..	RS. A. P. ..	RS. ..	RS. ..	RS. A. P. ..	RS. ..	RS. ..	RS. A. P. ..
Dodabetta ..	3,744	3,744	3,744 0 0	730	730	728 7 6	5,041	5,566	5,615 8 8	2,548	2,263	2,375 3 4
Nedivattam ..	3,900	3,873	3,858 0 0	400	700	656 3 0	5,629	5,588	5,702 2 7	2,754	2,875	2,774 2 9
Hooker ..	3,332	1,509	1,570 14 2	500	740	838 5 0	3,937	2,270	2,087 15 11	680	742	676 4 11
Factory charges ..	7,674	1,500	1,513 8 0	..	..	..	..	..	1,000 0 0	..	..	..
Total ..	31,742	20,547	20,498 7 11	1,630	2,170	2,222 15 6	14,607	14,414	14,405 11 2	5,982	5,880	5,825 11 0

Name of Plantation.	Crop.			Buildings and Plants.			Contingencies.		
	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.
	14	15	16	17	18	19	20	21	22
Head Office and General ..	RS. ..	RS. ..	RS. A. P. ..	RS. 300	RS. 300	RS. A. P. 298 13 8	RS. 329	RS. 336	RS. A. P. 200 14 6
Dodabetta ..	1,950	420	578 4 6	300	500	162 5 4	..	..	..
Nedivattam ..	2,500	1,047	971 15 9	400	400	495 1 6	..	..	..
Hooker ..	500	750	803 1 1	300	300	396 3 6	..	..	..
Factory charges ..	..	..	..	..	..	..	..	..	..
Total ..	4,950	2,217	2,353 5 4	1,300	1,500	1,352 7 7	329	336	200 14 6

Statement showing the Expenditure in detail on account of the Government Cinchona Plantations, Nilgiris, for the official year 1897-98—cont.

Name of Plantation.	Printing charges.			Peons' clothings.			Travelling allowances.		
	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.
	23	24	25	26	27	28	29	30	31
Head Office and General ..	RS. 100	RS. 100	RS. A. P. 55 2 4	RS. 12	RS. 12	RS. 10	RS. 1,500	RS. 1,500	RS. A. P. 1,472 10 0
Dodabetta ..	..	..	..	..	..	..	..	..	..
Nedivattam ..	..	..	..	..	..	..	..	..	..
Hooker ..	..	..	..	..	..	..	..	..	..
Factory charges ..	..	..	..	..	..	..	..	..	..
Total ..	100	100	55 2 4	12	12	10	1,500	1,500	1,472 10 0

Name of Plantation.	Assessment and Municipal tax.			Factory.			Total.		
	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.
	32	33	34	35	36	37	38	39	40
Head Office and General ..	RS. 400	RS. 150	RS. 154 13 0	RS. ..	RS. ..	RS. A. P. ..	RS. 15,733	RS. 12,819	RS. A. P. 11,974 6 10
Dodabetta ..	..	..	..	..	..	..	14,818	13,213	13,203 13 4
Nedivattam ..	..	..	..	2,848	2,848	2,852 5 7	18,431	17,331	17,309 15 2
Hooker ..	..	..	..	..	..	..	9,249	7,311	7,372 12 7
Factory charges ..	..	..	..	19,400	* 50,426	43,895 3 0	27,074	51,926	45,438 11 0
Total ..	400	150	154 13 0	22,248	53,274	46,747 8 7	84,800	1,02,100	95,299 10 11

* Includes Rs. 25,000 for the purchase of cinchona bark.

No. 4.

A.—Statement showing the total yield of the Government Cinchona Plantations, Nilgiris, for the official year 1897-98.

Name of Plantation.	Species of produce.	Bark.						Propagation.		
		Up-rooting.		Coppicing.		Total number of trees bark-ed.	Total quantity of green bark collected.	Total quantity of dry bark.	Seed.	Plants in the nurseries.
		Number of trees bark-ed.	Outturn of green bark.	Number of trees bark-ed.	Outturn of green bark.					
Dodabetta.	Crown bark	46	LB. 690	1,786	LB. 52,660	1,832	LB. 53,350	LB. 24,000	9 4	84,274
	Magnifolia	..	..	..	..	..	..	..	0 4	..
Nedivattam.	Crown bark	..	..	1,115	9,516	1,115	9,516	3,172	5 0	50,000
	Red bark	..	..	2,298	42,576	2,298	42,576	14,192	..	..
Hooker	Hybrid	..	..	63,068	65,055	63,068	65,055	21,685	..	..
	Crown bark	..	..	50,370	195,905	50,370	195,905	65,300	5 0	250,000
	Magnifolia	..	..	..	..	..	..	..	..	..
	Total	..	..	..	..	..	..	128,349	..	..
	Add the balance on 31st March 1897.	..	..	..	..	..	..	246,751	..	..
	Grand Total	..	..	..	..	..	..	375,100	..	..

B.—Statement showing the disposal of bark and other produce from the Government Cinchona Plantations, Nilgiris, for the official year 1897-98.

Name of Plantation.	Species of produce.	Bark.			Seed.		
		Quantity used for quinine and febrifuge.	Quantity supplied to the Medical Department and public.	Total quantity.	Sold to the public.	Used in nurseries.	Total.
Dodabetta	Crown bark	..	..	..	..	..	..
	Magnifolia	..	..	..	..	..	..
Nedivattam	Crown bark	..	..	..	..	..	..
	Red bark	..	..	..	..	..	..
Hooker	Magnifolia and Hybrid.	..	..	..	..	..	..
	Crown bark	..	..	..	..	..	..
	Magnifolia	..	..	..	..	..	..
	Crown bark purchased	..	..	..	..	..	..
	Total	240,584	1,311	241,895	0 4	..	..

No. 5.

STATEMENT showing the amount of Bark harvested from the commencement of the Plantations to 1897-98.

Official year.	Bark.	Official year.	Bark.
	LB.		LB.
To the end of 1874-75	181,481½	Crop of 1888-89	110,162
Crop of 1875-76	65,170	1889-90	160,226
1876-77	103,341	1890-91	133,331
1877-78	138,838½	1891-92	53,833
1878-79	114,320¼	1892-93	119,483
1879-80	119,299	1893-94	83,467
1880-81	243,896	1894-95	125,557
1881-82	242,052	1895-96	229,700
1882-83	129,712¼	1896-97	186,867
1883-84	183,765	1897-98	128,349
1884-85	118,017		
1885-86	113,360	Total	3,301,327½
1886-87	124,333		
1887-88	92,746		

No. 6.
STATEMENT showing the approximate number of Plants in permanent Plantations, Nilgiris, on 31st March 1898.

Species.	Dodabetta.				Nedivattam.				Hooker.			
	Esti- mated number of plants at close of year.	Replant- ed on plots previ- ously up- rooted.	Vacua- cies supplied.	Vacua- cies by death.	Esti- mated number of plants at close of year.	Replant- ed on plots previ- ously up- rooted.	Vacua- cies supplied.	Vacua- cies by death.	Esti- mated number of plants at close of year.	Replant- ed on plots previ- ously up- rooted.	Vacua- cies supplied.	Vacua- cies by death.
C. Succirubra	..	..	..	..	..	..	..	..	..	..	..	..
C. Officinalis	..	..	..	..	..	..	..	..	..	..	..	..
C. Calisaya var. Ledger	..	..	..	..	..	..	..	..	..	..	..	..
C. Do. other varieties.	..	..	..	..	..	..	..	..	..	..	..	..
C. Micrantha	..	..	..	..	..	..	..	..	..	..	..	..
C. Pitayensis	..	..	..	..	..	..	..	..	..	..	..	..
C. Lanecolata	..	..	..	..	..	..	..	..	..	..	..	..
C. Carthagens	..	..	..	..	..	..	..	..	..	..	..	..
C. Santa-Fé	..	..	..	..	..	..	..	..	..	..	..	..
C. Hybrid and others	..	..	..	..	..	..	..	..	..	..	..	..
Total	604,888	1,832	47,364	47,364	605,194	2,138	75,216	75,216	609,828	291,920	532,336	1,546,427

No. 7.

STATEMENT showing the quantity of bark in store at the commencement of the year 1897-98, the amount harvested, purchased and disposed of during the year, and the quantity remaining in store at its close.

Description of bark.	Balance at the commencement of the year.		Harvested during the year.	Purchased during the year.	Total.
	Previous crops.	Crop of 1896-97.			
1	2	3	4	5	6
Crown bark	LB.	LB.	LB.	LB.	LB.
Red bark	..	..	..	..	..
Magnifolia and Hybrid	..	..	..	..	..
Total ..	141,975	104,776	128,349	108,934	484,034

Description of bark.	Disposed of during the year.				Balance at the close of the year.			
	Previous crop.	Crop of 1897-98.	Purchased bark.	Total.	Previous crops.	Crop of 1897-98.	Purchased bark.	Total.
	7	8	9	10	11	12	13	14
Crown bark	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.
Red bark	..	..	..	..	..	..	..	..
Magnifolia and Hybrid	..	..	..	..	..	..	..	..
Total ..	132,961	..	108,934	241,895	113,790	128,349	..	242,139

No. 8.

STATEMENT showing the particulars of Cinchona bark disposed of during the year 1897-98.

—	Crops previous to 1896-97.	Value (cost price) at 4 annas 3-61 pies per pound.	Crop of 1896-97.	Value (cost price) at 4 annas 2-74 pies per pound.	Purchased during 1897-98.	Value (cost price) at 3 annas 6-29 pies per pound.	Total.	
							Pound.	Value.
Used for the manufacture of quinine and febrifuge. Sold to the Medical depôts, hospitals and public.	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.
114,650	30,818 2 6	17,000	4,492 9 8	108,934	23,999 6 5	240,584	59,310 2 7	
1,311	(a) 584 0 3	..	..	..	..	1,311	584 0 3	
Total ..	115,961	..	17,000	4,492 9 8	108,934	23,999 6 5	241,895	59,894 2 10

(a) This figure represents the actual amount realized by the sale of bark.

The value of the alkaloids extracted from the bark is as follows:—

5,092 lb. quinine at Rs. 12 per lb.	..	..	..	..	..	Rs. 61,104
6,389 lb. febrifuge at Rs. 10 per lb.	..	..	..	..	..	63,890
Total ..	..	..	..	..	..	124,994

No. 9.

STATEMENT showing the particulars of Sulphate of Quinine and Cinchona Febrifuge manufactured and disposed of during the year 1897-98.

Particulars.	Quantity in store at the commencement of the year.	Manufactured during the year.	Total.	Disposed of during the year.				Balance at the close of the year.
				To Madras Medical Department.	To Bombay and Bengal Medical Departments.	To hospitals, Post offices and the public.	Total.	
Sulphate of quinine	LB. OZ.	LB.	LB. OZ.	LB.	LB.	LB. OZ.	LB. OZ.	LB. OZ.
Febrifuge	..	..	..	..	..	..	..	..
4,862 8	5,092	9,954 8	400	3,150	2,786 8	6,336 8	3,618 0	
1,226 8	6,389	7,615 8	..	1,200	755 8	1,955 8	5,660 0	

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No. 10.
STATEMENT of Receipts and Charges of the Cinchona Department.

Year.	Charges.				Receipts.				Surplus, 9 — 5.	Deficit, 5 — 9.
	Of the year.	To end of year.	Simple interest (a).	Total, 2 + 4.	Of the year.	To end of year.	Simple interest (a).	Total, 6 + 8.		
1	2	3	4	5	6	7	8	9	10	11
Rs.										
1875-76	59,630	11,22,117	51,837	1,11,467	1,10,467	1,10,467	2,485	1,12,942	1,475	11,22,117
1876-77	69,772	11,81,747	54,748	1,24,520	3,57,915	4,67,672	13,008	3,70,223	2,45,703	..
1877-78	73,683	12,61,519	57,976	1,31,659	4,00,354	8,68,026	30,053	4,30,407	2,98,748	..
1878-79	79,724	13,25,202	61,428	1,41,152	4,39,787	13,07,813	48,956	4,88,743	3,47,691	..
1879-80	96,105	14,04,826	65,384	1,61,489	3,46,470	16,54,283	66,647	4,13,117	2,51,628	..
1880-81	1,13,575	15,01,031	70,102	1,83,677	5,71,889	22,26,172	87,310	6,59,199	4,76,622	..
1881-82	1,06,392	16,14,606	75,051	1,81,443	5,86,349	28,12,521	1,18,371	6,99,720	5,18,277	..
1882-83	1,24,561	17,20,995	80,248	2,04,809	85,081	28,97,602	1,28,478	2,18,559	8,750	..
1883-84	86,824	18,45,559	85,003	1,71,827	85,829	29,83,431	1,32,323	2,40,706	71,561	..
1884-85	80,379	19,32,383	88,766	1,69,145	1,04,109	30,87,540	1,36,597	2,12,345	85,648	..
1885-86	84,228	20,12,762	92,469	1,76,697	71,790	31,63,271	1,42,259	1,46,200	..	21,949
1886-87	72,161	21,69,151	95,988	1,68,149	8,941	31,66,873	1,42,428	1,46,030	..	22,639
1887-88	69,494	22,38,645	99,175	1,68,669	3,602	31,72,313	1,42,632	1,48,072	..	22,382
1888-89	68,181	23,06,826	1,02,273	1,70,454	5,440	32,01,189	1,43,404	1,72,280	..	8,127
1889-90	74,914	23,81,740	1,05,493	1,80,407	28,876	32,78,256	1,45,788	2,22,855	38,166	..
1890-91	75,805	24,57,545	1,08,884	1,84,689	77,067	33,51,363	1,49,160	2,21,967	30,717	..
1891-92	78,886	25,36,431	1,12,864	1,91,260	72,807	34,20,400	1,52,358	2,21,695	32,840	..
1892-93	73,071	26,09,502	1,15,784	1,88,855	69,337	34,98,112	1,55,667	2,33,379	35,777	..
1893-94	78,411	26,87,913	1,19,191	1,97,602	77,712	36,00,894	1,59,730	2,62,612	57,238	..
1894-95	82,560	27,70,473	1,22,814	2,05,374	1,02,882	37,48,304	1,66,359	3,12,669	1,03,592	..
1895-96	82,549	28,53,022	1,26,528	2,09,077	1,47,310	38,46,768	1,70,889	2,69,353	43,523	..
1896-97	95,300	29,48,322	1,30,530	2,25,830	98,464	38,46,768	1,70,889	2,69,353	26,43,081	11,97,214
1897-98	..	..	..	..	..	..	..	..	..	14,46,867
Surplus...										14,46,867

(a) Interest at $\frac{1}{2}$ per cent. on half the charges or receipts of the year, plus charges or receipts at the end of the previous year.

No. 11.

Stock Account of the Government Cinchona Plantations, Nilgiris, for the year ending 31st March 1898.

	RS.	A.	P.		RS.	A.	P.
Value of chemicals in store on 31st March 1897.	7,532	5	9	Value of chemicals in store on 31st March 1898.	9,428	2	10
" of quinine in store on 31st March 1897, 4,862½ lb. at Rs. 8-2-2 per lb.	39,558	7	5	" of quinine in store on 31st March 1898, 3,618 lb. at Rs. 7-3-3 per lb.	26,060	14	0
" of febrifuge in store on 31st March 1897, 1,226½ lb. at Rs. 8-2-2 per lb.	9,978	1	5	" of febrifuge in store on 31st March 1898, 5,660 lb. at Rs. 7-3-3 per lb.	40,769	11	5
" of quinine in stock with Collectors on 31st March 1897, 3,510-56 packets at Rs. 1-8-0.	5,265	14	0	" of quinine in stock with Collectors on 31st March 1898, 3,802-79 packets at Rs. 1-8-0.	5,704	3	8
" of quinine in stock with Postmasters, 7,865 packets at Rs. 1-8-0.	11,797	8	0	" of quinine in stock with Postmasters on 31st March 1898, 8,290 packets at Rs. 1-8-0.	12,435	0	0
" of 141,975 lb. of bark of previous years at As. 4-3-61 per lb.	38,163	2	9	" of 26,014 lb. bark, old crop, at Annas 4-3-61 per lb.	6,992	9	10
" of 104,776 lb. of bark, 1896-97 crop, at As. 4-2-74 per lb.	27,693	11	0	" of 8,776 lb. bark, 1896-97 crop, at As. 4-2-74 per lb.	23,196	10	2
				" of 128,349 lb. bark, 1897-98 crop, at As. 5-10-32 per lb.	47,008	10	4
Total ..	1,39,989	2	4	Total ..	1,71,595	14	3

No. 12

BALANCE sheet for the year 1897-98.

	RS.	A.	P.		RS.	A.	P.
Value of stock as above on 31st March 1897.	1,39,989	2	4	Value of stock as above on 31st March 1898.	1,71,595	14	4
Outstandings due to department on 31st March 1897.	2,867	9	0	By cash on account of outstandings of previous year.	2,867	9	0
Total expenditure on head office and plantations.	47,008	10	4	By sale of 4,862½ lb. quinine, 1896-97 stock, at Rs. 11 per lb.	53,487	8	0
Total expenditure on factory, &c.	48,291	0	7	By sale of 1,226½ lb. febrifuge, 1896-97 stock, at Rs. 10 per lb.	12,265	0	0
Outstandings due by department for bark.	999	6	5	By sale of 1,279½ lb. quinine, 1897-98 outturn, of 641 lb. febrifuge, 1897-98 outturn.	20,192	10	3
Balance representing profit for the year.	32,852	15	10	" of 1,311 lb. bark	6,410	0	0
				" of 900 lb. jalap	584	0	3
				By miscellaneous receipts	900	0	0
				" outstandings due for quinine and febrifuge.	1,756	12	8
					1,949	6	0
Total ..	2,72,008	12	6	Total ..	2,72,008	12	6

OOTACAMUND, (Signed) W. M. STANDEN,
2nd June 1898. Director.

ORDER—No. 426, Revenue, dated 2nd August 1898.

Miscellaneous.

Mr. Standen's report on the working of the Government Cinchona Plantations and the factory under his control during the year 1897-98 is full and clear. The Government will proceed to notice briefly the more important features in the year's administration.

2. The year under review was remarkable for the comparative failure of the north-east monsoon and the consequent prolonged drought which prevailed from December to March. This caused a certain amount of mortality among the young plants, particularly among those on old land. From statement No. 6 appended to the report it would appear that from one cause or another 122,580 plants died during the year. All these vacancies were, however, supplied by fresh plants.

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3. In parts III and IV of his report the Director discusses the interesting questions of replanting land which has already borne a crop of cinchona, of regeneration from coppice, and of the utility of manuring.

With regard to the question of replanting, the results of the experiments made on the Neduvattam estate appear to establish the inexpediency of endeavouring to replant old land with success as long as new land is available. The Government, however, approves of the Director's proposal to try the experiment of replanting old land under shade.

The facts noted by the Director as to the regenerative power of the stools in certain plots certainly warrant the hope that under careful cultivation the cinchona on the Nilgiris will undergo four rotations by coppice without loss of vitality. An equally important question in working a cinchona estate on a system of coppice rotation is whether a large outlay on manuring will be profitable. Mr. Standen has selected three plots bearing 800 trees each. Two of the plots have been highly manured and the third left unmanured. Careful accounts of the expenditure and return from three plots will be kept, and Mr. Standen anticipates that not only will the direct return from the manured trees, when coppiced, be greater than from those unmanured, but that the stools on these plots will exhibit a greater vitality and regenerative power. The results of the experiments will be awaited with interest.

4. Coppicing and thinning operations during the year were confined to sickly trees on ridges and poor soil and to trees on replanted land. The total amount of bark harvested during the year was thus only 128,349 lbs. from 118,683 trees as against 186,867 lbs. from 23,840 trees in the previous year. The yield of the plantations was supplemented by the purchase of 108,934 lbs. of bark in the local market. Adding the stock of bark on hand at the close of the previous year, the total amount of bark available for manufacture during the year was 484,034 lbs.

5. The following statement shows the quantities of bark, quinine and febrifuge, in stock at the beginning of the year, the additions made thereto, and the quantities disposed of during the year and the balance on hand at its close:—

	In stock at the beginning of 1897-98.	Additions made during 1897-98.	Total.	Disposed of during 1897-98.	Balance.
	LBS.	LBS.	LBS.	LBS.	LBS.
Bark	246,751	237,283	484,034	241,895	242,139
Quinine	4,862	5,092	9,954	6,376	3,618
Febrifuge	1,227	6,389	7,616	1,956	5,660

Work at the factory was much retarded owing to the loss at sea of the fusel oil and sulphuric acid required for the year's manufacture and to the consequent delay in obtaining fresh supplies. As the result only 240,584 lbs. of the total stock of 484,034 lbs. of bark were worked up during the year. The quantity of bark yielded 5,092 lbs. of quinine and 6,389 lbs. of febrifuge, or 11,481 lbs. of alkaloids in all.

The results of the manufacture show that the factory was most efficiently worked; for the total cost of manufacture and distribution was only Rs. 7-3-3 per pound of alkaloid as against Rs. 8-2-2 per pound in the previous year. Deducting the cost of the bark worked up, the actual cost of manufacture and distribution per pound of alkaloid was Rs. 2-0-7 as against Rs. 2-7-7 in the previous year. At the same time the bark appears to have been thoroughly exhausted and no loss of alkaloids allowed to occur, the yield from the crown bark being on the average 4.04 per cent. of sulphate of quinine and 1.65 per cent. of febrifuge as compared with 3.32 per cent. of sulphate of quinine and 1.39 per cent. of febrifuge in the previous year. The yield from the red bark was 3.75 per cent. of febrifuge as against 4.45 per cent. in the previous year. The smaller percentage from the red bark has to be accounted for by the fact that all the bark was taken from trees on replanted land.

It is also very satisfactory to note that the quinine manufactured was found by the Chemical Examiner to come up to the standard of purity laid down by the British Pharmacopoeia.

6. The amount of quinine distributed during the year was the highest on record and exceeded the previous year's issues by 428 lbs. The sales of quinine packets by postal agency continued to show an increase, having amounted to 658½ lbs. against 628 lbs. in 1896-97. On the other hand, sales by the Revenue officers showed a further decrease. This matter will be further commented upon on receipt of the Director's detailed report on the sales under the piece-packet system. The demand of the Government medical depots for febrifuge fell considerably. The decision of the Government not to extend the area under *succirubras* has thus been fully justified.

7. The total receipts and charges amounted to Rs. 98,464 and Rs. 95,300, respectively, against Rs. 1,47,310 and Rs. 82,549 in 1896-97. The fall in receipts was mainly due to the fact that the price of quinine supplied to Government medical depots was reduced from Rs. 18 in 1896-97 to Rs. 11 in the year under review. The financial condition of the plantations is exhibited in statements Nos. 10, 11 and 12 appended to the report. From the balance sheet (statement No. 12) it appears that the profit on the year's working amounted to Rs. 32,852-15-10.

8. The thanks of the Government are due to Mr. Standen for his efficient working of the plantations and factory during the year. The Government is also pleased to notice the testimony borne by the Director to the good work done by his subordinates.

(True Extract.)

A. H. L.

for Secretary to Government.

To the Director of Government Cinchona Plantations.
 „ the Board of Revenue (all Departments).
 „ the Deputy Adjutant-General, Madras Command.
 „ the Public Department.
 „ the Financial Department.
 „ the Educational Department.
 „ the Surgeon-General.
 „ the Accountant-General.
 „ the Postmaster-General.
 „ the Resident in Travancore and Cochin.

Copy to the Honorary Secretary, Agri-Horticultural Society.
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Ed. W. D' Moss.

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