M.R.O. 1—77,006—8-8-31.

(1) Number of pages 66.

(2) Date of repair 10-9-32

(3) Initials of the Referencer

MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No. 576-64 B C Press Mis.

Dated 28-6- 1893.

Not to be folded or roughly handled

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—the following letter from M. A. LAWSON, Esq., Government Botanist and Director of Government Cinchona Plantations, &c., Nilgiris, to the Secretary to Government, Revenue Department, dated Ootacamund, 5th June 1893, No. 47 :—

I have the honour to submit the annual Administration Report on the Government Cinchona Plantations, Nilgiris, for the year ending 31st March 1893, printed as desired in G.O., No. 224, dated the 7th March 1893, Revenue.

ANNUAL ADMINISTRATION REPORT ON THE GOVERNMENT CINCHONA DEPARTMENT, NILGIRIS, FOR THE YEAR 1892–93.

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I. SEASON AND RAINFALL.—Speaking generally, the rainfall on the estates on the western side of the plateau, that is, on the Wood, Hooker, and Nedivattam estates, was considerably below the average, while at Dodabetta, on the eastern side of the plateau, the amount registered was somewhat about the average. On the western side of the plateau, there was a severe drought extending from the end of October to the end of the year. During these five months, only 3·34 inches were registered at Nedivattam, the north-east monsoon having entirely failed. The winds during the year were unusually light except in the months of September and October. Of frost there was none to speak of. The season was chiefly notable for its gloominess from the 25th of May to the end of October. Although the rainfall was less than usual, there was hardly ever a gleam of sunshine.

(*a*) *Dodabetta.*—The rainfall registered on this estate was 52·10 inches, spread over 151 days. This was 5·77 inches more than that registered the year before, but about the average for the past ten years. The rainfall gauged during the last year was the highest for the past three years. October was again the wettest month, though the rainfall during that period was much less than in the previous year. February and March were unusually wet, when in these months 2·74 and 1·83 inches, respectively, were gauged. The season on the whole was a favorable one.

(*b*) *Nedivattam.*—On this estate an unsually small quantity of rain was registered during the past year, the total amount gauged being only 77·12 inches. This was less than what fell the year before by 23·72 inches and less than the average for the past ten years by 16·24 inches. As stated above under "general remarks," gloomy skies and constant drizzle were the characteristics of the season from the 25th of May to the end of October. The result of this want of sun was most damaging to the plants which had been put out in the early part of the year—a large number of these rotted off during the months of September and October. Heavy winds occurred during September and October and did a good deal of damage to the older trees on the estate.

(*c*) *Pykara*—(1) *Hooker.*—On this plantation 70·81 inches of rain were registered and was spread over 164 days. This was 4·75 inches less than what had been gauged the year before, and 18·51 inches below the average fall for the past ten years. July was the wettest month in the year, though less rain fell in that month than happened in the year before. An unusually large amount was registered during March.

(2) *Wood.*—The amount of rain registered on this plantation was 56·81 inches, spread over 163 days. This was 5·94 inches less than what had been gauged during the previous year and 13·47 inches less than the average amount for the past ten years. July was the wettest month, in fact over one-third of the total quantity of rain gauged for the whole year fell during this month alone. Here too, as at Hooker, an unusually large amount of rain fell in March last.

II. FINANCIAL—(*a*) *Receipts.*—When framing the budget estimate for 1892–93 it was originally calculated that only Rs. 60,600 worth of quinine and febrifuge would be sold during the year, and this calculation was based on the value of the indents which had been received during the previous year. Subsequently, however, owing to additional indents having been sent in, it was proposed to raise the estimate from Rs. 60,600 to Rs. 71,000; but Government thought that even this figure was too low and so raised it to Rs. 90,000—*vide* G.O., No. 1116 of 23rd November 1891, Revenue. When the time came for revising the estimate, it was found that Rs. 90,000 would not be realised; first, because the Government of Ceylon had notified their intention of buying no more quinine from this department; and, secondly, because the price of quinine had been reduced from Rs. 14–11–3 to Rs. 13–6–0. Under these circumstances, although it was proposed to allow the receipts to stand at Rs. 90,000, it was distinctly intimated that the realisation of this sum could not be guaranteed; and Government, therefore, reduced the estimate to Rs. 85,000—*vide* G.O., No. 1101 of 28th October 1892, Revenue. The actual receipts amounted to only Rs. 72,798–1–2, as detailed below:—

	RS.	A.	P.
Value of quinine supplied to the Medical Stores Departments of Madras, Bombay and Mysore	41,636	12	9
Value of febrifuge issued to the Medical Store Departments of Madras, Bombay and private parties	30,100	2	0
Bark sold to the Medical Stores Departments of Madras, Bombay, Mysore and private parties	926	14	10
Miscellaneous, viz., sale of seed and plants, percentage of the fees of the Government Quinologist, &c.	134	3	7
Total ...	72,798	1	2

but this sum (Rs. 72,798–1–2) does not include the value of 1,410 packets of quinine powders distributed to Collectors on their indents during the year; taking this into account, the total receipts have been Rs. 74,208–1–2 or Rs. 15,791–14–10 less than the budget, and Rs. 10,791–14–10 less than the revised estimate.

(*b*) *Expenditure.*—The budget estimate of expenditure was calculated originally at Rs. 82,800, but Government raised this sum to Rs. 83,000 (*vide* G.O., No. 1116 of 23rd November 1891, Revenue), and again in the revised estimate, the same figure was allowed to stand—*vide* G.O., No. 1101 of 28th October 1892, Revenue. The actual expenditure during the year was Rs. 78,885–11–8 or Rs. 4,114–4–4 below the budget and revised estimates. This, however, does not include Rs. 1,500 due to the Government Quinologist as his salary while on privilege leave; this sum was

paid to him by the treasury at Dehra Dun, in the North-Western Provinces; and it is not known yet if this charge is to be finally borne by this department or not; at present, under the instructions of the Accountant-General, the Rs. 1,500 have been debited to the Government of the North-Western Provinces. The expenditure has, therefore, been Rs. 4,677–10–6 in excess of the receipts, or, taking in Mr. Hooper's three months' salary, Rs. 6,177–10–6. The reduction in the actual expenditure was due to a desire to bring, if possible, the latter to the level of the receipts, but this unfortunately was not found practicable.

Had the price of quinine remained the same as it was the year before, Rupees 4,050–12–6 would have been added to the receipts, and the difference between them and the expenditure would then have been only Rs. 626–14–0, that is, taking the expenditure at Rs. 78,885–11–8.

III. GENERAL CONDITION—(*a*) *Dodabetta.*—Everything on this estate is in good order; all the less thriving trees were cut down, and it is from these that the greater part of the bark was harvested during the past year. This necessarily means that the crop taken was of inferior alkaloidal value, but it was considered that it would be better to take the crop from these poorer trees now than to let them run on till they grew worse and keep the better trees for future years. The grub is still most destructive to young plants, and the manuring of the pits with quick-lime seems to have had no beneficial effect whatever.

(*b*) *Nedivattam.*—Five acres of succirubras were coppiced and the renewed and mossed barks only were taken, the natural bark on the upper parts of the trees being too poor to make it worth while harvesting. This plot will eventually be planted with *Cinchona officinalis*, and the coppiced shoots of the *succirubras* will be cut down, after they have done their duty by affording shelter to the young plants.

A fire broke out near the Chinamen's lines, and spread through a shola, which was filled with dead *strobi-lanth*, till it reached a grove of *frenelas*, which had been planted on a ridge between two fields of cinchona as a shelter-belt. The *frenelas* took fire and burnt like straw, but no further damage than this was done to the estate. It may be remarked that, owing to their very inflammable nature during the dry season, these *frenelus* are dangerous trees to have in any large numbers. The plants put out in the early part of the season suffered severely from the prolonged monsoon, but those that did not succumb to the inclemency of the weather are now two feet or more in height and hardy vigorously growing plants without a branch.

(*c*) *Pykara—Hooker and Wood.*—Nothing particular has to be noticed regarding either of these plantations.

IV. UPKEEP.—The usual work connected with upkeep has been duly attended to, and all buildings, roads, drains, bridges, &c., have been well maintained during the past year.

V. MANURE.—Very little manure has been put out during the past year, but large quantities of stable and cattle manure have been stored on all the estates, which will be utilised during the present season.

VI. NURSERIES.—The plants in all the nurseries, with the exception of those on the Dodabetta estate, have greatly improved. The demand from planters for plants and seed during the past year has been almost *nil.*

VII. CROP.—The quantity of bark harvested during the past year was 119,483 lb. detailed thus:—

		LB.	LB.
Dodabetta.			
Crown bark		99,890	99,890
Nedivattam.			
Crown bark		4,266	
Red bark		11,820	16,086
Pykara.			
Crown bark		2,182	
Red bark		1,325	3,507
			119,483

At the close of the last year, there remained in stock 416,858 lb. of bark, making in all 536,341 lb. Of this quantity 173,992 lb. were disposed of during the year as follows:—

	LB.
Used in the factory for the manufacture of quinine and febrifuge.	171,717
Sold to the Medical Stores Department, Madras	1,000
" " " Bombay	890
Sold to the Mysore Durbar	300
Supplied to the Imperial Institute	175
Total ...	173,992

and there remained in stock at the end of the year 362,349 lb.

VIII. BUILDINGS.—All the buildings on the several estates have had the necessary annual repairs executed, and the total outlay thereon was Rs. 1,098–0–5, detailed thus:—

	RS.	A.	P.
Dodabetta	146	6	6
Nedivattam	801	7	0
Pykara	150	2	11
Total	1,098	0	5

IX. FACTORY.—The work in the factory was carried on continuously during the whole year, with the exception of a month in the autumn when fuel for the boilers fell short, and for three weeks in January when the place was closed for the Christmas holidays and some alterations which had to be made in the machinery and other plant.

In July last, the Carter's Disintegrator used at Nedivattam for grinding bark was broken, and though the leading firms at Calcutta and Bombay were telegraphed to, a new one could not be procured in India; but Messrs. Richardson and Cruddas of Bombay wrote to say that they had a "Devil Disintegrator," which they thought might answer the purpose of a "Carter's." Under the sanction of Government accorded in G.O., No. 3294 of 20th July 1892, Revenue, the Director proceeded to Bombay, but after seeing the "Devil Disintegrator" at work, it was found that it would not be suitable for the requirements of this department, as the bark turned out by it was of too coarse a quality and was also charred. The broken parts of the disintegrator were then sent for and there and then mended by Messrs. Richardson and Cruddas and taken back to Ootacamund.

During the past year, 4,933 lb. of sulphate of quinine were manufactured at the factory at Nedivattam. At the close of the previous year, there was in stock 2,652 lb. 10 oz., making in all 7,585 lb. 10 oz.; of this quantity 3,203 lb. 13 oz. were disposed of as follows:—

	LB.	OZ.
Issued to the Medical Stores Department, Madras	2,000	0
" " " Bombay	950	0
" " " Mysore	100	0
Sold to private parties	31	15½
Made up into powders for issue to Collectors in paper packets	121	13½
Total ...	3,203	13

and there remained in stock at the end of the year 4,381 lb. 13 oz.

Of febrifuge there was manufactured during the year 3,139 lb. and there remained in stock at the end of last year 1,355 lb., making in all 4,494 lb.; of this 2,608 lb. 8 oz. were disposed of detailed thus:—

	LB.	OZ.
Issued to the Madras Medical Stores	1,600	0
Issued to the Bombay Medical Stores Department	1,000	0
Sold to private parties	8	8
Total ...	2,608	8

and there remained in stock at the end of the year 1,885 lb. 8 oz.

The greater part of the bark used during the year was crown bark, but of varying alkaloidal value; some was as poor as to yield only 2·37 sulphate of quinine; this was from the trees spoken of above under III. "General condition"—(*a*) "Dodabetta"— while the sulphate of quinine in other bark ran as high as 5·55 and this was from the better trees on the estates taken by the stripping process. As the amount of quinine and febrifuge turned out in the factory was exceeding the immediate demands, it was thought desirable to work chiefly upon the inferior classes, and so relieve the godowns, which are choked, and reserve the better sorts for a future day.

Taking the present price of the quinine at Rs. 14–1–7 per lb. and the febrifuge at Rs. 10, the value of these drugs in stock at the end of the year amounted to Rs. 80,633–15–10, thus:—

	RS.	A.	P.
4,381 lb. 13 oz. of quinine at Rs. 14-1-7 per lb.	61,778	15	10
1,885 lb. 8 oz. of febrifuge at Rs. 10 per lb.	18,855	0	0
Total ...	80,633	15	10

X. MR. HOOPER'S REPORT.—During the year Mr. Hooper made a great number of analyses of barks, soils, chemicals, &c., for this department; some of which being of general interest he has embodied in his report.

XI. MISCELLANEOUS—(*a*) *Issue of packets of quinine powders.*—When compared with the results in the previous year, the indents for quinine powders have been satisfactory; the numbers sent out by this department having been no less than 1,704 packets or 170,400 powders. Last year only 370 packets or 37,000 powders were desposed of. Up to the time of writing, only eight reports on the sales by Collectors during the past year have been received, viz., from Salem, Malabar, Nilgiris, Coimbatore, Gódávari, Cuddapah, Vizagapatam and Tanjore; and so in accordance with the wishes of Government expressed in G.O., No. 224, of 7th March 1893, Revenue, a report on this subject will not be submitted until later on.

(*b*) *Issue of jalap powders with the quinine.*—The 200 packets or 10,000 jalap powders received from the Madras Medical Stores Department in July 1891 for issue with the quinine was exhausted in December last. Since then the stock of these jalap powders has not been replenished, as the question, whether the joint issue of the jalap with the quinine should be continued or not, is still under the consideration of Government.

(*c*) *Imperial Institute.*—In August last twenty-five pounds of each of the following kinds of bark were sent to Mr. E. Thurston, Calcutta, for the Imperial Institute:—

(1) Natural crown.
(2) Mossed do.
(3) Renewed do.
(4) Natural red.
(5) Mossed red.
(6) Renewed do.
(7) Natural magnifolia.

(*d*) *Mr. Hooper's leave.*—In accordance with the sanction of Government accorded in G.O., No. 4412, dated the 11th October 1892, Revenue, Mr. Hooper, the Government Quinologist, took three months' leave from the 25th October 1892 and returned to duty on the 25th January 1893.

(*e*) *Gun licenses.*—Hitherto no licenses under the Arms Act were obtained for the possession of fire arms by the watchers or the messengers sent to bring money to the Nedivattam and Pykara estates from Ootacamund, but in G.O., No. 2014, of 26th October 1892, Judicial, Government considered it unnecessary and inexpedient to sanction the further continuance of these persons being exempted under the Arms Act, and so licenses were obtained from the District Magistrate, Nilgiris, and these will be renewed as becomes necessary.

(*f*) *Statements accompanying the report.*—Two returns prepared for the first time in this office are furnished in accordance with the wishes of Government conveyed in G.O., No. 4740, dated 28th October 1892, Revenue. With regard to statement No. 12, it is suggested that for the future a less complicated form should be adopted. In 1883, when the present one was drawn up, the crude bark was, so

to speak, the finished product of the estates, but now the finished products consist almost entirely of quinine and febrifuge. The following is the new form proposed:

	RS.	A.	P.
Value of 4,933 lb. of quinine at Rs. 13-6-0 per lb. ...	65,978	14	0
Do. of 3,139 lb. of febrifuge at Rs. 10 per lb.	31,390	0	0
Miscellaneous receipts, such as sale of plants and seeds, &c...	1,061	2	5
Total ...	98,430	0	5
Expenditure for the year including salaries, upkeep of estate, factory, &c.	78,885	11	8
Profit on the year's working	19,544	4	9
Total ...	98,430	0	5

(*g*) *Spelling of names.*—It will be observed that the spelling of several names of places has been altered in accordance with G.O., No. 212, of 4th March 1893, Revenue.

(*h*) *A comparison of the alkaloids of barks when grown in rich and poor soils.*—The following circular memo intended for the information of the Superintendents of the Government Cinchona Estates may be of interest to others.

The following analyses of soils and barks have been made with the view of showing how an increase of alkaloids in the natural bark of cinchona trees follows upon enriching the soil:—

(1) Simply by deep digging.
(2) By deep digging and manuring.

With respect to the soils analysed, these were taken from a typical grass hill on the Government estates at Nedivattam. Both samples were taken two feet from the surface. The first was the natural sub soil; the second was from a trench after it had been filled in with top soil one and a half years, but had not been manured.

No. 1 contained 25·15 per cent. moisture.

No. 2 contained 29·13 per cent. moisture.

The soils dried at 100°C. yielded—

Organic matter and combined water	14·020	20·860
Iron and alumina	24·100	20·800
Lime	·092	·690
Magnesia	·063	·392
Potash	·112	·202
Phosphoric acid	·062	·145
Sulphuric acid	·005	·044
Silicates	32·430	34·850
Sand	25 460	17·240
Undetermined	3·656	4·977
Total ...	00·000	100·200
Nitrogen in the organic matter	·166	·420

From the above analyses it will be seen that, while the first soil is somewhat poor, the second is decidedly a rich one. The organic matter is increased by almost one-third, while the nitrogen is much more than doubled. It will be noticed too that the lime has been increased seven and a half times, the magnesia six and a quarter times and also the potash is nearly doubled. The phosphoric acid more than doubled and the sulphuric acid is increased nearly ninefold.

The lime and potash have been derived from the grass and weeds, which had decomposed in the trench; these grasses and weeds had taken the lime and potash in minute quantities at a time from the surrounding soil and accumulated them in their tissues. The increase of the nitrogen, phosphoric and sulphuric acids is due to the same cause.

If these grasses and weeds had been simply dug up and left on the surface of ground, exposed to the sun and air, they would have been burnt by slow combustion, almost as completely as if they had been put into a furnace, and the whole or nearly

the whole of the organic matter, with the contained nitrogen, would have been volatilized and lost; but by burying them deep in the ground the gases, as they are given off during the processes of decomposition, are absorbed by the soil and so made available for future use.

Thus it will be seen that to cultivate the surface of the ground only is very wasteful when compared with deep cultivation.

The following are analyses of three barks of *Cinchona officinalis* hybrids which were uniform so far as regards site and age. The samples in each case were taken not from one tree only but from twenty, so that the analyses may be regarded as representing the average qualities of the trees grown over the whole of the several plots.

No. I.—The trees to which the analysis refers were grown on grass land, which had never been trenched or manured; the only cultivation which had been carried out was that of mamooty weeding.

Quinine	2·25
Cinchonidine	1·36
Cinchonine	·30
Amorphous	1·62
	5·53
Sulphate of quinine	3·03

The second sample was taken from grass land, which had been trenched 18 months before, two feet deep by one foot broad, and the trenches filled in with the top soil and its weeds, but not manured.

Quinine	2·67
Cinchonidine	2·04
Cinchonine	·56
Amorphous	·47
	5·74
Sulphate of quinine	3·59

The third sample was taken from a plot which had been trenched and filled in, as in the last instance, but which had also been manured with cattle dung.

Quinine	3·18
Cinchonidine	2·08
Cinchonine	·42
Amorphous	·48
	6·16
Sulphate of quinine	4·28

To make the correlation between high cultivation and the increase of the alkaloids more apparent, the analyses of the three sorts are tabulated below:—

	No. 1 Mamooty weeded only.	No. 2 Trenched.	No. 3 Trenched and manured.
Quinine	2·25	2·67	3·18
Cinchonidine	1·36	2·04	2·08
Cinchonine	·30	·56	·42
Amorphous	1·52	·47	·48
	5·53	5·74	6·16
Sulphate of quinine	3·03	3·59	4·28

(*i*) *Service books.*—All the service books of the establishment have been kept duly written up.

DIRECTOR'S OFFICE,
OOTACAMUND,
5th June 1893.

(Signed) M. A. LAWSON,
Government Botanist and Director.

From D. HOOPER, Esq., Government Quinologist, to the Government Botanist and Director of the Cinchona Plantations, Nilgiris, dated Ootacamund, 6th May 1893.

I have the honour to forward the following report on the analytical work conducted in the laboratory during the year ending 31st March 1893.

2. Among the barks analysed during the year there have not been many of special interest or of very high value. A sample of crown bark from Dodabetta yielded 5·55 per cent. of sulphate of quinine, which is above the average of the bark used in the factory obtained from that plantation. A specimen of *Bagota* bark from an estate near Dodabetta belonging to General Jennings gave 5·81 per cent. of sulphate. The age of this tree was six years and it is supposed to be a variety of the Santa Fé or soft Columbian bark. The following is a full analysis of the bark :—

Quinine	4·32
Cinchonidine	·96
Quinidine	Trace
Cinchonine	·68
Amorphous	·88
Total	6·84

3. Several hybrid barks were analysed, some grown in poor soil and others in trenched and manured land. The soils in which these trees grew were also examined chemically, and the results are quoted in the Director's report, together with his remarks on their cultivation and treatment.

4. The quinine and febrifuge from the factory at Nedivattam have been good in composition and appearance, and the chemicals used in their manufacture have been tested from time to time as to their purity.

5. When a manure pit, made near a cinchona tree, is examined a few months after it has been filled, it will be found to have an abundance of feeding rootlets in it. Whereas a tree grown in poor soil will produce these rootlets very sparingly. This difference caused me to investigate the composition of this portion of the plant under these conditions and to see if the rootlets were richer in alkaloids when growing in rich soil, or poorer in alkaloids when grown in poor soil. I have already shown in former reports that the bark of cinchona trees, whether old or young, is susceptible to the influence of manure; but up to the present we have had no experiments to show how this influence is exerted in the roots. The rootlets of *Cinchona officinalis* were first examined. The bearded roots from a manured tree were so massive that it required the roots of about four trees from poor soil to make up an equal weight. The two samples were separately dried and reduced to a fine powder, and, on analysis, they yielded the following results :—

	Rootlets from poor soil.	Rootlets from manured soil.
Alkaloids	2·56	2·82
Tannin and cinchona red	16·86	18·02
Sugar and organic acid	2·02	3·82
Fibre	49·09	49·53
Ash	8·13	6·93
Water	5·74	5·87

The alkaloids were composed as under :—

	Rootlets from poor soil.	Rootlets from manured soil.
Quinidine	·65	·65
Cinchonine	1·27	1·58
Amorphous	·64	·59
Total	2·56.	2·82

The results of these analyses show that there is very little difference in the composition of the small fibrous roots of an officinalis tree, whether grown in the ordinary or manured soil. Before drawing conclusions from this experiment, I obtained samples of roots from succirubra trees. The first sample was from rich soil, and there was an abundance of bearded rootlets; the second sample, from a tree growing in a poor plot of land, contained so few of these rootlets

that, when they were dry, they were not sufficient for analysis and a sample was thereupon taken from the thicker quilled roots. The results of the two analyses are thus compared :—

	Rootlets from rich soil.	Small roots from poor soil.
Alkaloids	1·53	2·50
Tannin and cinchona red	14·34	8·84
Sugar and organic acid	2·34	14·98
Fibre	56·49	35·69
Ash	9·25	5·51
Water	9·19	13·24

The alkaloids were composed as under :—

Quinine	·38	
Cinchonidine	·44	
Quinidine	·32	·24
Cinchonine	·60	·37
Amorphous	·76	·92
Total	2·50	1·53

Although these analyses are not correctly comparable, the samples not having been taken from similar portions of the roots, yet they show that manure and fertilizing agents do not have the property of increasing the alkaloids in the rootlets. It would seem that, as a larger quantity of food is supplied to the tree by the additional rootlets, an increase of alkaloids must result from the elaboration of its sap. The absence of quinine in the rootlets and its gradual appearance and increase as the root thickens is one of the peculiarities of alkaloid distribution in the plant. The other peculiarities are (1) the large proportion of cinchonine in the root of the officinalis compared with the very small proportion that exists in the stem, and (2) the presence of a notable quantity of quinidine in the root of the succirubra compared with the traces of this alkaloid that are present in the natural stem bark.

6. *Manures.*—The manures suitable for cinchona cultivation must contain nitrogen, phosphoric acid, lime and potash, and, when a manure contains all these four constituents, it is more valuable than a substance deficient in one of them. The natural fertilizers available in Southern India are cattle manure, bones, fish and poonac. Cattle manure is well known and is more used than anything else by planters. Bones are not very suitable, unless mixed with other ingredients; they are poor in nitrogen, destitute of potash, and are applicable only for soils requiring phosphoric acid and lime. Fish is a valuable manure for cinchona, and its application to the trees is always attended with an invigorating growth and an increase of alkaloids. Some small fish, about the size of sardines, are supplied by merchants on the Western Coast; the fish are simply dried in the sun on the sand. A sample of fish of this description (*Sardinella Neohowii*) that we have been using on the plantations was beaten up into a paste and analysed with the following results :—

Water	15·30
Organic matter *	55·98
Lime	6·93
Phosphoric acid	30
Alkaline salts, &c.	11·67
Sand	4·32
Total	100·00

* Containing nitrogen 6·02 (equal to ammonia 7·31).

Poonac is a name given to the cake left after the expression of oil from certain oleaginous seeds. Poonac is often rich in nitrogen and the ash contains a large proportion of phosphoric acid and potash with smaller quantities of lime. Samples of seed-cakes, however, vary in composition according to the seeds that are employed, and the samples of cakes prepared from one kind of seed are not always identical because of varying quantities of oil, water, and sand retained in them. The following remarks are made on some samples of poonacs obtainable in Southern India that have passed through my hands. They are arranged according to their value :—

Castor poonac.—This is obtained from the seeds of the well-known castor-oil plant. The cake contains from 5 to 7·5 per cent. of nitrogen and 7 to 12 per cent. of mineral matter. It is one of the richest poonacs and in some parts of the country it is one of the most abundant.

Ground-nut poonac.—This is prepared from the seeds of *Arachis hypogœa*, which is cultivated so extensively in the districts bordering on the Coromandel coast. It contains from 5 to 7 per cent. of nitrogen and 9 to 12 per cent. of mineral matter. The cake from the decorticated seed is about one-tenth richer in albuminous substances than that from the undecorticated.

Nim or margosa poonac is made from the seeds of the Nim tree (*Melia azadirachta*) and is characterised by its asafœtida-like smell and its bitter taste. The nitrogen ranges from 4 to 5·5 per cent. and the ash is rich in phosphates. The cake usually retains a large quantity of oil, sometimes as much as 20 per cent.

Hongay poonac.—Hongay is the Canarese name for the *Pongamia glabra*, a large tree growing near the Coast and in Mysore. The cake, which is very bitter, contains from 4 to 5 per cent. of nitrogen and 4 to 6 per cent. of ash.

Cocoanut poonac is one of the products of the cocoanut palm on the Western Coast. When fresh it is eaten as food by the lower classes, but it soon decomposes and is fit for nothing else than a manure. It does not afford more than 3 to 4 per cent. of nitrogen and only a small proportion of ash.

Moura poonac is prepared from the seeds of *Bassia longifolia*, a tree known by the Tamil name *illupu*. The cake contains a large quantity of saccharine matter, but is rendered nauseous on account of a bitter principle being present. It yields from 2 to 3 per cent. of nitrogen.

7. *Singhara or water chestnut.*—In the North-Western Provinces the fruit of *Trapa bispinosa*, called by the Natives *singhara*, is used as an article of food. It is also grown in Guzerat, and in Cashmere it is said to be the only food for at least 30,000 people for five months in the year. Not having met with an analysis of this food product, I brought a supply of it from Mussoorie and have submitted it to a chemical examination. The following is the result of the analysis :—

Fat	·97
Sugar and gum	14·36
Albuminous matter	8·41
Starch	63·84
Cellulose	3·60
Ash	4·66
Water	4·16
Total ...	100·00

The nutrient ratio or the ratio between the albuminous matter and the starchy materials is 1 : 9·5, which is very similar to that of cleaned rice having a nutrient ratio of 1 : 10·8.

8. *Tangedu bark.*—In my report of the year 1889–90, I gave the tannin value of a large number of astringent barks and the list included the tangedu bark (*Cassia auriculata*) which, from an analysis of an authentic sample from Bangalore, I found to contain 11·9 per cent. of tannin. The Inspector-General of Forests of Mysore noticing the somewhat low value of this well known bark and the low position it occupied in the list, wrote to the Madras Government suggesting that there was a mistake, as an analysis of the bark made in England was much higher. I accordingly obtained from Mr. Cameron a sample of the bark as it is used in the tanneries and found that it yielded 20·1 per cent. of tannin, and, on reference to my notes of the previous analysis, I found that the sample had been from some young bark taken evidently from the small branches of the plant and would in consequence contain less tannin than that from the thicker branches and stems. In the analysis of vegetable economic products great importance is attached to the maturity of the sample and the condition under which it has been collected and preserved, as a slight difference in the age of the sample, or the presence of impurities, or any decomposition will make an analysis of that sample of little value.

(Signed) D. HOOPER,
Government Quinologist.

No. 1.

STATEMENT showing the Rainfall at the several Government Cinchona Plantations, Nilgiris, during the official year 1892-93.

Months.	Dodabetta.				Nedivattam.			
	1891–92.		1892–93.		1891–92.		1892–93.	
	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
April	2·47	7	3·34	12	3·92	7	4·49	12
May	4·38	13	5·72	16	5·98	16	4·67	13
June	3·77	16	6·34	23	9·26	22	8·89	23
July	6·57	24	7·83	21	46·82	30	30·03	29
August	2·98	13	6·93	24	16·93	25	15·19	30
September	1·45	9	3·37	10	3·13	14	4·75	18
October	15·94	27	10·46	20	10·64	19	5·76	20
November	5·88	7	1·35	6	2·41	3	0·64	5
December	2·73	15	2·12	5	0·55	2	0·33	3
January	0·00	..	0·07	1	0·00	..	0·00	..
February	0·12	3	2·74	5	0·00	..	0·55	3
March	0·04	1	1·83	8	1·20	1	1·82	2
Total ..	46·33	135	52·10	151	100·84	139	77·12	158

Months.	Hooker.				Wood.			
	1891–92.		1892–93.		1891–92.		1892–93.	
	Rainfall.	Number of wet days.	Rainfall.	Number of wet days.	Rainfall.	Number of wet days.	Rainfall.	Number of wet days.
	10	11	12	13	14	15	16	17
April	2·57	6	5·45	12	2·66	7	4·10	12
May	6·71	15	5·38	17	5·77	14	5·03	17
June	7·79	20	6·41	20	6·50	19	5·39	20
July	33·76	29	24·00	29	25·68	28	19·03	29
August	8·70	23	12·81	30	6·62	23	9·74	30
September	1·41	13	4·29	16	1·07	14	3·23	17
October	10·95	23	6·67	19	10·66	22	5·20	17
November	1·52	6	1·68	5	1·51	5	1·38	5
December	1·60	5	1·04	5	1·84	5	1·49	5
January	0·00	..	0·00	..	0·00	..	0·00	..
February	0·13	1	0·84	4	0·19	2	0·51	4
March	0·42	1	2·24	7	0·25	1	1·66	7
Total ..	75·56	142	70·81	164	62·75	140	56·81	163

No. 2.

STATEMENT showing the Receipts on account of the Government Cinchona Plantations, Nilgiris, for the official year 1892-93.

Particulars.	Sanctioned budget estimate for 1892–93.	Revised budget estimate for 1892–93.	Actuals for 1892–93.
	Rs.	Rs.	Rs. A. P.
Bark supplied to the Madras Medical Department	250	260	255 0 0
Do. Bombay do.	400	400	321 0 0
Do. Private parties and Mysore Durbar	500	500	350 14 10
Sale of seed and plants	100	100	52 2 7
Percentage of the fees of the Government Quinologist	50	40	21 0 0
Miscellaneous	500	500	61 1 0
Febrifuge	26,000	33,200	30,100 2 0
Quinine	62,200	50,000	41,636 12 9
Total ..	90,000	85,000	72,798 1 2

No. 3.

STATEMENT showing the Expenditure in detail on account of the Government Cinchona Plantations, Nilgiris, for the official year 1892-93.

Name of Plantation.	SALARIES.			NURSERIES.			WORKING CHARGES.			MANURE.		
	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.
1	2	3	4	5	6	7	8	9	10	11	12	13
	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.
Head Office and General	12,336	12,336	12,156 0 0	..	..	..	..	..	..	..	..	..
Dodabetta	3,744	3,744	3,744 0 0	400	260	272 15 0	5,044	4,751	4,662 3 3	2,400	1,814	2,293 14 2
Nedivattam	4,320	4,200	4,465 13 11	400	400	452 9 0	8,294	7,258	6,546 8 2	2,914	3,104	2,919 10 1
Pykara	3,887	3,887	3,868 0 0	500	575	564 11 6	7,100	4,690	4,464 2 4	880	680	704 6 2
Quinologist department	7,069	7,069	5,569 8 0	..	..	..	..	..	..	..	..	..
Total ..	31,356	31,236	29,803 5 11	1,300	1,235	1,290 3 6	20,438	16,699	15,672 13 9	6,194	5,598	5,917 14 5

Name of Plantation.	CROP.			NEW WORKS.			REPAIRS.			CONTINGENCIES.		
	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.
	14	15	16	17	18	19	20	21	22	23	24	25
	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.
Head Office and General	..	..	..	..	..	..	300	..	..	700	1,000	809 2 11
Dodabetta	3,000	2,156	2,306 2 9	..	..	..	200	147	146 6 6	..	..	..
Nedivattam	2,460	852	914 13 2	..	..	..	800	800	801 7 0	..	..	..
Pykara	275	275	206 5 2	..	..	..	450	350	150 2 11	..	..	..
Quinologist department	..	..	..	..	..	..	..	..	..	11,500	18,177	16,870 3 4
Total ..	5,735	3,283	3,427 5 1	..	..	..	1,750	1,297	1,098 0 5	12,200	19,177	17,679 6 3

No. 3.

Statement showing the Expenditure in detail on account of the Government Cinchona Plantations, Nilgiris, for the official year 1892-93.—*cont.*

Name of Plantation.	PRINTING CHARGES.			PEONS' CLOTHING.			TRAVELLING ALLOWANCE.		
	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.
	26	27	28	29	30	31	32	33	34
	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.
Head Office and General	40	40	37 14 1	12	12	12 0 0	1,500	1,500	1,479 0 6
Dodabetta	..	..	..	..	..	..	..	..	..
Nedivattam	..	..	..	..	..	..	..	..	..
Pykara	..	..	..	..	..	..	..	..	..
Quinologist department	..	..	..	..	..	..	..	..	..
Total ..	40	40	37 14 1	12	12	12 0 0	1,500	1,500	1,479 0 6

Name of Plantation.	HOUSE-RENT.			FACTORY.			TOTAL.		
	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.
	35	36	37	38	39	40	41	42	43
	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.
Head Office and General	..	..	..	..	..	..	14,888	14,888	14,494 1 6
Dodabetta	..	..	..	..	..	..	14,788	12,872	13,425 9 8
Nedivattam	..	..	..	1,875	2,323	1,917 11 9	21,063	18,937	18,018 9 1
Pykara	..	..	..	..	..	..	13,092	10,457	9,957 12 1
Quinologist department	600	600	550 0 0	..	..	..	19,169	25,846	22,989 11 4
Total ..	600	600	550 0 0	1,875	2,323	1,917 11 9	83,000	83,000	78,885 11 8

No. 4.

STATEMENT showing the Receipts and Expenditure of the Government Cinchona Plantations, Nilgiris, for the official year 1892–93.

RECEIPTS.

Classification.	Revised estimate.	Up to the end of the year.
	Rs.	Rs. A. P.
Sulphate of Quinine	50,000	41,636 12 9
Febrifuge	33,200	30,100 2 0
Bark supplied to the Madras Medical Department	260	255 0 0
Do. Bombay do.	400	221 0 0
Do. Private parties and Mysore Durbar	500	350 14 10
Sale of seed and plants	100	52 2 7
Percentage of the fees of Government Quinologist	40	21 0 0
Miscellaneous	500	61 1 0
Total ..	85,000	72,798 1 2

EXPENDITURE.

Classification.	A. Conservancy.		B. Establishment.		Total.	
	Revised estimate.	Up to the end of the year.	Revised estimate.	Up to the end of the year.	Revised estimate.	Up to the end of the year.
	Rs.	Rs. A. P.	Rs.	Rs. A. P.	Rs.	Rs. A. P.
Head Office and General ..	2,552	2,338 1 6	12,336	12,156 0 0	14,888	14,494 1 6
Quinologist department ..	18,777	17,420 3 4	7,069	5,569 8 0	25,846	22,989 11 4
Dodabetta	9,128	9,681 9 8	3,744	3,744 0 0	12,872	13,425 9 8
Nedivattam	14,737	13,552 11 2	4,200	4,465 13 11	18,937	18,013 9 1
Pykara	6,570	6,039 12 1	3,887	3,868 0 0	10,457	9,957 12 1
Total ..	51,764	49,032 5 9	31,236	29,803 5 11	83,000	78,885 11 8

No. 5.

STATEMENT showing the quantity of Cinchona Seed and number of Plants sold to the public during the official year 1892–93.

—	Seed.	Plants.
	LB. OZ.	No.
Cinchona Condaminea	6 8	..
Do. Magnifolia	0 13½	2,100
Do. Succirubra	1 12	..
Total ..	9 1½	2,100

No. 6.

A.—STATEMENT showing the total yield of the Government Cinchona Plantations, Nilgiris, for the official year 1892-93.

Name of Plantation.	Species of produce.	Bark. Under stripping and mossing system. Number of plot.	Number of trees decorticated.	Outturn of green bark.	Up-rooting. Number of plot.	Number of trees decorticated.	Outturn of green bark.	Coppicing. Number of plot.	Number of trees decorticated.	Outturn of green bark.	Scraping. Number of plot.	Number of trees decorticated.	Outturn of green bark.	Total number of trees decorticated.	Total quantity of green bark collected.	Quantity when dry.	Seed.	Propagation. Plants.	Seedlings.	Rooted cuttings.
				LBS.			LBS.			LBS.			LBS.		LBS.	LBS.	LB. OZ.			
Dodabetta ..	Crown bark ..	1	314	2,096	..	..	..	23	15,848	297,586	..	..	..	16,662	299,682	99,890	25 14	36,000	30,000	..
	Magnifolia ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3 14	..	..	..
Nedivattam ..	Crown bark ..	2	966	1,213	..	..	..	2	1,130	11,587	..	..	..	2,096	12,800	4,266	..	..	..	..
	Red do. ..	..	..	..	1	914	5,661	1	3,033	29,800	..	..	..	3,947	35,461	11,820	1 12	..	..	..
	Magnifolia ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	45,000	100,000	..
Pykara ..	Crown bark ..	1	278	207	1	611	3,952	..	..	..	..	1	..	889	6,548	2,182	..	11,000	..	..
	Red do. ..	..	..	..	1	213	3,975	..	..	..	..	..	..	213	3,975	1,325	..	..	..	..
		..	..	..	..	..	..	..	..	..	..	..	..	..	..	119,483	..	..	..	..
	Add the balance on 31st March 1892.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	416,858	..	..	..	..
	Total ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	536,341	..	..	..	..

B.—STATEMENT showing the disposal of bark and other produce collected in the Government Cinchona Plantations, Nilgiris, for the official year 1892–93.

Name of Plantation.	Species of produce.	Bark. Used for febrifuge and quinine. Bales.	Quantity.	Sold in the country. Bales.	Quantity.	Supplied to the Medical Department. Bales.	Quantity.	Total. Bales.	Quantity.	Seed. Sold to the public.	Used for nursery.	Total.	Propagated Plants and Seedlings. Plants. Sold to the public.	Permanently put up in the plantation.	Seedlings. Sold to the public.	Rooted cuttings. Transplanted.		Remarks.
			LBS.		LBS.		LBS.		LBS.	LB. OZ.	LB.	LB. OZ.						
Dodabetta ..	Crown bark ..	1,093½	109,370	¾	75	8	800	1,102½	110,245	6 8	2	8 8	..	..	..	..	..	
	Magnifolia ..	..	..	..	..	..	..	..	..	0 13½	..	0 13½	..	..	..	..	..	
Nedivattam ..	Crown bark ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Red bark ..	139½	13,946	3¾	375	10	1,000	153½	15,321	1 12	..	1 12	..	..	..	..	..	* As renewals in lieu of failures.
	Magnifolia ..	141½	14,154	¼	25	..	..	141½	14,179	..	3	3 0	1,200	*26,680	..	..	..	
Pykara	Crown bark ..	342½	34,247	..	..	..	..	342½	34,247	..	..	..	..	..	..	..	..	
		..	..	..	..	..	..	..	173,992	..	..	..	..	..	..	..	..	
	Add the balance on 31st March 1893.	..	..	..	..	..	..	..	362,349	..	..	..	..	..	..	..	..	
	Total ..	..	..	..	..	..	..	..	536,341	..	..	..	..	..	..	..	..	

No. 7.

STATEMENT showing the approximate number of plants in permanent plantations, Nilgiris, on 31st March 1893.

Species.	Dodabetta.				Nedivattam.				Hooker.				Wood.				Grand Total.
	Plants last year.	Coppiced or up-rooted.	Planted in this year.	Total.	Plants last year.	Coppiced or up-rooted.	Planted in this year.	Total.	Plants last year.	Coppiced or up-rooted.	Planted in this year.	Total.	Plants last year.	Coppiced or up-rooted.	Planted in this year.	Total.	
C. Succirubra	..	..	..	...	36,255	3,947	..	32,308	2,888	213	..	2,675	...	..	..	..	34,983
C. Officinalis	593,989	15,848	..	578,141	96,819	1,130	..	95,689	382,446	611	..	381,835	..	..	..	..	1,055,665
C. Calisaya var. Ledger ..	130	..	..	130	..	..	..	..	..	..	..	..	..	..	..	..	130
C. do. other varieties.	..	..	..	..	143	..	..	143	..	..	..	..	..	..	..	..	143
C. Micrantha	26	..	..	26	..	..	..	..	..	..	..	..	..	..	..	..	26
C. Pitayensis	43	..	..	43	..	..	..	..	..	..	..	..	..	..	..	..	43
C. Lanceolata	..	..	..	..	5	..	..	5	..	..	..	..	..	..	..	..	5
C. Carthagena	18	..	..	18	716	..	..	716	50	..	..	50	45	..	..	45	829
C. Sauta-Fe	9	..	..	9	3	..	..	3	..	..	..	..	..	..	..	..	12
C. Hybrid and others ..	61,806	..	..	61,806	269,925	..	..	269,925	292,995	..	..	292,995	41,583	..	..	41,583	666,309
Total ..	656,021	15,848	..	640,173	403,866	5,077	..	398,789	678,379	824	..	677,555	41,628	..	..	41,628	1,758,145

No. 8.

COMPARATIVE STATEMENT showing the quantity of bark of all sorts in store at the commencement of the year 1892-93 collected and disposed of during the year and remaining in store at its close.

1891-92.

Description of bark.	Quantity in store at the commencement of the year.								Collected during the year.	Total.	Disposed during the year.	
	Crop of 1883-84.	Crop of 1885-86.	Crop of 1886-87.	Crop of 1887-88.	Crop of 1888-89.	Crop of 1889-90.	Crop of 1890-91.	Total.			Crop of 1883-84.	Crop of 1885-86.
1	2	3	4	5	6	7	8	9	10	11	12	13
	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.
Crown bark	..	..	..	489	82,233	74,058	76,038	232,818	13,204	246,022	..	..
Red bark	..	37,313	28,981	35,056	26,009	68,568	57,313	253,240	40,487	293,727	..	24,370
Magnifolia	900	340	..	3,877	1,920	17,600	..	24,637	142	24,779	900	340
Total ..	900	37,653	28,981	39,422	110,162	160,226	133,351	510,695	53,833	564,528	900	24,710

1891-92—*cont.*

Description of bark.	Disposed during the year—*cont.*				Balance at the close of the year.							
	Crop of 1887-88.	Crop of 1888-89.	Crop of 889-90.	Total.	Crop of 1885-86.	Crop of 1886-87.	Crop of 1887-88.	Crop of 1888-89.	Crop of 1889-90.	Crop of 1890-91.	Crop of 1891-92.	Total.
	14	15	16	17	18	19	20	21	22	23	24	25
	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.
Crown bark	489	82,233	29,978	112,700	..	..	..	..	44,080	76,038	13,204	133,322
Red bark	..	..	..	24,370	12,943	28,981	35,056	26,009	68,568	57,313	40,487	269,357
Magnifolia	3,877	1,920	3,563	10,600	..	..	..	..	14,037	..	142	14,179
Total ..	4,366	84,153	33,541	147,670	12,943	28,981	35,056	26,009	126,685	133,351	53,833	416,858

No. 8—*cont.*

Comparative statement showing the quantity of bark of all sorts in store at the commencement of the year 1892-93 collected and disposed of during the year and remaining in store at its close—*cont.*

1892-93.

Description of bark.	Quantity in store at the commencement of the year.				Collected during the year.	Disposed during the year.					Balance at the close of the year.					
	Crop of 1885–86.	Crop of 1886–87.	Crop of 1889–90.	Crop of 1891–92.	Total.	Crop of 1885–86.	Crop of 1886–87.	Crop of 1887–88.	Crop of 1889–90.	Total.	Crop of 1889–90.	Crop of 1890–91.	Crop of 1891–92.	Crop of 1892–93.	Total.
	26	27	30	31	32	33	34	35	36	37	38	39	40	41	42	43
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Crown bark	..	..	44,080	76,033	133,322	..	106,338	..	..	106,338	44,080	76,038	13,204	11,170	144,492	26,984
Red bark	12,943	28,981	63,568	57,313	269,357	..	13,145	35,056	26,009	74,210	63,568	57,313	40,487	13,145	174,513	194,829
Magnifolia	..	..	14,037	..	14,179	..	..	..	..	..	14,037	..	142	..	14,179	14,179
Total ..	12,943	28,981	126,685	133,346	416,858	..	119,483	35,056	26,009	180,548	121,685	133,351	53,833	24,315	333,184	235,992

1892-93—*cont.*

Description of bark.	Disposed during the year—*cont.*						Balance at the close of the year.					
	Crop of 1889–90.	Crop of 1890–91.	Crop of 1891–92.	Crop of 1892–93.	Total.		Crop of 1889–90.	Crop of 1890–91.	Crop of 1891–92.	Crop of 1892–93.	Total.	
	44	45	46	47	48	49	50	51	52	53	54	55
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Crown bark	..	..	..	..	..	..	44,080	76,038	13,204	11,170	144,492	26,984
Red bark	35,056	26,009	68,568	57,313	40,487	13,145	..	..	..	..	16,321	194,829
Magnifolia	..	..	..	..	..	..	14,037	..	142	..	14,179	14,179
Total ..	35,056	26,009	68,568	57,313	40,487	13,145	58,117	76,038	13,346	11,170	173,992	235,992

No. 9.

STATEMENT showing the particulars of Cinchona bark disposed of during the year 1892-93.

Particulars.	Product of 1885–86.		Product of 1886–87.		Product of 1889–90.		Product of 1890–91.	
	Pounds.	Value realized.	Pounds.	Value realized.	Pounds.	Value realized.	Pounds.	Value realized.
1	2	3	4	5	6	7	8	9
		Rs. A. P.		Rs. A. P.		Rs. A. P.		Rs. A. P.
Cinchona bark used for the manufacture of sulphate of quinine and solid febrifuge.	11,568	..	2,378	..	57,217	..	76,038	..
Cinchona bark supplied to Madras Medical Department.	1,000	255 0 0	..	..	..	..	..	..
Cinchona bark supplied to Bombay Medical Department.	..	..	..	..	800	321 0 0	..	..
Cinchona bark supplied to Mysore Durbar and private parties, &c.	375	90 0 0	..	..	100	..	..	..
Total ..	12,943	345 0 0	2,378	..	58,117	321 0 0	76,038	..

Particulars.	Product of 1891–92.		Product of 1892–93.		Total.	
	Pounds.	Value realized.	Pounds.	Value realized.	Pounds.	Value realized.
	10	11	12	13	14	15
		Rs. A. P.		Rs. A. P.		Rs. A. P.
Cinchona bark used for the manufacture of sulphate of quinine and solid febrifuge.	13,346	..	11,170	..	171,717	* ..
Cinchona bark supplied to Madras Medical Department.	..	..	..	..	1,000	255 0 0
Cinchona bark supplied to Bombay Medical Department.	..	..	..	..	800	321 0 0
Cinchona bark supplied to Mysore Durbar and private parties, &c.	..	..	..	..	475	90 0 0
Total ..	13,346	..	11,170	..	173,992	666 0 0

	Rs. A. P.
* Value of 4,933 lb. of sulphate of quinine at Rs. 13–6–0 per lb. ..	65,978 14 0
Value of 3,139 lb. of febrifuge at Rs. 10 per lb.	31,390 0 0
Total ..	97,368 14 0

No. 10.

STATEMENT showing the particulars of Sulphate of Quinine and Cinchona Febrifuge manufactured and disposed of during the year 1892-93.

Particulars.	Quantity in store at the commencement of the year.	Manufactured during the year.	Total.	Disposed of during the year.					Dryage.	Balance at the close of the year including paper packets.
				To Madras Medical Department.	To Bombay Medical Department.	To Mysore.	To private parties and paper packets to Collectors.	Total.		
	Lb. oz.	Lb.	Lb. oz.	Lb.	Lb.	Lb.	Lb. oz.	Lb. oz.		Lb. oz.
Sulphate of quinine.	2,652 10	4,933	7,585 10	2,000	950	100	* 153 13	3,203 13	..	4,381 13
Solid febrifuge ...	1,355 0	3,139	4,494 0	1,600	1,000	..	8 8	2,608 8	..	1,885 8

* Includes 1,704 quinine packets.

No. 11.

STATEMENT showing the Capital and Revenue Account of the Government Cinchona Plantations, Nilgiris, from the commencement up to the official year 1892-93.

Year.	CHARGES. Establishment including Superintendent's salary.	Building and plant.	Working charges. Departmental labour.	Working charges. Convict labour.	Total.	Total outlay to end of year.	Simple interest at 4½ per cent. on outlay to end of previous year *plus* half outlay during the year.	Total of columns 6 and 8.
1	2	3	4	5	6	7	8	9
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1860-61	..	..	4,821 15 0	..	4,821 15 0	48,21 15 0	108 7 11	4,930 6 11
1861-62	..	..	22,914 15 4	..	22,914 15 4	27,736 14 4	732 9 2	23,647 8 6
1862-63	..	..	48,390 0 0	..	48,390 0 0	76,126 14 4	2,336 15 0	50,726 15 0
1863-64	..	..	53,173 9 2	..	65,900 7 9	1,42,027 6 1	4,908 7 7	70,808 15 4
1864-65	12,726 14 7	..	59,666 12 0	..	84,111 4 11	2,26,138 11 0	8,283 11 9	92,395 0 8
1865-66	24,444 8 11	..	58,887 5 0	..	88,037 3 0	3,14,175 14 0	12,157 1 4	1,00,194 4 4
1866-67	25,449 14 0	3,700 0 0	52,032 0 0	48,666 10 8	1,28,127 4 6	4,42,303 2 6	17,020 12 6	1,45,148 1 0
1867-68	23,803 9 10	3,025 0 0	43,295 14 4	48,666 10 8	1,20,649 12 1	5,62,952 14 7	22,618 3 6	1,43,267 15 7
1868-69	26,087 3 1	2,600 0 0	30,636 1 0	48,666 10 8	1,07,004 3 6	6,69,957 2 1	27,740 7 8	1,34,744 11 2
1869-70	25,671 7 10	2,030 0 0	19,163 0 0	..	50,280 11 0	7,20,237 13 1	31,279 6 2	81,560 1 2
1870-71	25,783 5 4	5,334 5 8	6,143 0 0	..	30,173 5 4	7,50,411 2 5	33,089 9 8	63,262 15 0
1871-72	23,730 5 4	300 0 0	13,160 4 9	..	33,567 10 1	7,83,978 12 6	34,523 12 5	68,091 6 6
1872-73	17,157 5 4	3,250 0 0	16,441 0 0	..	29,715 0 0	8,13,693 12 6	35,947 10 2	65,662 10 2
1873-74	12,724 0 0	550 0 0	15,091 14 0	..	30,423 14 0	8,44,117 10 6	37,300 12 2	67,724 10 2
1874-75	12,574 0 0	2,758 0 0	17,417 0 0	..	35,523 8 0	8,79,641 2 6	38,784 9 2	74,308 1 2
1875-76	16,406 8 0	1,700 0 0	27,423 0 0	..	46,207 0 0	9,26,848 2 6	40,623 8 3	86,830 8 3
1876-77	17,234 0 0	1,550 0 0	44,850 3 0	..	59,630 1 3	9,86,478 3 9	43,004 13 6	1,02,634 14 9
1877-78	8,064 5 4	6,715 8 11	56,241 10 3	..	69,771 13 3	10,55,250 1 0	45,916 6 3	1,15,688 3 6
1878-79	8,061 5 4	5,468 13 8	53,954 10 8	..	73,682 11 5	11,28,932 12 5	49,144 1 10	1,22,826 13 3
1879-80	9,637 2 8	10,090 14 1	63,095 0 3	..	79,724 5 0	12,08,657 1 5	52,595 12 4	1,32,320 1 4
1880-81	10,092 0 0	6,837 4 9	72,858 15 3	..	96,105 0 7	13,04,762 2 0	56,551 14 11	1,52,656 15 6
1881-82	11,879 1 0	11,367 0 4	90,921 2 1	..	1,13,575 5 4	14,18,337 7 4	61,269 11 11	1,74,845 1 3
1882-83	16,375 14 6	6,278 4 9	50,049 11 5	..	1,06,392 4 11	15,24,729 12 3	56,219 0 3	1,72,611 5 2
1883-84	15,094 14 1	32,247 11 5	69,128 8 6	..	1,24,560 14 4	16,49,290 10 7	71,415 7 4	1,95,976 5 8
1884-85	20,083 7 5	35,348 14 5	60,190 8 7	..	86,824 6 4	17,36,115 0 11	76,171 10 0	1,62,996 0 4
1885-86	20,413 3 4	6,220 10 5	50,629 13 10	..	80,378 10 11	18,16,493 11 10	79,933 11 2	1,60,312 6 1
1886-87	26,235 7 5	3,513 5 8	48,720 11 2	..	84,228 4 6	19,00,722 0 4	83,637 5 8	1,67,865 10 2
1887-88	27,581 14 3	7,925 11 1	38,973 13 10	..	72,161 3 1	19,72,883 3 5	87,156 1 11	1,59,317 5 0
1888-89	30,831 11 6	2,355 9 9	40,082 3 1	..	69,493 13 11	20,42,377 1 4	90,343 5 8	1,59,837 3 7
1889-90	26,686 14 3	2,724 12 7	28,460 7 1	..	68,180 8 2	21,10,557 9 6	93,441 0 6	1,61,621 8 8
1890-91	38,105 12 2	1,614 4 11	30,719 12 5	..	74,914 0 9	21,85,471 10 3	96,660 10 7	1,71,574 11 4
1891-92	42,061 6 6	2,132 13 10	24,082 1 1	..	75,805 1 7	22,61,276 11 10	1,00,051 13 5	1,75,856 15 0
1892-93	49,887 3 10	1,835 12 8	28,226 0 6	..	78,885 11 8	23,40,162 7 6	1,03,532 6 1	1,82,418 1 9
Total ..	49,561 10 9	1,098 0 5						
	6,74,446 8 7	1,70,272 15 4	13,49,442 15 7	1,46,000 0 0	23,40,162 7 6	..	16,04,501 5 9	39,44,663 13 3

No. 11—*cont.*

Statement showing the Capital and Revenue Account of the Government Cinchona Plantations, Nilgiris, from the commencement up to the official year 1892-93—*cont.*

Year.	RECEIPTS. Value of bark supplied to Quinologist, or for experimental purposes and the value of quinine and febrifuge sold.	Value of bark sent to England, sold or supplied to other Governments or departments or private parties.	Sale of plants, seeds, &c.	Total.	NET REVENUE (DIFFERENCE BETWEEN COLUMNS 9 AND 13). Surplus.	Deficit.
	10	11	12	13	14	15
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1860-61	..	..	..	..	..	4,930 6 11
1861-62	..	..	..	..	..	23,647 8 6
1862-63	..	..	..	..	..	50,726 15 0
1863-64	..	..	..	..	..	70,808 15 4
1864-65	..	..	..	..	..	92,395 0 8
1865-66	..	..	..	..	..	1,00,194 4 4
1866-67	..	..	2,450 0 0	2,450 0 0	..	1,42,698 1 0
1867-68	..	287 8 0	..	287 8 0	..	1,42,980 7 7
1868-69	..	..	1,680 0 0	1,680 0 0	..	1,33,064 11 2
1869-70	1,512 6 4	..	..	1,512 6 4	..	80,047 10 10
1870-71	4,364 14 8	..	323 14 0	4,688 12 8	..	58,574 2 4
1871-72	9,542 12 8	3,479 3 6	..	13,022 0 2	..	55,069 6 4
1872-73	16,806 15 8	4,388 2 1	227 1 4	21,422 3 1	..	44,240 7 1
1873-74	21,136 7 0	36,417 6 3	300 9 0	57,854 6 3	..	9,870 3 11
1874-75	8,576 0 0	..	273 4 0	8,849 4 0	..	65,458 13 2
1875-76	..	60,404 7 11	2,000 0 0	62,404 7 11	..	24,426 0 4
1876-77	..	1,07,878 4 0	2,579 3 10	1,10,457 7 10	7,822 9 1	..
1877-78	..	3,51,746 0 6	5,469 0 2	3,57,215 0 8	2,41,526 13 2	..
1878-79	..	3,92,217 10 1	8,136 9 2	4,00,354 3 3	2,77,527 6 0	..
1879-80	..	4,24,323 12 8	15,462 12 4	4,39,786 9 0	3,07,466 7 8	..
1880-81	..	3,33,295 1 3	13,175 4 8	3,46,470 5 11	1,93,813 6 5	..
1881-82	..	5,64,236 3 11	7,653 2 9	5,71,889 6 8	3,97,044 5 5	..
1882-83	..	5,82,003 10 1	4,345 7 10	5,86,349 1 11	4,13,737 12 9	..
1883-84	..	80,519 10 6	4,561 2 8	85,080 13 2	..	1,10,895 8 6
1884-85	933 12 0	83,351 10 0	1,543 13 5	85,829 3 5	..	77,166 12 11
1885-86	1,418 0 8	1,02,101 0 0	589 10 4	1,04,108 11 0	..	56,203 11 1
1886-87	2,127 1 0	68,067 4 8	1,595 4 9	71,789 10 5	..	96,075 15 9
1887-88	1,203 0 0	1,975 0 0	763 1 11	3,941 1 11	..	1,55,376 3 1
1888-89	2,134 0 0	420 0 0	1,047 11 10	3,601 11 10	..	1,56,235 7 9
1889-90	4,048 10 6	792 1 9	599 12 4	5,440 8 7	..	1,56,181 0 1
1890-91	27,535 0 10	835 13 10	504 15 1	28,875 13 9	..	1,42,698 13 7
1891-92	75,262 10 5	1,038 13 6	765 2 3	77,066 10 2	..	98,790 4 10
1892-93	71,736 14 9	926 14 10	134 3 7	72,798 1 2	..	1,09,620 0 7
Total ..	2,48,338 10 6	32,00,705 11 4	76,181 3 3	35,25,225 9 1	..	4,19,438 4 2

No. 12.

STATEMENT showing the receipts and charges on account of the Government Cinchona Plantations, Nilgiris, for the year 1892–93 prepared in accordance with the instructions issued in the Secretary of State's despatch, No. 3, dated 11th February 1886.

Disbursements, &c.	Amount.	Receipts, &c.	Amount.
To value of bark in stock on 31st March 1892 (416,858 lb.) as under—	Rs. A. P.	By value of bark in stock on 31st March 1893 (362,349 lb.) as under—	Rs. A. P.
12,943 lb of 1885–86 at 0 11 4·132 per lb.	9,176 13 8	26,603 lb. of 1886–87 at 0 10 10·069 per lb.	18,022 0 1
28,931 ,, of 1886–87 ,, 0 10 10·069 ,,	19,632 15 5	35,056 ,, of 1887–88 ,, 0 12 5·385 ,,	27,275 3 5
35,056 ,, of 1887–88 ,, 0 12 5·385 ,,	27,275 3 5	26,009 ,, of 1888–89 ,, 0 10 1·120 ,,	16,407 5 6
26,009 ,, of 1888–89 ,, 0 10 1·120 ,,	16,407 5 6	68,568 ,, of 1889–90 ,, 0 6 9·701 ,,	29,177 7 6
126,685 ,, of 1889–90 ,, 0 6 9·701 ,,	53,907 12 3	57,313 ,, of 1890–91 ,, 0 8 11·862 ,,	32,197 5 10
133,351 ,, of 1890–91 ,, 0 8 11·862 ,,	74,914 0 9	40,487 ,, of 1891–92 ,, 1 6 6·365 ,,	57,011 12 11
53,833 ,, of 1891–92 ,, 1 6 6·365 ,,	75,805 1 7	108,313 ,, of 1892–93 ,, 0 10 6·763 ,,	71,510 13 4
Total ..	2,77,119 4 7	Total ..	2,51,602 0 7
To establishment and working charges ..	78,885 11 8	Sulphate of quinine supplied to the Medical Stores Department, Madras, Bombay, &c.	41,636 12 9
To value of quinine and febrifuge (including 630 packets of quinine) in stock on 31st March 1892.	49,658 13 9	Febrifuge supplied to the Medical Stores Department, Madras, Bombay, &c.	30,100 2 0
Net profit on operations	780 3 7	Bark supplied to the Madras Medical Department	255 0 0
		Bark supplied to the Bombay Medical Department	321 0 0
		Bark supplied to private parties and Mysore Durbar	350 14 10
		Sale of seeds and plants	52 2 7
		Percentage of the fees of the Government Quinologist	21 0 0
		Miscellaneous	61 1 0
		Total ..	72,798 1 2
		Value of quinine packets supplied to Collectors, but not recovered	1,410 0 0
		By value of febrifuge and quinine in stock on 31st March 1893	80,633 15 10
Grand Total ..	4,06,444 1 7	Grand total of all receipts including the items in stock ..	4,06,444 1 7

DIRECTOR'S OFFICE,
OOTACAMUND,
5th June 1893.

(Signed) M. A. LAWSON,
Government Botanist and Director, &c.

ORDER—dated 28th June 1893, No. 576, Revenue.

Miscellaneous.

Mr. Lawson submits his report on the working of the Government Cinchona department for the year 1892–93 and Mr. Hooper's report on the analytical work done by him during the same period.

2. *Season.*—The rainfall registered in all the estates except Dodabetta was considerably below the average. The absence of sunshine and drought which prevailed on the western side of the plateau from October till the end of February last rendered the season unfavorable for cinchona cultivation in all the estates except Dodabetta, where conditions were favorable. Naduvattam appears to have suffered most of all the estates not only from the gloomy weather and the drought above referred to, but also from the strong winds of September and October, which did damage to a number of the old trees standing on the estate. The following statement compares the rainfall gauged at the several estates during the last two years:—

Estates.	Rainfall in 1891–92.	Rainfall in 1892–93.
	IN.	IN.
Dodabetta	46·33	52·10
Naduvattam	100·84	77·12
Hooker	75·56	70·81
Wood	62·75	56·81

3. *Working.*—In his letter No. 67, dated 25th October 1892, explaining certain discrepancies noticed by Government in the report for 1891–92, Mr. Lawson stated that 10 acres of ground uprooted at Naduvattam were really replanted in April and May 1892, and that the figures relating to these plants would come into the statistics of 1892–93. It does not, however, appear from the statement No. 7 appended to the present report that any new trees were planted in any of the estates during the year under review. This requires explanation. Statement No. 7 shows that 1,779,894 trees were standing on the several estates at the commencement of 1892–93, and that 21,749 of them were either coppiced or uprooted during the year, leaving at its close 1,758,145 standing trees.

4. The balance of bark in stock at the commencement of the year was 416,858 lbs. and consisted of 133,322 lbs. of crown bark, 269,357 lbs. of red bark and 14,179 lbs. of magnifolia. The crop harvested during the year was 106,338 lbs. of crown bark and 13,145 lbs. of red bark. The quantity disposed of during the year was 144,492 lbs. of crown bark, 15,321 lbs. of red bark and the whole of the magnifolia in stock, *i.e.*, 14,179 lbs. or 173,992 lbs. in all. Of the bark disposed of, 171,717 lbs. represent the quantity utilised for the manufacture of sulphate of quinine and solid febrifuge, and the remainder, the bark supplied to the Madras, Bombay and Mysore Medical departments, to the Imperial Institute and to private parties. The balance outstanding at the close of the year was 95,168 lbs. of crown bark and 267,181 lbs. of red bark or altogether 362,349 lbs. Mr. Lawson states that crown bark was principally used in the manufacture of quinine, and that it was thought desirable to work chiefly upon the inferior classes so as to relieve the godowns which were choked. If it was essential to clear off inferior kinds of bark in stock, it is not clear why red bark, of which there was an enormous quantity in store, and which is poorer in quinine than crown bark, was not more extensively made use of.

5. The quantity of sulphate of quinine and febrifuge in stock at the close of the previous year was 2,653 lbs. and 1,355 lbs. repectively. During the year 4,933 lbs. and 3,139 lbs. of the two drugs were manufactured at the Nedivattam factory and 3,204 lbs. of quinine and 2,609 lbs. of febrifuge were supplied to the Medical Stores departments of Madras and Bombay, to the Mysore Durbar and to private parties. The balance outstanding at the close of the year was 4,382 lbs. of quinine and 1,885 lbs. of the febrifuge. The quantity of these drugs purchased by private parties was very small, having been only 32 lbs. of quinine and 8 lbs. 8 oz. of febrifuge. It is evident that the annual outturn of the factory is likely to be in future, as it was during the last two years, considerably in excess of the requirements of the Government Medical department and that there will always be a sufficient quantity of the drugs in stock to meet all demands. The Bengal Government now advertises in all the official Gazettes and some of the leading newspapers the fact of their quinine and febrifuge being available for sale to the public, and Mr. Lawson may with advantage publish similar advertisements both in English and in the vernaculars in the *Fort St. George Gazette* and occasionally in one or two of the leading newspapers of this Presidency.

6. The Government observes with satisfaction that there was a very material increase in the number of indents received from the several Collectors for quinine packets, the number of powders sent out during the year under review having been 170,400 as against 37,000 in the previous year. In G.O. No. 1252, dated 13th December 1892, the Government desired Mr. Lawson to embody the district reports on the subject of the sale of the powders in his annual administration report, but the Government of India having subsequently fixed the 1st July as the date on which the administration report should be submitted to them, it was found more convenient to allow Mr. Lawson to review separately, at a later date, the reports received from Collectors.

7. In paragraph 6 of G.O. No. 995, dated 22nd September 1892, reviewing the report for 1891–92, the Government remarked that the question of making certain modifications in the existing arrangements for the packing and sale of quinine powders was then under reference to the Board of Revenue and the Surgeon-General, and that orders would be passed on receipt of their replies. This question has recently been disposed of in G.O. No. 347, dated 28th April 1893, in which it has been decided to discontinue the distribution of jalap with quinine powders, and, with the permission

of the Government of India, to introduce the Bengal system of sale through postmasters as an experiment in a few selected districts.

8. The receipts during the year under review, excluding the cost of quinine packets supplied to Collectors for distribution, amounted to Rs. 72,798, being Rs. 17,202 and 12,202 less than the budget and revised estimates respectively. The decrease is due to a reduction in the price of quinine and to the Ceylon Government having discontinued the purchase of quinine from the Nedivattam factory. The cost of the quinine packets supplied to the Collectors at the rate of Re. 1 per packet was Rs. 1,410. The expenditure of the department during the year amounted to Rs. 78,886, or Rs. 4,114 less than the budget and revised estimates. The reduction in the estimated expenditure is explained by a laudable desire on the Director's part to equalize, as far as possible, the actual revenue and expenditure. The latter, however, was still Rs. 6,088 in excess of the former.

9. The usual statements showing the receipts and disbursements during the year under review and previous years have this year been prepared by Mr. Lawson and are printed as appendices 11 and 12 to his report. The Director considers the form of statement No. 12 to be somewhat cumbrous and proposes to substitute a simpler form which, he thinks, will meet all requirements. The Government is, however, unable to accept the Director's proposal as the form at present in use has been adopted in accordance with the instructions of the Secretary of State for India and cannot be altered without his authority.

10. Mr. Hooper's report on the analytical work done by him contains as usual much interesting matter.

(True Extract.)

(Signed) C. A. GALTON,
Secretary to Government.

To the Government Botanist.
" the Commissioners of Land Revenue.
" the Commissioner of Revenue Settlement, Land Records and Agriculture.
" the Military Department.
" the Public Department.
" the Financial Department.
" the Surgeon-General with Government.
" the Accountant-General.
" the Resident in Travancore and Cochin through the Political Department, for information and communication to the Sirkars concerned.

Copy to the Hon. Secretary, Agri-Horticultural Society.
" the Chamber of Commerce.

No. 576A.

Copy to the Government of India, Revenue and Agricultural Department.

(Signed) C. A. GALTON,
Secretary to Government.

No. 576B.

Copy to the Government of Bengal.

(Signed) C. A. GALTON,
Secretary to Government.

No. 576C.

Copy to the Chief Commissioner, Burma.

(Signed) C. A. GALTON,
Secretary to Government.

Exd. S. J. Pereira.
200 Copies.

Original

Govt. of {1893} Madras.

REVENUE.

Issued.

Recd. Encl.

G.O., 28th June 1893,
Nos. 576, 576A, 576B. 576C.

JUNE.

Cinchona Department.

Reviewing report on the working of the Government — for 1892–93 and that on Mr. Hooper's analytical work done during the same period.

GOVT RECORD

No. 47

Director's Office,
Ootacamund, 5th June 27 1893.

From

M. A. LAWSON, Esq.,

Government Botanist and Director of

Government Cinchona Plantations, &c.,

Nilgiris.

To *The Secretary to Government*
Revenue Department
Ootacamund

Sir,

I have the honor to submit the Annual Administration Report on the Govt Cinchona Plantations, Nilgiris, for the year ending 31st March 1893, printed as desired in G.O. No. 224 dated the 7th March 1893 - Revenue.

I have the honor to be
Sir
Your Most Obedt Servant
M. A. Lawson
Govt Botanist & Director

Revenue {1893} Cinchona. Dept.

Current Number 4257.

From

M. A. LAWSON, Esq.,

GOVERNMENT BOTANIST AND DIRECTOR OF GOVERNMENT CINCHONA PLANTATIONS,

Nilgiris.

To The Secretary to Government
Revenue Department
Ootacamund

No. 47

Dated 5th
Despd. —
Recd. 6th } June 1893.

ENCLOSURES/ on

SUBJECT.

Annual Administration Report on the Govt Cinchona Plantations Nilgiris for the year ending 31 March 1893. Submitting the——

Fo. 30-3-91 No 311
22-9-92 No 995
26-9-92 No 1211
13-10-92 No 1154
28-11-92 No 1101
4-5-92 No 2257
23-11-91 No 1116
9-10-91 No 851
8-3-92 No 1327
13-12-92 No 1252
21-12-92 No 1263
26-5-92 No 1217
30-10-92 No 826
19-12-91 No 1108
28-7-92 No 1032

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ANNUAL ADMINISTRATION REPORT ON THE GOVERNMENT CINCHONA DEPARTMENT, NILGIRIS, FOR THE YEAR 1892–93.

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I. SEASON AND RAINFALL.—Speaking generally, the rainfall on the estates on the western side of the plateau, that is, on the Wood, Hooker, and Nedivattam estates, was considerably below the average, while at Dodabetta, on the eastern side of the plateau, the amount registered was somewhat about the average. On the western side of the plateau, there was a severe drought extending from the end of October to the end of the year. During these five months, only 3·34 inches were registered at Nedivattam, the north-east monsoon having entirely failed. The winds during the year were unusually light except in the months of September and October. Of frost there was none to speak of. The season was chiefly notable for its gloominess from the 25th of May to the end of October. Although the rainfall was less than usual, there was hardly ever a gleam of sunshine.

(*a*) *Dodabetta.*—The rainfall registered on this estate was 52·10 inches, spread over 151 days. This was 5·77 inches more than that registered the year before, but about the average for the past ten years. The rainfall gauged during the last year was the highest for the past three years. October was again the wettest month, though the rainfall during that period was much less than in the previous year. February and March were unusually wet, when in these months 2·74 and 1·83 inches, respectively, were gauged. The season on the whole was a favorable one.

(*b*) *Nedivattam.*—On this estate an unsually small quantity of rain was registered during the past year, the total amount gauged being only 77·12 inches. This

was less than what fell the year before by 23·72 inches and less than the average for the past ten years by 16·24 inches. As stated above under "general remarks," gloomy skies and constant drizzle were the characteristics of the season from the 25th of May to the end of October. The result of this want of sun was most damaging to the plants which had been put out in the early part of the year—a large number of these rotted off during the months of September and October. Heavy winds occurred during September and October and did a good deal of damage to the older trees on the estate.

(*c*) *Pykara*—(1) *Hooker*.—On this plantation 70·81 inches of rain were registered and was spread over 164 days. This was 4·75 inches less than what had been gauged the year before, and 18·51 inches below the average fall for the past ten years. July was the wettest month in the year, though less rain fell in that month than happened in the year before. An unusually large amount was registered during March.

(2) *Wood*.—The amount of rain registered on this plantation was 56·81 inches, spread over 163 days. This was 5·94 inches less than what had been gauged during the previous year and 13·47 inches less than the average amount for the past ten years. July was the wettest month, in fact over one-third of the total quantity of rain gauged for the whole year fell during this month alone. Here too, as at Hooker, an unusually large amount of rain fell in March last.

II. Financial—(*a*) *Receipts*.—When framing the budget estimate for 1892–93 it was originally calculated that only Rs. 60,600 worth of quinine and febrifuge would be sold during the year, and this calculation was based on the value of the indents which had been received during the previous year. Subsequently, however, owing to additional indents having been sent in, it was proposed to raise the estimate from Rs. 60,600 to Rs. 71,000; but Government thought that even this figure was too low and so raised it to Rs. 90,000—*vide* G.O., No. 1116 of 23rd November 1891, Revenue. When the time came for revising the estimate, it was found that Rs. 90,000 would not be realised; first, because the Government of Ceylon had notified their intention of buying no more quinine from this department; and, secondly, because the price of quinine had been reduced from Rs. 14–11–3 to Rs. 13–6–0. Under these circumstances, although it was proposed to allow the receipts to stand at Rs. 90,000, it was distinctly intimated that the realisation of this sum could not be guaranteed; and Government, therefore, reduced the estimate to Rs. 85,000—*vide* G.O., No. 1101 of 28th October 1892, Revenue. The actual receipts amounted to only Rs. 72,798–1–2, as detailed below:—

	Rs.	A.	P.
Value of quinine supplied to the Medical Stores Departments of Madras, Bombay and Mysore	41,636	12	9
Value of febrifuge issued to the Medical Store Departments of Madras, Bombay and private parties	30,100	2	0
Bark sold to the Medical Stores Departments of Madras, Bombay, Mysore and private parties	926	14	10
Miscellaneous, viz., sale of seed and plants, percentage of the fees of the Government Quinologist, &c.	134	3	·7
Total ...	72,798	1	2

but this sum (Rs. 72,798–1–2) does not include the value of 1,410 packets of quinine powders distributed to Collectors on their indents during the year; taking this into account, the total receipts have been Rs. 74,208–1–2 or Rs. 15,791–14–10 less than the budget, and Rs. 10,791–14–10 less than the revised estimate.

(*b*) *Expenditure*.—The budget estimate of expenditure was calculated originally at Rs. 82,800, but Government raised this sum to Rs. 83,000 (*vide* G.O., No. 1116 of 23rd November 1891, Revenue), and again in the revised estimate, the same figure was allowed to stand—*vide* G.O., No. 1101 of 28th October 1892, Revenue. The actual expenditure during the year was Rs. 78,885–11–8 or Rs. 4,114–4–4 below the budget and revised estimates. This, however, does not include Rs. 1,500 due to the Government Quinologist as his salary while on privilege leave; this sum was paid to him by the treasury at Dehra Dun, in the North-Western Provinces; and it

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is not known yet if this charge is to be finally borne by this department or not; at present, under the instructions of the Accountant-General, the Rs. 1,500 have been debited to the Government of the North-Western Provinces. The expenditure has, therefore, been Rs. 4,677–10–6 in excess of the receipts, or, taking in Mr. Hooper's three months' salary, Rs. 6,177–10–6. The reduction in the actual expenditure was due to a desire to bring, if possible, the latter to the level of the receipts, but this unfortunately was not found practicable.

Had the price of quinine remained the same as it was the year before, Rupees 4,050–12–6 would have been added to the receipts, and the difference between them and the expenditure would then have been only Rs. 626–14–0, that is, taking the expenditure at Rs. 78,885–11–8.

III. General condition—(*a*) *Dodabetta*.—Everything on this estate is in good order; all the less thriving trees were cut down, and it is from these that the greater part of the bark was harvested during the past year. This necessarily means that the crop taken was of inferior alkaloidal value, but it was considered that it would be better to take the crop from these poorer trees now than to let them run on till they grew worse and keep the better trees for future years. The grub is still most destructive to young plants, and the manuring of the pits with quick-lime seems to have had no beneficial effect whatever.

(*b*) *Nedivattam*.—Five acres of succirubras were coppiced and the renewed and mossed barks only were taken, the natural bark on the upper parts of the trees being too poor to make it worth while harvesting. This plot will eventually be planted with *Cinchona officinalis*, and the coppiced shoots of the *succirubras* will be cut down, after they have done their duty by affording shelter to the young plants.

A fire broke out near the Chinamen's lines, and spread through a shola, which was filled with dead *strobi-lanth*, till it reached a grove of *frenelas*, which had been planted on a ridge between two fields of cinchona as a shelter-belt. The *frenelas* took fire and burnt like straw, but no further damage than this was done to the estate. It may be remarked that, owing to their very inflammable nature during the dry season, these *frenelas* are dangerous trees to have in any large numbers. The plants put out in the early part of the season suffered severely from the prolonged monsoon, but those that did not succumb to the inclemency of the weather are now two feet or more in height and hardy vigorously growing plants without a branch.

(*c*) *Pykara—Hooker and Wood*.—Nothing particular has to be noticed regarding either of these plantations.

IV. Upkeep.—The usual work connected with upkeep has been duly attended to, and all buildings, roads, drains, bridges, &c., have been well maintained during the past year.

V. Manure.—Very little manure has been put out during the past year, but large quantities of stable and cattle manure have been stored on all the estates, which will be utilised during the present season.

VI. Nurseries.—The plants in all the nurseries, with the exception of those on the Dodabetta estate, have greatly improved. The demand from planters for plants and seed during the past year has been almost *nil*.

VII. Crop.—The quantity of bark harvested during the past year was 119,483 lb. detailed thus:—

		lb.	lb.
	Dodabetta.		
Crown bark		99,890	99,890
	Nedivattam.		
Crown bark		4,266	
Red bark		11,820	16,086
	Pykara.		
Crown bark		2,182	
Red bark		1,325	3,507
			119,483

At the close of the last year, there remained in stock 416,858 lb. of bark, making in all 536,341 lb. Of this quantity 173,992 lb. were disposed of during the year as follows:—

	LB.
Used in the factory for the manufacture of quinine and febrifuge.	171,717
Sold to the Medical Stores Department, Madras	1,000
" " " Bombay	800
Sold to the Mysore Durbar	300
Supplied to the Imperial Institute	175
Total ...	173,992

and there remained in stock at the end of the year 362,349 lb.

VIII. Buildings.—All the buildings on the several estates have had the necessary annual repairs executed, and the total outlay thereon was Rs. 1,098–0–5, detailed thus:—

	RS.	A.	P.
Dodabetta	146	6	6
Nedivattam	801	7	0
Pykara	150	2	11
Total ...	1,098	0	5

IX. Factory.—The work in the factory was carried on continuously during the whole year, with the exception of a month in the autumn when fuel for the boilers fell short, and for three weeks in January when the place was closed for the Christmas holidays and some alterations which had to be made in the machinery and other plant.

In July last, the Carter's Disintegrator used at Nedivattam for grinding bark was broken, and though the leading firms at Calcutta and Bombay were telegraphed to, a new one could not be procured in India; but Messrs. Richardson and Cruddas of Bombay wrote to say that they had a "Devil Disintegrator," which they thought might answer the purpose of a "Carter's." Under the sanction of Government accorded in G.O., No. 3294 of 20th July 1892, Revenue, the Director proceeded to Bombay, but after seeing the "Devil Disintegrator" at work, it was found that it would not be suitable for the requirements of this department, as the bark turned out by it was of too coarse a quality and was also charred. The broken parts of the disintegrator were then sent for and there and then mended by Messrs. Richardson and Cruddas and taken back to Ootacamund.

During the past year, 4,933 lb. of sulphate of quinine were manufactured at the factory at Nedivattam. At the close of the previous year, there was in stock 2,652 lb. 10 oz., making in all 7,585 lb. 10 oz.; of this quantity 3,203 lb. 13 oz. were disposed of as follows:—

	LB.	OZ.
Issued to the Medical Stores Department, Madras	2,000	0
" " " Bombay	950	0
" " " Mysore	100	0
Sold to private parties	31	15½
Made up into powders for issue to Collectors in paper packets	121	13½
Total ...	3,203	13

and there remained in stock at the end of the year 4,381 lb. 13 oz.

Of febrifuge there was manufactured during the year 3,139 lb. and there remained in stock at the end of last year 1,355 lb., making in all 4,494 lb.; of this 2,608 lb. 8 oz. were disposed of detailed thus:—

	LB.	OZ.
Issued to the Madras Medical Stores	1,600	0
Issued to the Bombay Medical Stores Department	1,000	0
Sold to private parties	8	8
Total ...	2,608	8

and there remained in stock at the end of the year 1,885 lb. 8 oz.

The greater part of the bark used during the year was crown bark, but of varying alkaloidal value; some was as poor as to yield only 2·37 sulphate of quinine; this was from the trees spoken of above under III. "General condition"—(*a*) "Dodabetta"— while the sulphate of quinine in other bark ran as high as 5·55 and this was from the better trees on the estates taken by the stripping process. As the amount of quinine and febrifuge turned out in the factory was exceeding the immediate demands, it was thought desirable to work chiefly upon the inferior classes, and so relieve the godowns, which are choked, and reserve the better sorts for a future day.

Taking the present price of the quinine at Rs. 14–1–7 per lb. and the febrifuge at Rs. 10, the value of these drugs in stock at the end of the year amounted to Rs. 80,633–15–10, thus:—

	RS.	A.	P.
4,381 lb. 13 oz. of quinine at Rs. 14-1-7 per lb.	61,778	15	10
1,885 lb. 8 oz. of febrifuge at Rs. 10 per lb.	18,855	0	0
Total	80,633	15	10

X. Mr. Hooper's report.—During the year Mr. Hooper made a great number of analyses of barks, soils, chemicals, &c., for this department; some of which being of general interest he has embodied in his report.

XI. Miscellaneous—(*a*) *Issue of packets of quinine powders.*—When compared with the results in the previous year, the indents for quinine powders have been satisfactory; the numbers sent out by this department having been no less than 1,704 packets or 170,400 powders. Last year only 370 packets or 37,000 powders were desposed of. Up to the time of writing, only eight reports on the sales by Collectors during the past year have been received, viz., from Salem, Malabar, Nilgiris, Coimbatore, Gódávari, Cuddapah, Vizagapatam and Tanjore; and so in accordance with the wishes of Government expressed in G.O., No. 224, of 7th March 1893, Revenue, a report on this subject will not be submitted until later on.

(*b*) *Issue of jalap powders with the quinine.*—The 200 packets or 10,000 jalap powders received from the Madras Medical Stores Department in July 1891 for issue with the quinine was exhausted in December last. Since then the stock of these jalap powders has not been replenished, as the question, whether the joint issue of the jalap with the quinine should be continued or not, is still under the consideration of Government.

(*c*) *Imperial Institute.*—In August last twenty-five pounds of each of the following kinds of bark were sent to Mr. E. Thurston, Calcutta, for the Imperial Institute:—

(1) Natural crown.
(2) Mossed do.
(3) Renewed do.
(4) Natural red.
(5) Mossed red.
(6) Renewed do.
(7) Natural magnifolia.

(*d*) *Mr. Hooper's leave.*—In accordance with the sanction of Government accorded in G.O., No. 4412, dated the 11th October 1892, Revenue, Mr. Hooper, the Government Quinologist, took three months' leave from the 25th October 1892 and returned to duty on the 25th January 1893.

(*e*) *Gun licenses.*—Hitherto no licenses under the Arms Act were obtained for the possession of fire arms by the watchers or the messengers sent to bring money to the Nedivattam and Pykara estates from Ootacamund, but in G.O., No. 2014, of 26th October 1892, Judicial, Government considered it unnecessary and inexpedient to sanction the further continuance of these persons being exempted under the Arms Act, and so licenses were obtained from the District Magistrate, Nilgiris, and these will be renewed as becomes necessary.

(*f*) *Statements accompanying the report.*—Two returns prepared for the first time in this office are furnished in accordance with the wishes of Government conveyed in G.O., No. 4740, dated 28th October 1892, Revenue. With regard to statement No. 12, it is suggested that for the future a less complicated form should be adopted. In 1883, when the present one was drawn up, the crude bark was, so

to speak, the finished product of the estates, but now the finished products consist almost entirely of quinine and febrifuge. The following is the new form proposed :

	Rs.	A.	P.
Value of 4,933 lb. of quinine at Rs. 13-6-0 per lb. ...	65,978	14	0
Do. of 3,139 lb. of febrifuge at Rs. 10 per lb	31,390	0	0
Miscellaneous receipts, such as sale of plants and seeds, &c...	1,061	2	5
Total ...	98,430	0	5
Expenditure for the year including salaries, upkeep of estate, factory, &c.	78,885	11	8
Profit on the year's working	19,544	4	9
Total ...	98,430	0	5

(*g*) *Spelling of names.*—It will be observed that the spelling of several names of places has been altered in accordance with G.O., No. 212, of 4th March 1893, Revenue.

(*h*) *A comparison of the alkaloids of barks when grown in rich and poor soils.*—The following circular memo intended for the information of the Superintendents of the Government Cinchona Estates may be of interest to others.

The following analyses of soils and barks have been made with the view of showing how an increase of alkaloids in the natural bark of cinchona trees follows upon enriching the soil :—

(1) Simply by deep digging.
(2) By deep digging and manuring.

With respect to the soils analysed, these were taken from a typical grass hill on the Government estates at Nedivattam. Both samples were taken two feet from the surface. The first was the natural sub soil ; the second was from a trench after it had been filled in with top soil one and a half years, but had not been manured.

No. 1 contained 25·15 per cent. moisture.

No. 2 contained 29·13 per cent. moisture.

The soils dried at 100°C. yielded—

Organic matter and combined water	14·020	20·860
Iron and alumina	24·100	20·800
Lime	·092	·690
Magnesia	·063	·392
Potash	·112	·202
Phosphoric acid	·062	·145
Sulphuric acid	·005	·044
Silicates	32·430	34·850
Sand	25 460	17·240
Undetermined	3·656	4·977
Total ...	100·000	100·200
Nitrogen in the organic matter	·166	·420

From the above analyses it will be seen that, while the first soil is somewhat poor, the second is decidedly a rich one. The organic matter is increased by almost one-third, while the nitrogen is much more than doubled. It will be noticed too that the lime has been increased seven and a half times, the magnesia six and a quarter times and also the potash is nearly doubled. The phosphoric acid more than doubled and the sulphuric acid is increased nearly ninefold.

The lime and potash have been derived from the grass and weeds, which had decomposed in the trench; these grasses and weeds had taken the lime and potash in minute quantities at a time from the surrounding soil and accumulated them in their tissues. The increase of the nitrogen, phosphoric and sulphuric acids is due to the same cause.

If these grasses and weeds had been simply dug up and left on the surface of ground, exposed to the sun and air, they would have been burnt by slow combustion, almost as completely as if they had been put into a furnace, and the whole or nearly

the whole of the organic matter, with the contained nitrogen, would have been volatilized and lost ; but by burying them deep in the ground the gases, as they are given off during the processes of decomposition, are absorbed by the soil and so made available for future use.

Thus it will be seen that to cultivate the surface of the ground only is very wasteful when compared with deep cultivation.

The following are analyses of three barks of *Cinchona officinalis* hybrids which were uniform so far as regards site and age. The samples in each case were taken not from one tree only but from twenty, so that the analyses may be regarded as representing the average qualities of the trees grown over the whole of the several plots.

No. I.—The trees to which the analysis refers were grown on grass land, which had never been trenched or manured ; the only cultivation which had been carried out was that of mamooty weeding.

Quinine	2·25
Cinchonidine	1·36
Cinchonine	·30
Amorphous	1·62
	5·53
Sulphate of quinine	3·03

The second sample was taken from grass land, which had been trenched 18 months before, two feet deep by one foot broad, and the trenches filled in with the top soil and its weeds, but not manured.

Quinine	2·67
Cinchonidine	2·04
Cinchonine	·56
Amorphous	·47
	5·74
Sulphate of quinine	3·59

The third sample was taken from a plot which had been trenched and filled in, as in the last instance, but which had also been manured with cattle dung.

Quinine	3·18
Cinchonidine	2·08
Cinchonine	·42
Amorphous	·48
	6·16
Sulphate of quinine	4·28

To make the correlation between high cultivation and the increase of the alkaloids more apparent, the analyses of the three sorts are tabulated below :—

	No. 1 Mamooty weeded only.	No. 2 Trenched.	No. 3 Trenched and manured.
Quinine	2·25	2·67	3·18
Cinchonidine	1·36	2·04	2·08
Cinchonine	·30	·56	·42
Amorphous	1·62	·47	·48
	5·53	5·74	6·16
Sulphate of quinine	3·03	3·59	4·28

(*i*) *Service books.*—All the service books of the establishment have been kept duly written up.

Director's office
OOTACAMUND,
5th June 1893

M. L. Lawson
Government Botanist and Director.

From D. HOOPER, Esq., Government Quinologist, to the Government Botanist and Director of the Cinchona Plantations, Nilgiris, dated Ootacamund, 6th May 1893.

I have the honour to forward the following report on the analytical work conducted in the laboratory during the year ending 31st March 1893.

2. Among the barks analysed during the year there have not been many of special interest or of very high value. A sample of crown bark from Dodabetta yielded 5·55 per cent. of sulphate of quinine, which is above the average of the bark used in the factory obtained from that plantation. A specimen of *Bagota* bark from an estate near Dodabetta belonging to General Jennings gave 5·81 per cent. of sulphate. The age of this tree was six years and it is supposed to be a variety of the Santa Fé or soft Columbian bark. The following is a full analysis of the bark:—

Quinine	4·32
Cinchonidine	·96
Quinidine	Trace
Cinchonine	·68
Amorphous	·88
Total	6·84

3. Several hybrid barks were analysed, some grown in poor soil and others in trenched and manured land. The soils in which these trees grew were also examined chemically, and the results are quoted in the Director's report, together with his remarks on their cultivation and treatment.

4. The quinine and febrifuge from the factory at Nedivattam have been good in composition and appearance, and the chemicals used in their manufacture have been tested from time to time as to their purity.

5. When a manure pit, made near a cinchona tree, is examined a few months after it has been filled, it will be found to have an abundance of feeding rootlets in it. Whereas a tree grown in poor soil will produce these rootlets very sparingly. This difference caused me to investigate the composition of this portion of the plant under these conditions and to see if the rootlets were richer in alkaloids when growing in rich soil, or poorer in alkaloids when grown in poor soil. I have already shown in former reports that the bark of cinchona trees, whether old or young, is susceptible to the influence of manure; but up to the present we have had no experiments to show how this influence is exerted in the roots. The rootlets of *Cinchona officinalis* were first examined. The bearded roots from a manured tree were so massive that it required the roots of about four trees from poor soil to make up an equal weight. The two samples were separately dried and reduced to a fine powder, and, on analysis, they yielded the following results:—

	Rootlets from poor soil.	Rootlets from manured soil.
Alkaloids	2·56	2·82
Tannin and cinchona red	16·86	18·02
Sugar and organic acid	2·02	3·82
Fibre	49·09	49·53
Ash	8·13	6·93
Water	5·74	5·87

The alkaloids were composed as under:—

	Rootlets from poor soil.	Rootlets from manured soil.
Quinidine	·65	·65
Cinchonine	1·27	1·58
Amorphous	·64	·59
Total	2·56	2·82

The results of these analyses show that there is very little difference in the composition of the small fibrous roots of an officinalis tree, whether grown in the ordinary or manured soil. Before drawing conclusions from this experiment, I obtained samples of roots from succirubra trees. The first sample was from rich soil, and there was an abundance of bearded rootlets; the second sample, from a tree growing in a poor plot of land, contained so few of these rootlets

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that, when they were dry, they were not sufficient for analysis and a sample was thereupon taken from the thicker quilled roots. The results of the two analyses are thus compared:—

	Rootlets from rich soil.	Small roots from poor soil.
Alkaloids	1·53	2·50
Tannin and cinchona red	14·34	8·84
Sugar and organic acid	2·34	14·98
Fibre	56·49	35·69
Ash	9·25	5·51
Water	9·19	13·24

The alkaloids were composed as under:—

Quinine	·24	·38
Cinchonidine	·37	·44
Quinidine	·92	·32
Cinchonine		·60
Amorphous		·76
Total	1·53	2·50

Although these analyses are not correctly comparable, the samples not having been taken from similar portions of the roots, yet they show that manure and fertilizing agents do not have the property of increasing the alkaloids in the rootlets. It would seem that, as a larger quantity of food is supplied to the tree by the additional rootlets, an increase of alkaloids must result from the elaboration of its sap. The absence of quinine in the rootlets and its gradual appearance and increase as the root thickens is one of the peculiarities of alkaloid distribution in the plant. The other peculiarities are (1) the large proportion of cinchonine in the root of the officinalis compared with the very small proportion that exists in the stem, and (2) the presence of a notable quantity of quinidine in the root of the succirubra compared with the traces of this alkaloid that are present in the natural stem bark.

6. *Manures.*—The manures suitable for cinchona cultivation must contain nitrogen, phosphoric acid, lime and potash, and, when a manure contains all these four constituents, it is more valuable than a substance deficient in one of them. The natural fertilizers available in Southern India are cattle manure, bones, fish and poonac. Cattle manure is well known and is more used than anything else by planters. Bones are not very suitable, unless mixed with other ingredients; they are poor in nitrogen, destitute of potash, and are applicable only for soils requiring phosphoric acid and lime. Fish is a valuable manure for cinchona, and its application to the trees is always attended with an invigorating growth and an increase of alkaloids. Some small fish, about the size of sardines, are supplied by merchants on the Western Coast; the fish are simply dried in the sun on the sand. A sample of fish of this description (*Sardinella Neohowii*) that we have been using on the plantations was beaten up into a paste and analysed with the following results:—

Water	15·30
Organic matter *	55·98
Lime	6·93
Phosphoric acid	5·80
Alkaline salts, &c.	11·67
Sand	4·32
Total	100·00

* Containing nitrogen 6·02 (equal to ammonia 7·31).

Poonac is a name given to the cake left after the expression of oil from certain oleaginous seeds. Poonac is often rich in nitrogen and the ash contains a large proportion of phosphoric acid and potash with smaller quantities of lime. Samples of seed-cakes, however, vary in composition according to the seeds that are employed, and the samples of cakes prepared from one kind of seed are not always identical because of varying quantities of oil, water, and sand retained in them. The following remarks are made on some samples of poonacs obtainable in Southern India that have passed through my hands. They are arranged according to their value:—

Castor poonac.—This is obtained from the seeds of the well-known castor-oil plant. The cake contains from 5 to 7·5 per cent. of nitrogen and 7 to 12 per cent. of mineral matter. It is one of the richest poonacs and in some parts of the country it is one of the most abundant.

Ground-nut poonac.—This is prepared from the seeds of *Arachis hypogæa*, which is cultivated so extensively in the districts bordering on the Coromandel coast. It contains from 5 to 7 per cent. of nitrogen and 9 to 12 per cent. of mineral matter. The cake from the decorticated seed is about one-tenth richer in albuminous substances than that from the undecorticated.

Nim or margosa poonac is made from the seeds of the Nim tree (*Melia azadirachta*) and is characterised by its asafœtida-like smell and its bitter taste. The nitrogen ranges from 4 to 5·5 per cent. and the ash is rich in phosphates. The cake usually retains a large quantity of oil, sometimes as much as 20 per cent.

Hongay poonac.—Hongay is the Canarese name for the *Pongamia glabra*, a large tree growing near the Coast and in Mysore. The cake, which is very bitter, contains from 4 to 5 per cent. of nitrogen and 4 to 6 per cent. of ash.

Cocoanut poonac is one of the products of the cocoanut palm on the Western Coast. When fresh it is eaten as food by the lower classes, but it soon decomposes and is fit for nothing else than a manure. It does not afford more than 3 to 4 per cent. of nitrogen and only a small proportion of ash.

Moura poonac is prepared from the seeds of *Bassia longifolia*, a tree known by the Tamil name *illupu*. The cake contains a large quantity of saccharine matter, but is rendered nauseous on account of a bitter principle being present. It yields from 2 to 3 per cent. of nitrogen.

7. *Singhara or water chestnut.*—In the North-Western Provinces the fruit of *Trapa bispinosa*, called by the Natives *singhara*, is used as an article of food. It is also grown in Guzerat, and in Cashmere it is said to be the only food for at least 30,000 people for five months in the year. Not having met with an analysis of this food product, I brought a supply of it from Mussoorie and have submitted it to a chemical examination. The following is the result of the analysis :—

Fat	·97
Sugar and gum	14·36
Albuminous matter	8·41
Starch	63·84
Cellulose	3·60
Ash	4·66
Water	4·16
Total	100·00

The nutrient ratio or the ratio between the albuminous matter and the starchy materials is 1 : 9·5, which is very similar to that of cleaned rice having a nutrient ratio of 1 : 10·8.

8. *Tangedu bark.*—In my report of the year 1889–90, I gave the tannin value of a large number of astringent barks and the list included the tangedu bark (*Cassia auriculata*) which, from an analysis of an authentic sample from Bangalore, I found to contain 11·9 per cent. of tannin. The Inspector-General of Forests of Mysore noticing the somewhat low value of this well known bark and the low position it occupied in the list, wrote to the Madras Government suggesting that there was a mistake, as an analysis of the bark made in England was much higher. I accordingly obtained from Mr. Cameron a sample *of the* bark as it is used in the tanneries and found that it yielded 20·1 per cent. of tannin, and, on reference to my notes of the previous analysis, I found that the sample had been from some young bark taken evidently from the small branches of the plant and would in consequence contain less tannin than that from the thicker branches and stems. In the analysis of vegetable economic products great importance is attached to the maturity of the sample and the condition under which it has been collected and preserved, as a slight difference in the age of the sample, or the presence of impurities, or any decomposition will make an analysis of that sample of little value.

(Signed) D. Hooper

Govt. Quinologist

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No. 1.

STATEMENT showing the Rainfall at the several Government Cinchona Plantations, Nilgiris, during the official year 1892-93.

Months.	Dodabetta.				Nedivattam.			
	1891-92.		1892-93.		1891-92.		1892-93.	
	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
April	2·47	7	3·34	12	3·92	7	4·49	12
May	4·38	13	5·72	16	5·98	16	4·67	13
June	3·77	16	6·34	23	9·26	22	8·89	23
July	6·57	24	7·83	21	46·82	30	30·03	29
August	2·98	13	6·93	24	16·93	25	15·19	30
September	1·45	9	3·37	10	3·13	14	4·75	18
October	15·94	27	10·46	20	10·64	19	5·76	20
November	5·88	7	1·35	6	2·41	3	0·64	5
December	2·73	15	2·12	5	0·55	2	0·33	3
January	0·00	..	0·07	1	0·00	..	0·00	..
February	0·12	3	2·74	5	0·00	..	0·55	3
March	0·04	1	1·83	8	1·20	1	1·82	2
Total	46·33	135	52·10	151	100·84	139	77·12	158

Months.	Hooker.				Wood.			
	1891-92.		1892-93.		1891-92.		1892-93.	
	Rainfall.	Number of wet days.	Rainfall.	Number of wet days.	Rainfall.	Number of wet days.	Rainfall.	Number of wet days.
	10	11	12	13	14	15	16	17
April	2·57	6	5·45	12	2·66	7	4·10	12
May	6·71	15	5·38	17	5·77	14	5·08	17
June	7·79	20	6·41	20	6·50	19	5·39	20
July	33·76	29	24·00	29	25·68	23	19·03	29
August	8·70	23	12·81	30	6·62	14	9·74	30
September	1·41	13	4·29	16	1·07	22	3·23	17
October	10·95	23	6·67	19	10·66	5	5·20	17
November	1·52	6	1·68	5	1·51	5	1·38	5
December	1·60	5	1·04	5	1·84	..	1·49	5
January	0·00	..	0·00	..	0·00	..	0·00	..
February	0·13	1	0·84	4	0·19	2	0·51	4
March	0·42	1	2·24	7	0·25	1	1·66	7
Total	75·56	142	70·81	164	62·75	140	56·81	163

No. 2.

STATEMENT showing the Receipts on account of the Government Cinchona Plantations, Nilgiris, for the official year 1892-93.

Particulars.	Sanctioned budget estimate for 1892-93.	Revised budget estimate for 1892-93.	Actuals for 1892-93.
	Rs.	Rs.	Rs. A. P.
Bark supplied to the Madras Medical Department	250	260	255 0 0
Do. Bombay do.	400	400	321 0 0
Do. Private parties and Mysore Durbar	500	500	350 14 10
Sale of seed and plants	100	100	52 2 7
Percentage of the fees of the Government Quinologist	50	40	21 0 0
Miscellaneous	500	500	61 1 0
Febrifuge	26,000	33,200	30,100 2 0
Quinine	62,200	50,000	41,636 12 9
Total	90,000	85,000	72,798 1 2

No. 3.

STATEMENT showing the Expenditure in detail on account of the Government Cinchona Plantations, Nilgiris, for the official year 1892-93.

Name of Plantation.	SALARIES.			NURSERIES.			WORKING CHARGES.			MANURE.		
	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.
1	2	3	4	5	6	7	8	9	10	11	12	13
	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.
Head Office and General	12,336	12,336	12,156 0 0	..	..	..	..	..	..	..	..	..
Dodabetta	3,744	3,744	3,744 0 0	400	260	272 15 0	5,044	4,751	4,662 3 3	2,400	1,814	2,293 14 2
Nedivattam	4,320	4,200	4,465 13 11	400	400	452 9 0	8,294	7,258	6,546 8 2	2,914	3,104	2,919 10 1
Pykara	3,887	3,887	3,868 0 0	500	575	564 11 6	7,100	4,690	4,464 2 4	880	680	704 6 2
Quinologist department	7,069	7,069	5,569 8 0	..	..	..	..	..	..	..	..	..
Total ..	31,356	31,236	29,803 5 11	1,300	1,235	1,290 3 6	20,438	16,699	15,672 13 9	6,194	5,598	5,917 14 5

Name of Plantation.	CROP.			NEW WORKS.			REPAIRS.			CONTINGENCIES.		
	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.
	14	15	16	17	18	19	20	21	22	23	24	25
	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.
Head Office and General	..	..	..	..	..	..	300	..	..	700	1,000	809 2 11
Dodabetta	3,000	2,156	2,306 2 9	..	..	..	200	147	146 6 6	..	..	..
Nedivattam	2,460	852	914 13 2	..	..	..	800	800	801 7 0	..	..	..
Pykara	275	275	206 5 2	..	..	..	450	350	150 2 11	..	..	..
Quinologist department	..	..	..	..	..	..	..	..	..	11,500	18,177	16,870 3 4
Total ..	5,735	3,283	3,427 5 1	..	..	..	1,750	1,297	1,098 0 5	12,200	19,177	17,679 6 3

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No. 3.

Statement showing the Expenditure in detail on account of the Government Cinchona Plantations, Nilgiris, for the official year 1892-93.—cont.

Name of Plantation.	PRINTING CHARGES.			PEONS' CLOTHING.			TRAVELLING ALLOWANCE.		
	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.
	26	27	28	29	30	31	32	33	34
	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.
Head Office and General	40	40	37 14 1	12	12	12 0 0	1,500	1,500	1,479 0 6
Dodabetta	..	..	..	..	..	..	..	..	..
Nedivattam	..	..	..	..	..	..	..	..	..
Pykara	..	..	..	..	..	..	..	..	..
Quinologist department	..	..	..	..	..	..	..	..	..
Total ..	40	40	37 14 1	12	12	12 0 0	1,500	1,500	1,479 0 6

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Name of Plantation.	HOUSE-RENT.			FACTORY.			TOTAL.		
	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.	Budget estimate.	Revised estimate.	Actuals.
	35	36	37	38	39	40	41	42	43
	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.	RS.	RS.	RS. A. P.
Head Office and General	..	..	..	..	..	..	14,888	14,888	14,494 1 6
Dodabetta	..	..	..	..	..	..	14,788	12,872	13,425 9 8
Nedivattam	..	..	..	1,875	2,323	1,917 11 9	21,063	18,937	18,018 9 1
Pykara	..	..	..	..	..	..	13,092	10,457	9,957 12 1
Quinologist department	600	600	550 0 0	..	..	..	19,169	25,846	22,989 11 4
Total ..	600	600	550 0 0	1,875	2,323	1,917 11 9	83,000	83,000	78,885 11 8

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No. 4.

STATEMENT showing the Receipts and Expenditure of the Government Cinchona Plantations, Nilgiris, for the official year 1892–93.

RECEIPTS.

Classification.	Revised estimate.	Up to the end of the year.
	RS.	RS. A. P.
Sulphate of Quinine	50,000	41,636 12 9
Febrifuge	33,200	30,100 2 0
Bark supplied to the Madras Medical Department	260	255 0 0
Do. Bombay do.	400	321 0 0
Do. Private parties and Mysore Durbar	500	350 14 10
Sale of seed and plants	100	52 2 7
Percentage of the fees of Government Quinologist	40	21 0 0
Miscellaneous	500	61 1 0
Total ..	85,000	72,798 1 2

EXPENDITURE.

Classification.	A. Conservancy.		B. Establishment.		Total.	
	Revised estimate.	Up to the end of the year.	Revised estimate.	Up to the end of the year.	Revised estimate.	Up to the end of the year.
	RS.	RS. A. P.	RS.	RS. A. P.	RS.	RS. A. P.
Head Office and General ..	2,552	2,338 1 6	12,336	12,156 0 0	14,888	14,494 1 6
Quinologist department ..	18,777	17,420 3 4	7,069	5,569 8 0	25,846	22,989 11 4
Dodabetta	9,128	9,681 9 8	3,744	3,744 0 0	12,872	13,425 9 8
Nedivattam	14,737	13,552 11 2	4,200	4,465 13 11	18,937	18,018 9 1
Pykara	6,570	6,089 12 1	3,887	3,868 0 0	10,457	9,957 12 1
Total ..	51,764	49,082 5 9	31,236	29,803 5 11	83,000	78,885 11 8

No. 5.

STATEMENT showing the quantity of Cinchona Seed and number of Plants sold to the public during the official year 1892–93.

—	Seed.	Plants.
	LB. OZ.	NO.
Cinchona Condaminea	6 8	..
Do. Magnifolia	0 13½	2,100
Do. Succirubra	1 12	..
Total ..	9 1½	2,100

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No. 6.

A.—Statement showing the total yield of the Government Cinchona Plantations, Nilgiris, for the official year 1892-93.

Name of Plantation.	Species of produce.	Bark. Under stripping and mossing system. Number of plot.	Under stripping and mossing system. Number of trees decorticated.	Under stripping and mossing system. Outturn of green bark.	Coppicing. Number of plot.	Coppicing. Number of trees decorticated.	Coppicing. Outturn of green bark.	Up-rooting. Number of plot.	Up-rooting. Number of trees decorticated.	Up-rooting. Outturn of green bark.	Scraping. Number of plot.	Scraping. Outturn of green bark.	Scraping. Number of trees decorticated.	Scraping. Outturn of green bark.	Total quantity of green bark collected.	Total number of trees decorticated.	Outturn of green bark.	Number of trees decorticated.	Total quantity.	Seed. Quantity when dry.	Propagation. Plants.	Propagation. Seedlings.	Propagation. Rooted cuttings.
															LBS.		LBS.			LB. OZ.			
Dodabetta ..	Crown bark	1	814	2,096	23	15,848	..	..	..	..	..	..	16,662	297,586	299,682	16,662	297,586	15,848	110,245	99,890	36,000	30,000	..
	Magnifolia	.. 2	966	1,213	.. 2	1,130	..	..	..	..	..	..	2,096	11,587	12,800	2,096	11,587	1,130	16,321	4,266	..	..	..
Nedivattam ..	Crown bark	..	..	..	.. 1	3,033	..	..	914	5,661	..	..	3,947	29,800	35,461	3,947	29,800	3,033	14,179	11,820	45,000	100,000	..
	Magnifolia	.. 1	278	207	.. ..	..	..	1	611	3,952	1	859	6,648	..	6,648	859	..	..	34,247	2,182	11,000	..	..
Pykara ..	Crown bark	.. ..	..	..	.. ..	..	..	1	213	3,975	..	213	3,975	..	3,975	213	..	..	173,992	1,325	..	..	..
	Red do.	.. ..	..	..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	382,349	119,483	..	..	..
	Add the balance on 31st March 1892.	.. ..	..	..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	416,858	..	..	..
	Total ..	.. ..	..	..	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	536,341	536,341	..	..	..

B.—Statement showing the disposal of bark and other produce collected in the Government Cinchona Plantations, Nilgiris, for the official year 1892–93.

Name of Plantation.	Species of produce.	Bark. Used for febrifuge and quinine. Quantity.	Bark. Used for febrifuge and quinine. Bales.	Bark. Sold in the country. Quantity.	Bark. Sold in the country. Bales.	Bark. Supplied to the Medical Department. Quantity.	Bark. Supplied to the Medical Department. Bales.	Bark. Total. Quantity.	Bark. Total. Bales.	Seed. Used for nursery.	Seed. Total.	Propagated Plants and Seedlings. Plants. Sold to the public.	Propagated Plants and Seedlings. Plants. Permanently put in the plantation.	Propagated Plants and Seedlings. Seedlings. Sold to the public.	Propagated Plants and Seedlings. Rooted cuttings Transplanted.	Remarks.
		LBS.		LBS.		LBS.		LBS.		LB.	LB. OZ.					
Dodabetta ..	Crown bark	1,093½	..	109,370	..	800	1,102½	110,245	..	2	8 8	..	..	..	..	..
	Magnifolia	..	..	..	..	..	..	..	..	..	0 13½	..	..	..	..	..
Nedivattam ..	Crown bark	139½	13,946	2¾	..	1,000	15,321	15,321	1 12	..	..	..	..	..	..	..
	Red bark	141½	14,154	..	..	..	14,179	14,179	..	..	..	..	..	..	..	..
	Magnifolia	342½	34,247	..	..	..	34,247	34,247	..	3	1 11	..	..	..	..	..
Pykara ..	Crown bark	..	..	..	..	..	..	..	..	..	3 0	1,200	*26,080	..	..	* As renewals in lieu of failures.
	Add the balance on 31st March 1893.	..	..	..	..	..	..	173,992	..	..	..	..	..	..	..	..
	Total ..	..	..	..	..	..	..	382,349	..	..	..	..	..	..	..	..
		..	..	..	..	..	..	536,341	..	..	..	..	..	..	..	..

No. 7.

STATEMENT showing the approximate number of plants in permanent plantations, Nilgiris, on 31st March 1893.

Species.	Dodabetta.				Nedivattam.				Hooker.				Wood.				Grand Total.
	Plants last year.	Coppiced or up-rooted.	Planted in this year.	Total.	Plants last year.	Coppiced or up-rooted.	Planted in this year.	Total.	Plants last year.	Coppiced or up-rooted.	Planted in this year.	Total.	Plants last year.	Coppiced or up-rooted.	Planted in this year.	Total.	
C. Succirubra	..	..	..	..	36,255	3,947	..	32,308	2,888	213	..	2,675	..	..	..	..	34,983
C. Officinalis	593,989	15,848	..	578,141	96,819	1,130	..	95,689	382,446	611	..	381,835	..	..	..	..	1,055,665
C. Calisaya var. Ledger ..	130	..	..	130	..	..	..	..	..	..	..	..	..	..	..	..	130
C. do. other varieties. ..	..	..	..	..	143	..	..	143	..	..	..	..	..	..	..	..	143
C. Micrantha	26	..	..	26	..	..	..	..	..	..	..	..	..	..	..	..	26
C. Pitayensis	43	..	..	43	..	..	..	..	..	..	..	..	..	..	..	..	43
C. Lancelata	..	..	..	..	5	..	..	5	..	..	..	..	..	..	..	..	5
C. Carthagena	18	..	..	18	716	..	..	716	50	..	..	50	45	..	..	45	829
C. Sauta-Fe	9	..	..	9	3	..	..	3	..	..	..	..	..	..	..	..	12
C. Hybrid and others ..	61,806	..	..	61,806	269,925	..	..	269,925	292,995	..	..	292,995	41,583	..	..	41,583	666,309
Total ..	656,021	15,848	..	640,173	403,866	5,077	..	398,789	678,379	824	..	677,555	41,628	..	..	41,628	1,758,145

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COMPARATIVE STATEMENT showing the quantity of bark of all sorts in store at the commencement of the year 1892-93 collected and disposed of during the year and remaining in store at its close.

Description of bark.	1891-92.											
	Quantity in store at the commencement of the year.								Collected during the year.	Total.	Disposed during the year.	
	Crop of 1883-84.	Crop of 1885-86.	Crop of 1886-87.	Crop of 1887-88.	Crop of 1888-89.	Crop of 1889-90.	Crop of 1890-91.	Total.			Crop of 1883-84.	Crop of 1885-86.
1	2	3	4	5	6	7	8	9	10	11	12	13
	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.
Crown bark	..	..	..	489	82,233	74,058	76,038	232,818	13,204	246,022	..	..
Red bark	..	37,313	28,981	35,056	26,009	68,568	57,313	253,240	40,487	293,727	..	24,370
Magnifolia	900	340	..	3,877	1,920	17,600	..	24,637	142	24,779	900	340
Total ..	900	37,653	28,981	39,422	110,162	160,226	133,351	510,695	53,833	564,528	900	24,710

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Description of bark.	1891-92—*cont.*											
	Disposed during the year—*cont.*				Balance at the close of the year.							
	Crop of 1887-88.	Crop of 1888-89.	Crop of 1889-90.	Total.	Crop of 1885-86.	Crop of 1886-87.	Crop of 1887-88.	Crop of 1888-89.	Crop of 1889-90.	Crop of 1890-91.	Crop of 1891-92.	Total.
	14	15	16	17	18	19	20	21	22	23	24	25
	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.
Crown bark	489	82,233	29,978	112,700	..	..	..	..	44,080	76,038	13,204	133,322
Red bark	..	..	..	24,370	12,943	28,981	35,056	26,009	68,568	57,313	40,487	269,357
Magnifolia	3,877	1,920	3,563	10,600	..	..	..	..	14,037	..	142	14,179
Total ..	4,366	84,153	33,541	147,670	12,943	28,981	35,056	26,009	126,685	133,351	53,833	416,858

No. 8—*cont.*

Comparative statement showing the quantity of bark of all sorts in store at the commencement of the year 1892-93 collected and disposed of during the year and remaining in store at its close—*cont.*

1892-93.

Description of bark.	Quantity in store at the commencement of the year.					Collected during the year.	Disposed during the year.							Balance at the close of the year.
	Crop of 1885-86.	Crop of 1886-87.	Crop of 1887-88.	Crop of 1888-89.	Crop of 1889-90.	Crop of 1890-91.	Total.	Crop of 1885-86.	Crop of 1886-87.	Crop of 1887-88.	Crop of 1888-89.	Crop of 1889-90.	Total.	
	26	27	28	29	30	31	33	34	35	36	37			
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Crown bark	..	..	..	..	44,080	76,038	133,322	106,338	239,660	..	..	..	..	..
Red bark	12,943	28,981	35,056	26,000	14,037	57,313	269,357	13,145	282,502	12,943	2,378	68,568	26,009	35,056
Magnifolia	..	..	..	..	..	..	14,179	..	14,179	..	..	..	..	..
Total ..	12,943	28,981	35,056	26,000	58,117	133,351	416,858	119,483	536,341	12,943	2,378	68,568	26,009	35,056

1892-93—*cont.*

Description of bark.	Disposed during the year—*cont.*							Balance at the close of the year.						
	Crop of 1889-90.	Crop of 1890-91.	Crop of 1891-92.	Crop of 1892-93.	Total.	Crop of 1885-86.	Crop of 1886-87.	Crop of 1887-88.	Crop of 1888-89.	Crop of 1889-90.	Crop of 1890-91.	Crop of 1891-92.	Crop of 1892-93.	Total.
	38	39	40	41	42	43	44	45	46	47	48	49	50	
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Crown bark	44,080	76,038	13,204	11,170	144,492	..	..	..	..	..	..	..	95,168	95,168
Red bark	..	..	..	..	15,321	12,943	26,603	35,056	26,000	68,568	57,313	40,487	13,145	267,181
Magnifolia	14,037	..	142	..	14,179	..	..	..	..	..	..	..	..	..
Total ..	58,117	76,038	13,346	11,170	173,992	12,943	26,603	35,056	26,000	68,568	57,313	40,487	108,313	362,349

No. 9.

STATEMENT showing the particulars of Cinchona bark disposed of during the year 1892-93.

Particulars.	Product of 1885-86.		Product of 1886-87.		Product of 1889-90.		Product of 1890-91.	
	Pounds.	Value realized.	Pounds.	Value realized.	Pounds.	Value realized.	Pounds.	Value realized.
1	2	3	4	5	6	7	8	9
		Rs. A. P.		Rs. A. P.		Rs. A. P.		Rs. A. P.
Cinchona bark used for the manufacture of sulphate of quinine and solid febrifuge.	11,568	..	2,378	..	57,217	..	76,038	..
Cinchona bark supplied to Madras Medical Department.	1,000	255 0 0	..	..	..	..	..	..
Cinchona bark supplied to Bombay Medical Department.	..	..	..	..	800	321 0 0	..	..
Cinchona bark supplied to Mysore Durbar and private parties, &c.	375	90 0 0	..	..	100	..	..	..
Total ..	12,943	345 0 0	2,378	..	58,117	321 0 0	76,038	..

Particulars.	Product of 1891-92.		Product of 1892-93.		Total	
	Pounds.	Value realized.	Pounds.	Value realized.	Pounds.	Value realized.
	10	11	12	13	14	15
		Rs. A. P.		Rs. A. P.		Rs. A. P.
Cinchona bark used for the manufacture of sulphate of quinine and solid febrifuge.	13,346	..	11,170	..	171,717	* ..
Cinchona bark supplied to Madras Medical Department.	..	..	..	..	1,000	255 0 0
Cinchona bark supplied to Bombay Medical Department.	..	..	..	..	800	321 0 0
Cinchona bark supplied to Mysore Durbar and private parties, &c.	..	..	..	..	475	90 0 0
Total ..	13,346	..	11,170	..	173,992	666 0 0

	Rs. A. P.
* Value of 4,933 lb. of sulphate of quinine at Rs. 13-6-0 per lb. ..	65,978 14 0
Value of 3,139 lb. of febrifuge at Rs. 10 per lb.	31,390 0 0
Total ..	97,368 14 0

No. 10.

STATEMENT showing the particulars of Sulphate of Quinine and Cinchona Febrifuge manufactured and disposed of during the year 1892-93.

Particulars.	Quantity in store at the commencement of the year.	Manufactured during the year.	Total.	Disposed of during the year.					Dryage.	Balance at the close of the year including paper packets.
				To Madras Medical Department.	To Bombay Medical Department.	To Mysore.	To private parties and paper packets to Collectors.	Total.		
	Lb. oz.	Lb.	Lb. oz.	Lb.	Lb.	Lb.	Lb. oz.	Lb. oz.		Lb. oz.
Sulphate of quinine.	2,652 10	4,933	7,585 10	2,000	950	100	* 153 13	3,203 13	..	4,381 13
Solid febrifuge ..	1,355 0	3,139	4,494 0	1,600	1,000	..	8 8	2,608 8	..	1,885 8

* Includes 1,704 quinine packets.

No. 11.

Statement showing the Capital and Revenue Account of the Government Cinchona Plantations, Nilgiris, from the commencement up to the official year 1892-93.

Year.	Charges.							Receipts.				Net revenue (difference between columns 9 and 13).	
	Establishment including Superintendent's salary.	Building and plant.	Working charges.		Total.	Total outlay to end of year.	Simple interest at 4½ per cent. on outlay to end of previous year *plus* half outlay during the year.	Value of bark supplied to Quinologist, or for experimental purposes and the value of quinine and febrifuge sold.	Value of bark sent to England, sold or supplied to other Governments or departments or private parties.	Sale of plants, seeds, &c.	Total.	Surplus.	Deficit.
			Departmental labour.	Convict labour.			Total of columns 6 and 8.						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1860-61	..	..	4,821 15 0	..	4,821 15 0	48,21 15 0	108 7 11	4,930 6 11	..	..	..	..	..	4,930 6 11
1861-62	..	..	22,914 15 4	..	22,914 15 4	27,736 14 4	732 9 2	23,647 8 6	..	..	..	..	..	23,647 8 6
1862-63	..	..	48,390 0 0	..	48,390 0 0	76,126 14 4	2,336 15 0	50,726 15 0	..	..	..	..	..	50,726 15 0
1863-64	12,726 14 7	..	53,173 9 2	..	65,900 7 9	1,42,027 6 1	4,908 7 7	70,808 15 4	..	..	..	..	..	70,808 15 4
1864-65	24,444 8 11	..	59,666 12 0	..	84,111 4 11	2,26,138 11 0	8,283 11 9	92,395 0 8	..	..	..	..	..	92,395 0 8
1865-66	25,449 14 0	3,700 0 0	58,887 5 0	..	88,037 3 0	3,14,175 14 0	12,157 1 4	1,00,194 4 4	..	..	2,450 0 0	2,450 0 0	..	1,00,194 4 4
1866-67	23,803 9 10	3,025 0 0	52,632 0 0	48,666 10 8	1,28,127 4 6	4,42,303 2 6	17,020 12 6	1,45,148 1 0	..	287 8 0	..	287 8 0	..	1,42,698 1 0
1867-68	26,087 3 1	2,600 0 0	43,295 14 4	48,666 10 8	1,20,649 12 1	5,62,952 14 7	22,618 3 6	1,43,267 15 7	..	..	1,680 0 0	1,680 0 0	..	1,42,980 7 7
1868-69	25,671 7 10	2,030 0 0	30,636 1 0	48,666 10 8	1,07,004 3 6	6,69,957 2 1	27,740 7 8	1,34,744 11 2	..	..	..	1,512 6 4	..	1,33,064 11 2
1869-70	25,783 5 4	5,334 5 8	19,163 0 0	..	50,280 11 0	7,20,237 13 1	31,279 6 2	81,560 1 2	1,512 6 4	..	323 14 0	4,688 12 8	..	80,047 10 10
1870-71	23,730 5 4	800 0 0	6,143 0 0	..	30,173 5 4	7,50,411 2 5	33,089 9 8	63,262 15 0	4,364 14 8	..	..	13,022 0 2	..	58,574 2 4
1871-72	17,157 5 4	3,250 0 0	13,160 4 9	..	33,567 10 1	7,83,978 12 6	34,523 12 5	68,091 6 6	9,542 12 8	3,479 3 6	..	..	..	55,069 6 4
1872-73	12,724 0 0	550 0 0	16,441 0 0	..	29,715 0 0	8,13,693 12 6	35,947 10 2	65,662 10 2	16,806 15 8	4,388 2 1	227 1 4	21,422 3 1	..	44,240 7 1
1873-74	12,574 0 0	2,758 0 0	15,091 14 0	..	30,423 14 0	8,44,117 10 6	37,300 12 2	67,724 10 2	21,136 7 0	36,417 6 3	300 9 0	57,854 6 3	..	9,870 3 11
1874-75	16,406 8 0	1,700 0 0	17,417 0 0	..	35,523 8 0	8,79,641 2 6	38,784 9 2	74,308 1 2	8,576 0 0	..	273 4 0	8,849 4 0	..	65,458 13 2
1875-76	17,234 0 0	1,550 0 0	27,423 0 0	..	46,207 0 0	9,25,848 2 6	40,623 8 3	86,830 8 3	..	60,404 7 11	2,000 0 0	62,404 7 11	..	24,426 0 4
1876-77	8,064 5 4	6,715 8 11	44,850 3 0	..	59,630 1 3	9,85,478 3 9	43,004 13 6	1,02,634 14 9	..	1,07,878 4 0	2,579 3 10	1,10,457 7 10	7,822 9 1	..
1877-78	8,061 5 4	5,463 13 8	56,241 10 3	..	69,771 13 3	10,55,250 1 0	45,916 6 3	1,15,688 3 6	..	3,51,746 0 6	5,469 0 2	3,57,215 0 8	2,41,526 13 2	..
1878-79	9,637 2 8	10,090 14 1	53,954 10 8	..	73,682 11 5	11,28,932 12 5	49,144 1 10	1,22,826 13 3	..	3,92,217 10 1	8,136 9 2	4,00,354 3 3	2,77,527 6 0	..
1879-80	10,092 0 0	6,537 4 9	63,095 0 3	..	79,724 5 0	12,08,657 1 5	52,695 12 4	1,32,320 1 4	..	4,24,323 12 8	15,462 12 4	4,39,786 9 0	3,07,466 7 8	..
1880-81	11,879 1 0	11,367 0 4	72,858 15 3	..	96,105 0 7	13,04,762 2 0	56,551 14 11	1,52,656 15 6	..	3,33,295 1 3	13,175 4 8	3,46,470 5 11	1,93,813 6 5	..
1881-82	16,375 14 6	6,278 4 9	90,921 2 1	..	1,13,575 5 4	14,18,337 7 4	61,269 11 11	1,74,845 1 3	..	5,64,236 3 11	7,653 2 9	5,71,889 6 8	3,97,044 5 5	..
1882-83	15,094 14 1	32,247 11 5	60,049 11 5	..	1,06,392 4 11	15,24,729 12 3	56,219 0 8	1,72,611 5 2	..	5,82,603 10 1	4,345 7 10	5,86,349 1 11	4,13,737 12 9	..
1883-84	20,083 7 5	35,348 14 5	69,123 8 6	..	1,24,560 14 4	16,49,290 10 7	71,415 7 4	1,95,976 5 8	..	80,519 10 6	4,561 2 8	85,080 13 2	..	1,10,895 8 6
1884-85	20,413 3 4	6,220 10 5	60,190 8 7	..	86,824 6 4	17,36,115 0 11	76,171 10 0	1,62,996 0 4	933 12 0	83,351 10 0	1,543 13 5	85,829 3 5	..	77,166 12 11
1885-86	26,235 7 5	3,513 5 8	50,629 13 10	..	80,378 10 11	18,16,493 11 10	79,933 11 2	1,60,312 6 1	1,418 0 8	1,02,101 0 6	589 10 4	1,04,108 11 0	..	56,203 11 1
1886-87	27,581 14 3	7,925 11 1	48,720 11 2	..	84,228 4 6	19,00,722 0 4	83,637 5 8	1,67,865 10 2	2,127 1 0	68,067 4 8	1,595 4 9	71,789 10 5	..	96,075 15 9
1887-88	30,831 11 6	2,355 9 9	38,973 13 10	..	72,161 3 1	19,72,883 3 5	87,156 1 11	1,59,317 5 0	1,203 0 0	1,975 0 0	763 1 11	3,941 1 11	..	1,55,376 3 1
1888-89	26,686 14 3	2,724 12 7	40,082 3 1	..	69,493 13 11	20,42,377 1 4	90,343 5 8	1,59,837 3 7	2,134 0 0	420 0 0	1,047 11 10	3,601 11 10	..	1,56,235 7 9
1889-90	38,105 12 2	1,614 4 11	28,460 7 1	..	68,180 8 2	21,10,557 9 6	93,441 0 6	1,61,621 8 8	4,048 10 6	792 1 9	599 12 4	5,440 8 7	..	1,56, 81 0 1
1890-91	42,061 6 6	2,132 13 10	30,719 12 5	..	74,914 0 9	21,85,471 10 3	96,660 10 7	1,71,574 11 4	27,535 0 10	835 13 10	504 15 1	28,875 13 9	..	1,42,698 13 7
1891-92	49,887 3 10	1,835 12 8	24,082 1 1	..	75,805 1 7	22,61,276 11 10	1,00,051 13 5	1,75,856 15 0	75,262 10 5	1,038 13 6	765 2 3	77,066 10 2	..	98,790 4 10
1892-93	49,561 10 9	1,098 0 5	28,226 0 6	..	78,885 11 8	23,40,162 7 6	1,03,532 6 1	1,82,418 1 9	71,736 14 9	926 14 10	134 3 7	72,798 1 2	..	1,09,620 0 7
Total ..	6,74,446 8 7	1,70,272 15 4	13,49,442 15 7	1,46,000 0 0	23,40,162 7 6	..	16,04,501 5 9	39,44,663 13 3	2,48,338 10 6	32,00,705 11 4	76,181 3 3	35,25,225 9 1	..	4,19,438 4 2

No. 12.

STATEMENT showing the receipts and charges on account of the Government Cinchona Plantations, Nilgiris, for the year 1892–93 prepared in accordance with the instructions issued in the Secretary of State's despatch, No. 3, dated 11th February 1886.

Disbursements, &c.	Amount.	Receipts, &c.	Amount.
To value of bark in stock on 31st March 1892 (416,858 lb.) as under—	Rs. A. P.	By value of bark in stock on 31st March 1893 (362,349 lb.) as under—	Rs. A. P.
12,943 lb. of 1885–86 at Rs. 0 11 4·132 per lb.	9,176 13 8	26,603 lb. of 1886–87 at Rs. 0 10 10·069 per lb.	18,022 0 1
28,931 ,, of 1886–87 ,, 0 10 10·069 ,,	19,632 15 5	35,056 ,, of 1887–88 ,, 0 12 5·385 ,,	27,275 3 5
35,056 ,, of 1887–88 ,, 0 12 5·385 ,,	27,275 3 5	26,009 ,, of 1888–89 ,, 0 10 1·120 ,,	16,407 5 6
26,009 ,, of 1888–89 ,, 0 10 1·120 ,,	16,407 5 6	68,568 ,, of 1889–90 ,, 0 6 9·701 ,,	29,177 7 6
126,685 ,, of 1889–90 ,, 0 6 9·701 ,,	53,907 12 3	57,313 ,, of 1890–91 ,, 0 8 11·862 ,,	32,197 5 10
133,351 ,, of 1890–91 ,, 0 8 11·862 ,,	74,914 0 9	40,487 ,, of 1891–92 ,, 1 6 6·365 ,,	57,011 12 11
53,833 ,, of 1891–92 ,, 1 6 6·365 ,,	75,805 1 7	108,313 ,, of 1892–93 ,, 0 10 6·763 ,,	71,610 13 4
Total ..	2,77,119 4 7	Total ..	2,51,602 0 7
To establishment and working charges ..	78,885 11 8	Sulphate of quinine supplied to the Medical Stores Department, Madras, Bombay, &c.	41,636 12 9
To value of quinine and febrifuge (including 630 packets of quinine) in stock on 31st March 1892.	49,658 13 9	Febrifuge supplied to the Medical Stores Department, Madras, Bombay, &c.	30,100 2 0
Net profit on operations	780 3 7	Bark supplied to the Madras Medical Department	255 0 0
		Bark supplied to the Bombay Medical Department	321 0 0
		Bark supplied to private parties and Mysore Durbar	350 14 10
		Sale of seeds and plants	52 2 7
		Percentage of the fees of the Government Quinologist	21 0 0
		Miscellaneous	61 1 0
		Total ..	72,798 1 2
		Value of quinine packets supplied to Collectors, but not recovered	1,410 0 0
		By value of febrifuge and quinine in stock on 31st March 1893	80,633 15 10
Grand Total ..	4,06,444 1 7	Grand total of all receipts including the items in stock ..	4,06,444 1 7

Director's office
OOTACAMUND,
5th June 1893

W. L. Lawson

Government Botanist and Director, &c.

576

576

1893
REVENUE DEPARTMENT.
Enclosure No. 1

Read C. No. 4251 of 2 to
55

Order of 28 June 1893, no: 57

Mr. Lawson submits his report on the working of the Govt. Cinchona Dept. for the year 1892-93 and Mr. Hooper report on the analytical work done by him during the same period.

2. Season. The rainfall registered in all the estates except Dodabetta was considerably below the average. The absence of sunshine and a severe drought which prevailed on the western side of the plateau from October till the end of February last rendered the season unfavourable for Cinchona cultivation in all the estates except Dodabetta where ~~every thing is reported to have been in good order.~~ condition were from the vattam appears to have

Suff.

vered the most of all
estates not only from
gloomy weather and
drought above
vered to but also from
strong winds of Sep-
ber and October which
d damage to a good
number of the old trees
standing on the estate.
The following statement
compares the rainfall gauges
at the several estates
during the last two years.

Estates	Rainfall in	
	1891-92	1892-93
	inches	inches
Dodabetta	46·33	52·10
Nedivattam	100·84	77·12
Hooker	75·56	70·81
Wood	62·75	56·81

3. Working. In his letter no. 67 d. 25th October 1892, explaining certain discrepancies observed by Govt in the report for 1891-92, Mr Lawson stated that ten acres of ground uprooted at

RE
Enclosure
To Current N

at Nedivattam were replanted in April and June 1892 and that the figures relating to these plants had come into the Statistics for 1892-93. It does not however appear from the statement No. 7 appended to the present report that any new trees were planted in any of the estates during the year under review. This requires explanation. Statement no. 7 shows that 1,779,894 trees were standing on the several estates at the commencement of 1892-93, and that 21,749 of them were either officinal or uprooted during the year, leaving standing at its close 1,758,145 trees.

4. The balance of bark in stock at the commencement of the year was 416858 lbs and consisted of 133,322 lbs of crown bark 269,357 lbs of red bark

14179 lbs of magnifolia.
rop harvested during
ar was 106,338 lbs of
n bark, and 13,146 lbs
l bark. The quantity
sed of during the year
s 144,492 lbs of crown
ark, 15321 lbs of red bark
and the whole of the magni-
folia in stock, i.e. 14179 lbs
or 173992 lbs in all. Of
the bark disposed of, 171,717 lbs
represent the quantity uti-
lised for the manufacture of
Sulphate of quinine and
solid febrifuge, and the
remainder the bark supplied
to the Madras, Bombay and
Mysore Medical Departments,
to the Imperial Institute
and to private parties. The
balance outstanding at the
close of the year was 95,168 lbs
of crown bark and 267,181 lbs
of red bark or altogether
62,349 lbs. Mr. Lawson
tates that crown bark
s principally used in the
nufacture of quinine and

that it was thought
sirable to work chief
on the inferior classes
as to relieve the godown
which were choked. If
was essential to clear of
inferior kinds of bark in
stock, it is not clear wh
red bark, of which there
was an enormous quanti-
ty in store, and which
is poorer in quinine than
crown bark, was not
more extensively made
use of.

5. The quantity of Sul-
phate of quinine and febri-
fuge in stock at the close
f the previous year was
2653 lbs
~~2652 lbs - 10 oz~~ and 1355
lbs respectively. During
the year, 4933 lbs, and 3139
lbs of the two drugs were
manufactured at the Nedi-
vattam factory and 3204 lbs
~~[illegible]~~ of quinine and 2609 lbs
~~[illegible]~~ of febrifuge were suppl
to the Medical Stores Depar
ments of Madras and Bo

Mysore Durbar, and to
ate parties. The balance
standing at the close of
year was 4382 lbs - ~~[illegible]~~
quinine, and 1885 lbs, ~~[illegible]~~
the febrifuge. The quanti-
ty of these drugs purchased
by private parties was
very small, having been
only 32 lbs of quinine; and
8 lbs - 8 oz of febrifuge. It
is evident that the annual
outturn of the factory is likely to be in
future, as it was during
the last two years, ~~likely~~
~~to be~~ considerably in excess
of the requirements of the
Government Medical De-
partment and that there
will always be a sufficient
quantity of the drugs in stock
to meet all demands. The
Bengal Government now
advertises in all the Official
Gazettes and some of the
leading newspapers the
fact of their quinine and
febrifuge being available
for sale to the public, ~~at the~~
~~Office~~

~~Office of the Superin~~
~~Botanical Gardens~~
Seebpore, and Mr. L
may with advantage
lish similar ~~notices~~ advertisements
in English and in the vern
culars in the Fort St. George
Gazette and occasionally
in one or two of the leading
newspapers of this Presi-
dency ~~in English~~.

6. The Government ~~is~~
~~glad to~~ observes with satisfaction that there
was a very ~~satisfactory~~ material in-
crease in the number of
indents received from
the several Collectors
for quinine packets, the
number of powders sent
out during the year under
review having been —
170,400 as against 37000
in the previous year. In
G.O. No. 1252, dated 13th
December 1892, the Govt.
desired Mr. Lawson to
embody the district re-
ports on the subject of
the sale of the powd

...s annual adminis-
...ion report but, the
... of India having sub-
...ently fixed the 1st July
... date on which the Ad-
...stration Report should
... submitted to them, it was
...und more convenient to
...llow Mrs Lawson to
review separately, at a
later date, the reports
received from the Collectors.

7. In para 6 of G.O.
995, dated 22nd September
1892 reviewing the report
for 1891-92, the Govt re-
marked that the question
of making certain modi-
fications in the existing
arrangements for the
packing and sale of
quinine powders was
then under reference to
the Board of Revenue,
and the Surgeon-General,
and that orders would
... passed on receipt of
...ir replies. This ques-
...n has ~~now~~ recently been
disposed

disposed of in G.O. 2 to
347 dated 28th April 18...
which it has been de...
to discontinue the dis...
bution of Jalap with ...
quinine powders a...
introduce with the perm...
sion of the Govt of India
the Bengal System of Sale
through Postmasters as an
experiment in a few selected
districts.

8. The receipts during
the year under review,
excluding the cost of
the quinine packets sup-
plied to Collectors for
distribution, amounted
to Rs 72,798, being Rs
17,202 and 12,202 less
than the budget and
revised estimates res-
pectively. The decrease is
due to a reduction in the
price of quinine and to
the Ceylon Govt having
discontinued the purcha...
of quinine from the
Nedivattam factory

Mr Burma

...st of the quinine pack-
...supplied to the Collec-
... at the rate of Rupee 1
...packet was Rs 1410. The
...penditure of the Dept. du-
...ng the year amounted to
...s 78,886, or Rs 4114 less
...an the budget and re-
...vised estimates. The
reduction in the estimated
expenditure is explained
by a laudable desire on
the Director's part to
equalize, as far as possi-
ble, the actual revenue
and expenditure. The
latter, however, was
still Rs 6088 in excess of
the former.

9. The usual State-
ments showing the receipts
and disbursements du-
ring the year under review
and previous years have
this year been prepared
by Mr. Lawson and are
printed as appendices 11
...d 12 to his report. The
...ector considers the form
of

of statement No. 12 to
be somewhat cumbrous
and proposes to substitute
a simpler form which, he
thinks, will meet all
requirements. The Govt.
is however unable to ac-
cept the Director's proposal
as the form at present in
use has been adopted in
accordance with the instruc-
tions of the Secretary of
State for India and
cannot be altered with-
out his authority.

10. Mr. Hooper's
report on the analytical
work done by him con-
tains as usual much
interesting matter.

Dis. 12.7.93

To
11 The Govt. Botanist
16 Pol. Comrs. of L. Rivers marked
25 Comr. of Mis. L. R. & agric.
8 Military Deptt.
5 Public Deptt.
5 Financial Deptt.
6 Surgeon-General with Govt.
6 Acctt. General
5 Resident in Travancore & Cochin
thro' the Pol. Deptt. for information
& communication to the Sirkars concerned
2 copy to the Hon. Secy. Agri. Horticultural Society
2 " " Chamber of Commerce

Dis. 12.7.93

Endt. No. 576A.
copy to the Govt. of India,
Rev. & Agric. Deptt.

No. 576B.
Copy to the Govt. of Bengal.

No. 576C.
Copy to the Chief Comr.,
Burma

200/15

22.VI.93

26 P.C. Des. 12.7

3 P.C. Des. 12.7

22 6 93

23 June

Draft Review

Cinchona Report.

H.M.S.

&

H.E. the Governor

C.Ced. 28 June 1893, no: 576

V.E.

Print very emergent.
It is due with the
Govt of India on the
1st July. C.R.
28/6/93

Note
The review has to be submitted
to Govt of India by 1st July.

23/6