Dock 10235

2. A duly tested rain-gauge has recently been sent to the Collector of Nilgiris for use at Kadavatam.

3. The Director will report whether he uses separate rain-gauges, and if so, whether they have been duly tested. If not, fresh ones should be obtained through the Board of Revenue, the present gauges being used till they are replaced.

(True Extract)

Illegible

Ag. Secy. to Govt.

No. 2858 Wdf Dec. 1. 1885

2723 W of 13/11/85
2388 W of 13/10/85

Comm. to the Supt. Engr. IV Circle with reference to GO. No. 2723 W dt 13.11.85.

To the P.W. Dept: S
" " Board of Rev.
" " Dir. Govt. Cinch. Plant.

Ad 9/12

CA

27/11/85

S.E. IV Circle 27.11.85

Dec. 1-12-85.

Rev. 9608/1

No. 2723 W. dt. Nov. 13. 1885

B

Comd. to the
Revenue Dept with
refce to G.O No. 1016,
dated 11th Septr 85
for the issue of the
necessary orders.

D.M.C.
6/11/85

U.
6.11.85

Revenue Dept.

S. E. IV Circle

with Copy of G.O No. 2388 W
dated 18th Oct/85 returned

28-11-85

From,

The Offg: Supg Engineer,
IV Circle

Dated 2
Recd 5
Despatched
} November 1885

No. 443
E. W.

Enclosure. 1.

No. 2723 W. dt. Nov. 13. 1885.

Administration Report
on Govt. Cinchona
Plantation for 1884-85.

Forwards in original letter
No. 1985 of 29th October/85
from the Exec: Engr: Nilgiris
offering certain observations
on rainfall noted in —
and requests to obtain
necessary orders for test-
-ing the Rain guages of
both the Departments.

REVENUE DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read Progs. of the P. W. D.
dt 13th Nov: 1885, No. 2723 W, com-
municating letter from the Executive
Engr., Nilgiri Dn., for the issue of
necessary orders for testing the rain-
gauges maintained by the Collector
and the Dir. of Govt. Cinchona Plantations,
at Naduvattam.

Order thereon, 23rd Nov: 1885, No. 6495.

The figures for 1882-83 and 1883-84
quoted by the Executive Engineer
from the annual repots of the Director,
Government Cinchona Plantations, refer
to Dodabetta and not to Naduvatam.
The figures for the latter are 194·93
and 102·06 inches respectively. But
even these show differences compared
with the Collector's figures quoted by
the Executive Engineer.

2. A

From

The Executive Engineer

Nilgiri Division.

PUBLIC ENGINEER'S OFFICE
No. 880-Nil
31 OCT. 85
P.W.D.
NILGIRI CIRCLE

To

THE SUPERINTENDING ENGINEER

FOURTH CIRCLE

COIMBATORE.

Dated 28th
Despatched 29th October 1885.
Received

No. 1985

Enclosures. 1

Subject.

Govt. Cinchona Plantation Administration Report on — for 1884/85 — rainfall noted in — Offers certain observations on.

2. The circumstance that the figures given by the Director are for the Official and those of the Collector for the Calendar year does not seem of much consequence as there is usually little or no rain between January and March-

3. I pray consequently suggest the advisability of the Rain Gauges maintained by both the Departments being tested.

I have the honorable
Sir
Your most obed. Servant.

A Smith Major R.E.
Executive Engineer.

No 443
E.V.

Forwarded to the Chief Engineer P.W.D. with a request that he will be so good as to obtain necessary orders for testing the Rain Gauges of both the Departments.

Coimbatore
2d Novr/85

P.W. Thompson Col: R.E
Offg Supt: Engineer IV Circle

No. 1985

N. B.—Please quote the number and date of this letter in any future communication on the subject.

Enclosures.

NILGIRI DIVISION OFFICE
STATION. Wellington
28 October 1885.

From

The Executive Engineer,
Nilgiri Division.

To

THE SUPERINTENDING ENGINEER
FOURTH CIRCLE
COIMBATORE.

SIR,

In returning herewith G. O. No 2388 of 13th October 1885, passing Orders on the Administration Report of Government Chona Plantations for 1884/85 received with your endorsement No. 650/N.I of 19th idem, I have the honor to inform you that I notice a large discrepancy in the Statement of Rainfall at Naduvattam as registered by the Collector and the Director Government Cinchona Plantation for the past 3 years as noted below.

Years	By Collector	By Director	Difference
1882-83	189.25	61.35	127.90
1883-84	99.09	51.49	47.60
1884-85	93.12	92.96	0.16
Total	381.46	205.80	175.66

Order thereon No: 2388 Rd/13.10.85

Communicated
to S. E. IV Circle
for information
18/9/ JJ.

Govt. of {1885} Madras.

REVENUE.

Issued

Recd. Encl.

G.O., 11th September 1885, No. 1016.

Rno: 2388 Rr dy/13th Oct /85.

SEPTEMBER.

Government Cinchona Plantations.

Report on the — for 1884-85, reviewed.

S. Engr IV Cir
Ex P.W. Ats

No. II.—STATEMENT showing the receipts and charges on account of the Government Cinchona Plantations, Nilgiris, for 1884-85 calculated in accordance with orders of the Secretary of State (*vide* G.O., No. 1163, dated 23rd October 1882).

	RS.	A.	P.		RS.	A.	P.
To value of stock on 31st March 1884 of 92,526 lb., at 8 annas 2·402 pies per pound	47,420	8	7	By value of stock on 31st March 1885 of 1,225,663 lb., at 11 annas 6·646 pies per pound...	90,743	1	4
To establishment and working	85,221	14	8	By value of 25,681 lb. of bark at cost price awaiting disposal in England ...	18,544	10	0
Profit on the year's working.	62,474	7	6	By value of 2,000 lb. of bark supplied to Dr. Cleaver ...	933	12	0
				By value of 81,880 lb. of bark sold locally	82,344	2	0
				By value of 1,000 lb. of bark supplied to Bombay Medical Department ...	1,007	8	0
				By sale-proceeds of seed ...	1,033	2	0
				By miscellaneous receipts ...	510	11	5
Total ...	1,95,116	14	9	Total ...	1,95,116	14	9

In 1884-85 the cost price of 1 lb. of bark is 11 annas 6·646 pies per pound, *i.e.*, Rs. 85,221-14-8, expenditure ÷ 118,017 lb. of bark, the crop of the year.

Exd. W. J. Lewis.

150 Copies

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—the following letter from M. A. LAWSON, Esq., Director, Government Cinchona Plantations, Parks and Gardens, Nílgiris, to the Secretary to Government, Revenue Department, dated Ootacamund, 9th July 1885, No. 28 :—

I have the honor to forward the Administration Report on the Government Cinchona Plantations, Nílgiris—viz., Dodabetta, Naduvatam, Hooker and Wood—for the official year 1884-85.

2. In accordance with the observations made in paragraph 14 of G.O., dated 17th September 1884, No. 1050, Revenue, the number of statements accompanying the "Report" have been reduced from 17 to 9.

3. SEASON AND RAINFALL—(*a*) *Dodabetta.*—Taken altogether the season was not unfavorable for carrying on the general work of the estate. The total amount of rain registered during the year was 61·20 inches, and was spread over 123 days, but of this quantity more than half, or 31·77 inches, fell during the two months of October and November. The early part of the year was unusually dry, and until the end of April, hardly any rain fell. In both May and June 5·0 inches were recorded, but the greater portion of this fell in a very short space of time, during one or two violent thunderstorms. The result of these heavy showers, falling upon the dusty earth, especially on the steeper slopes, was that the water ran off before it had time to sink into the ground beyond a few inches. July, again, was an exceedingly dry month, 1·87 inches only being recorded, and it was not till the end of August that the earth was sufficiently wetted to begin planting. In this month, 6·39 inches were spread over 20 days. The following month of September was very droughty and some of the plants which had been put out in the end of August died in consequence. October and November, however, were, as I have already mentioned, most unusually rainy, and the ground was thoroughly soaked and our failing springs re-established. Some damage was done on the steeper slopes through the earth being washed away; also in one of the ravines, two hundred trees or more were destroyed by some large rocks which were undermined, and on being dislodged from their site, crashed through a portion of the plantation immediately below them. The trees thus destroyed were some of the finest on the estate. After this heavy burst of rain, the weather continued propitious till the end of December, so that all the plants which had been put out were well established, and able to withstand the prolonged drought of the next five months.

(*b*) *Naduvatam.*—The rainfall on this estate for the past year was 92·96 inches, and was spread over 141 days. The earlier months of April and May received 3 and 4 inches respectively, and in June 7·34 inches fell. This saturated the ground, so that the planting, of which a very great deal had to be done, was commenced as early as possible. In July, 19·38 inches of rain fell, but at the same time this rain was accompanied with such violent storms of wind that the whole of the June planting, at least all those portions of it which lay at all exposed to the south-west, were destroyed and

had to be replanted later on in the season. After this the weather continued normal till the end of December. A large portion of the planting was not completed till the end of November, and I greatly feared that the plants would not be sufficiently established before the rains ceased, to be able to withstand the dry weather of the ensuing spring. However, to give them the best chance of prospering, I had them all doubled ferned, and I am glad to be able to report now, after having received our first spring showers, that they have survived, and are beginning to grow. Of the 14·80 inches which were recorded in October, no less than 11·0 inches fell in about thirty hours. Of course such a continuous downpour necessarily caused some wash, but owing to the ground being well covered with weeds, the damage done was comparatively trifling.

(*c*) *Hooker.*—The rainfall recorded on this estate for the past official year was 104·27 inches and was spread over 136 days. The weather throughout the year was favorable for all kinds of work, and great strides were made in the restoration of this plantation. The extensive new plantings and renewals are all doing well.

(*d*) *Wood.*—The total amount of rain which fell on this estate during the past year was 86·06 inches and was spread over 139 days. So far as the season was concerned, nothing further could have been wished for.

4. RECEIPTS AND EXPENDITURE—(*a*) *Receipts.*—The revised estimate of receipts for the past year (*vide* G.O., dated 8th November 1884, No. 1229, Revenue), was Rs. 45,900. The actual amount realized has been Rs. 84,895. The difference between the estimated and actual receipts, viz., Rs. 38,995, has been due partly to a larger quantity of bark being sold by auction in Madras than was originally intended. 81,880 lb. were sold instead of 60,000 lb., partly owing to a larger proportion of the more costly crown as compared with the cheaper red barks being sold than was originally proposed, and partly due to a slight recovery in the prices realized. Statement No. 7 shows the rise and fall in the prices which have been offered for the different kinds of Government barks at the auction sales in Madras since December 1883. The receipts on account of the sale of cinchona seed and plants amounted to Rs. 1,033 as against the estimate of Rs. 700. Again, under Miscellaneous items, Rs. 510 were realized as against the estimate of Rs. 50. This increase under the latter head was due chiefly to a market being found for the stems of the trees which were coppiced the year before on the Dodabetta estate.

(*b*) *Expenditure.*—The budget allotment for the working and other charges of the department was Rs. 91,245 (*vide* G.O., dated 8th November 1884, No. 1229, Revenue, paragraph 8). This included the sum of Rs. 2,100 for the pay for six months for the Government Quinologist. The actual expenditure has been Rs. 87,903 or Rs. 3,342 less than the budget allotment. Certain unexpected charges have, however, been paid out of the allotment, which altogether amounted to Rs. 9,535. But for these, therefore, the savings would have amounted to Rs. 12,877. These unexpected charges were partly those connected with the establishment of the Quinologist's Department, which altogether amounted to Rs. 6,853, and partly to an old English debt of Rs. 2,681, which had been contracted in the year 1882 for the manufacture of bark into febrifuge.

5. PERMANENT PLANTATION—(*a*) *Dodabetta.*—The trees on this estate, taken altogether, are in a fair condition. Those parts of the plantation, the trees on which I stated in my report of last year to be past their prime, have been coppiced and interplanted. The coppiced stumps have already nearly all of them thrown out shoots, and the inter-planting is also doing well. For fear of denudation of the soil taking place during the heavy spring rains and before the ground would be covered with weeds, I had a number of brushwood revetments made on all the steeper slopes where the trees had been cut down. The following table shows the number of trees which were growing in the "Permanent Plantation" on the 31st of March last to be 633,487 :—

Number of Trees on 31st March 1884.	Number of Trees uprooted.	Number of Trees coppiced.	Number of Trees planted out.	Number of Trees on 31st March 1885.
489,305	200	5,618	150,000	633,487

(*b*) *Naduvatam.*—This estate is improving, but it will be many years before it again arrives at its former state of perfection. The plantings of 1882 and 1883 look remarkably well. This is due to their having been liberally manured. The stumps of the trees which were coppiced the year before last, as also those which were dealt with in a similar manner last year, have thrown up shoots most satisfactorily and I shall therefore continue to coppice small portions of the estate year by year, whenever the trees show signs of having past their prime. The accompanying table professes to show the number of trees growing at the present time on the estate, but it must be pointed out that the table credits the plantation with all the plants put out during the year, whereas the June and July failures ought to be deducted. Unfortunately, owing to gross irregularities which began to take place in the management of the estate about this time, the number of these failures have not been recorded :—

Number of Trees on 31st March 1884.	Number of Trees uprooted.	Number of Trees coppiced.	Number of Trees planted out.	Number of Trees on 31st March 1885.
298,610	5,052	1,837	140,370	432,091

About 400 plants of *Cinchona Carthagena* have now been put out in a plot of ground near the drying sheds. They are growing well and seem to prefer the climate of Naduvatam to that of Dodabetta. Some of the older plants flowered for the first time both at Naduvatam and in Sim's Park at Coonoor.

The single remaining specimen of *Cinchona Santa Fe*, which I reported last year to have been saved from death by Mr. Jamieson, was planted out last January in a plot adjoining the *C. Carthagenas*. It is perfectly healthy and has grown considerably since it was planted out. Besides this specimen, I have a dozen others in the propagating house in the Government Gardens, all or most of which will, I hope, be sufficiently advanced to admit of their being planted out before the end of the season. These dozen are cuttings from the original plant; the largest of them is only about four inches high though nearly two years old. They have been most difficult to raise, and have required the greatest possible care and attention.

I propose grouping together in this part of the estate all the different species and the more strongly marked varieties of cinchona which have been grown in Southern India, in order that those who take an interest in the history of the introduction of the cinchona into this country may have an opportunity of studying the different kinds side by side. Again, because many of the species so freely hybridize, the plants which I propose to establish here have all of them been raised from cuttings which have been taken from the trees originally introduced by Mr. Clements Markham and others.

It will be convenient to mention here that Mr. Jamieson has raised from the seed sent by Mr. T. Thiselton Dyer from Kew about 200 healthy plants of the *Remijia*, which yields the *Cuprea* bark. These I shall, before the end of the season, plant out also at Naduvatam.

(*c*) *Hooker.*—Great advances have been made during the past year in the renovation of this estate. Large tracts have been cleared of the worthless trees which were growing upon it, and replanted. The ground has been deeply tilled, and all the young trees have been manured. The accompanying table shows the amount of planting which has been done during the past year :—

Number of Trees on 31st March 1884.	Number of Trees uprooted.	Number of Trees coppiced.	Number of Trees planted out.	Number of Trees on 31st March 1885.
334,851	2,685	...	223,000	555,166

(*d*) *Wood.*—The condition of this estate I can only characterize as being increasingly miserable. The planting which was done in the early part of the year was disgraceful. That which was carried out during the latter months under different auspices was good, but whether good or bad nearly all the plants have been destroyed by the ravages, which

have been committed by the pestilent sambur. I have ordered at a cost of Rs. 601-11-6 barbed wire, with which to entirely fence the estate, as I have found that trying to shoot the sambur down is of little avail; for as fast as one is shot another takes its place. Mr. Rhodes Morgan, Deputy Conservator of Forests in the Southern Circle, who has spent much time in patiently investigating the habits of these pests, informs me that the sambur is migratory, and that there is a constant stream of them passing at one time of the year from the plains to the hills, and at another time of the year from the hills to the plains. This, if correct, fully explains why there is no apparent decrease in their number notwithstanding the assiduity of the Government shikari.

I append no table to show the number of trees growing upon this estate, as, owing to the evil circumstances which have attended all planting operations, no accurate calculation is possible. I can only hope that next year, after the barbed fence has been put up, I may be able to give a more favorable report.

6. Upkeep.—The weeding at proper times, deep tilling, the maintenance of the roadways, clearance of drains, &c., have been thoroughly well executed on all of the three first plantations. On the Wood estate much is still required to be done in this respect.

7. Manure—(*a*) *Dodabetta.*—The whole of the manure collected during the last year had been used for those plots, which have been more recently planted, so that there was none available for the older trees. I have, however, been able to make arrangements by which the stock of manure will for the future be greatly increased, and next season I hope to have enough to enrich a large portion of the older parts of the estate.

(*b*) *Naduvatam.*—This estate is very badly off for manure and measures will have to be adopted to increase the supply.

(*c*) *Hooker* and (*d*) *Wood.*—Both of these estates are fairly well supplied by the cattle which are brought up by the coolies who work upon the plantations.

The proper storing up of manure has hitherto been sadly neglected, the subordinates on the estates having been utterly ignorant of the first principles upon which this branch of agriculture ought to be conducted. I have, therefore, during the past year paid special attention to this subject. Formerly the daily produce of the cattle sheds was thrown out in loose heaps, where half of the valuable ammoniacal salts, according to the season, were either evaporated or washed away. I have now had pits dug eight feet deep and the produce of the cattle sheds well trodden down when it is put in and, whenever necessary, watered. I have also at Naduvatam, Hooker and Wood, where the rainfall is excessive, put a roof of thatch over the pits. By these means I look to being able to turn out in all seasons exactly the sort of manure I wish to have—that is a short well-rotted compost very rich in ammoniacal salts.

8. Silos.—During the last winter the cattle on the estates fell into a very miserable condition, owing to their not getting a sufficiency of proper food. I have, therefore, put up on the Dodabetta and Wood estates *silos* for the preservation of fodder during the wet season. I have had hitherto no personal experience of *silos*, but it seems to be an established fact that they are most valuable for storing up nutritious food in climates such as obtains on these hills, where herbage is plentiful only at those times when the preservation of it in a dry state would be impossible. I hope I shall be able to report next year that the experiment has proved successful.

9. Nurseries.—Owing to the small demand there is now on the part of the public for cinchona plants, I have reduced the number of nurseries on all the estates to one a piece. This is ample for the requirements of the plantations and will also suffice to accommodate 100,000 of each of the more commonly grown varieties, should a demand for plants again arise. Last year some 1,000,000 seedlings were thrown away as useless.

There is still a small demand for seed, the varieties which were chiefly sought after last year being *C. succirubra* and *C. pubescens*. A complaint was received a short time ago from a gentleman that an order he had given had not been properly attended to, but upon investigation it turned out to be due to his having been confused by the names *C. pubescens* and *C. robusta*. I therefore give below the nomenclature as understood by this department, with the view of preventing a similar disappointment in the future.

There are two notable species of cinchona, viz.:—

(*a*) *C. succirubra.*
(*b*) *C. officinalis.*

These two species freely hybridize. Some of the hybrids approach more closely to *C. succirubra* while others approach more closely to *C. officinalis.*

C. robusta is the name which has been given by Doctor Trimen to *all* such hybrids.

C. pubescens is the name given on these hills to those hybrids which more closely approach *C. succirubra.* This form thrives best at a moderately low situation and in more sheltered places. It has the light green tender leaf of *C. succirubra* and the same habit of growth, but it is slightly more hardy.

C. magnifolia is the name given to those hybrids which more closely approach *C. officinalis.* This form grows well at high elevations and on exposed and rocky ground. The leaves in its most characteristic form are of a dark, rich glossy green; they are also tough and leathery, which enables it to resist better the evil effect of high winds. In its habit of growth it is similar to *C. succirubra*, but is much more sturdy.

Experiments which I have made on the keeping properties of cinchona seed show that it loses its germinating power if kept several months exposed to the air, but that if the air is excluded, the seed retains its vitality for a considerable time longer.

Perfectly fresh ripe seed ought to be a pale green color, but a short exposure to the air turns this to a dull red. This change is due to the oxidation of the fixed oils which the seed contains in great abundance. This change in color is by no means necessarily indicative of the seed having lost its germinating power.

10. Crop.—The total amount of bark taken from the trees on the estates during the past year was 118,017 lb. Besides this there remained over on 31st March 1884 92,526 lb., making a total of 210,543 lb. as specified in the table given below. Of this quantity 84,880 lb. was disposed of during the year, so that the balance at present in stock is 125,663 lb.:—

Name of Plantation.	Crown Bark.	Red Bark.	Total.
	LB.	LB.	LB.
Dodabetta	99,874	...	99,874
Naduvatam	27,580	45,775	73,355
Hooker	100	14,300	14,400
Wood	900	22,014	22,914
Total ...	128,454	82,089	210,543

11. Buildings and Repairs—*New Works.*—The only new building put up during the year was a set of cooly lines at Naduvatam. These were erected at some distance from the new Bark shed at a cost of Rs. 270-5-7. The smallness of the cost was due to the materials used in building the lines being taken from the old jail which had just before been dismantled.

Repairs.—The usual annual repairs to all the permanent buildings were carried out at a cost of Rs. 1,170-6-2, distributed as follows:—

	Rs.	A.	P.	Rs.	A.	P.
Naduvatam	431	3	9			
Dodabetta	466	6	2			
Hooker	13	6	6			
Wood	259	5	9			
				1,170	6	2

For want of better accommodation, the cattle shed near the jail at Dodabetta was converted into a store-room for bark. At Wood the Overseer's quarters received repairs

which they sadly needed, and the drying shed was done up. At Naduvatam the old drying and packing shed was pulled down as the centre wall had given way and it was thought best to demolish it to prevent further damage.

12. General Remarks—*Staff of Subordinate Officers.*—Great changes have been made during the past year in the staff of subordinate officers employed on the estates and in the head office.

(*a*) *Dodabetta.*—In the early part of the year Mr. T. Narrainasawmi Naidu, Assistant Superintendent of this Plantation, and who for the last twenty years has most worthily carried on the work of the different positions which he has occupied, suddenly fell sick of an acute rheumatism, which necessitated his applying for extended leave. Much as I regretted the loss of his valuable services, I felt bound to comply with his request, and I accordingly granted him furlough for two years, and I appointed Mr. E. Collins, who for some time past had been acting on the estate as Sub-Overseer, to officiate in his stead. In December last, however, owing to the suspension of the Head Overseer of Naduvatam, I transferred Mr. E. Collins to Naduvatam to act in his place, and recalled Mr. T. Narrainasawmi Naidu to officiate again in his former post.

(*b*) *Naduvatam.*—I regret to have to report that very grave cases of dishonesty were brought against Mr. Hillier, the Head Overseer of this estate, and that these charges have been established in a Court of Law. Mr. Hillier was convicted and sentenced to two years' imprisonment. Upon investigation little doubt could be entertained but that several of his subordinates had been in collusion with him, especially *Pudmanaba Naidu* the Sub-Overseer, and whom I have in consequence dismissed from the Government service. His post has been filled up by Sashachullum Naidu formerly acting Sub-Overseer at Dodabetta, and his place at Dodabetta has been filled by Mr. A. McDonald.

(*c*) *Hooker.*—The subordinate officers on the estate remain the same as heretofore.

(*d*) *Wood.*—The Sub-Overseer in charge of this estate at the beginning of last year was Mr. Burrows, but I was so much dissatisfied with the character of his work that I caused him to apply for two years' furlough and, in the meantime, I have put into his place Mr. M. Collins, a brother of Mr. E. Collins, and who for some years back had been acting partly as Storekeeper and partly as Assistant Overseer on the Naduvatam estate.

(*e*) *Head Office.*—The Manager of this office was prosecuted at Coimbatore last February for having participated in the Hillier frauds and was convicted by the judge who tried the case. He was, however, set free on an appeal to the High Court at Madras. Nevertheless I dismissed him from Government service and appointed in his place Mr. Donald Campbell, who had previously been Head Accountant in the Collector's office.

These changes necessarily caused a great deal of confusion in the department for a time, but I am glad to be able to report that they are resulting in an accuracy of recording official matters and in an honesty in transacting estate affairs, which did not exist before.

13. Fuel Supply.—In my last year's report, paragraph 80, I stated that the sholas upon which the estates had hitherto been dependent for fuel were nearly exhausted, and that I proposed replanting the old sholas with *Eucalyptus* and *Acacia melanoxylon.* This was in a great part done, but owing to the unseasonableness of the weather immediately after the planting had been effected, nearly the whole of the trees died out. I do not now intend making any provision for a fresh supply of fuel trees as I have recently learned that the Forest Department will be able to give all that is needed by the estate at a reasonable cost close at hand.

14. Labor.—I am happy to say that I have been able, at last, to do away with the system of paying the maistries on the Naduvatam and Hooker estates a commission on the earnings of the coolies employed. The maistries are now paid fixed salaries only. This alteration has been made possible during the last year only on account of the great decrease which has occurred in the demand for labor in the Wynaad.

15. The Quinologist Department.—Mr. Hooper was appointed last summer by the Secretary of State for India to act as Quinologist. He arrived in Madras last October. He commenced work immediately and within a fortnight of his arrival had so far equipped his laboratory that he was able to begin the analyses of the Government barks. Mr. Hooper has submitted a report on the work he has done during the last half-year. It is full of interesting matter and argues the possession of great professional skill and industry on his part. It will be seen from the report that Mr. Hooper has not confined himself to the study of the cinchona barks only, but that he has also investigated the properties of many other products of economic interest.

One of the first things which Mr. Hooper turned his attention to was the manufacture on a small scale of the liquid extract of cinchona as originally devised by Dr. DeVrij of the Hague. A gallon of this preparation was sent to Dr. Cornish, the Surgeon-General, for experimentation, and just before he left for England Dr. Cornish reported in very favorable terms upon its therapeutic and keeping value. In consequence of this report, Government have ordered Mr. Hooper to produce 1,000 lb. weight of this fluid extract with the view of having it still more fully tested. Mr. Hooper will, therefore, as soon as possible, carry out these instructions in the laboratories connected with the Medical Store Department in Madras.

The advantage of the above-mentioned preparation over other kinds of febrifuge is the great economy and simplicity of its production. So simple, indeed, is the method that any druggist and chemist could, so long as he had a bark of a determined alkaloidal value, make the extract without any difficulty in his own shop.

If the liquid extract continues to hold the high reputation which has been given to it by Dr. Cornish, and I see no reason to doubt its doing so, Government will have at last as cheap a febrifuge as can possibly be turned out.

Dr. Cornish in some sense speaks rather disparagingly of the febrifuge which is manufactured by Government in Northern India. He says that it produces nausea. Mr. Hooper has analyzed samples of the Darjeeling febrifuge and regards it not unfavorably as a drug; and the experience of those who have told me that they have administered it to their servants and others, when on tour in feverish parts of the country, leads me to regard it as much better than it is commonly believed to be, though no doubt it may frequently cause disturbance in particular constitutions when given in large doses. Of course, if it were possible, one would desire to administer nothing but the pure alkaloids; but the great cost of manufacturing these forbids their being used on any large scale, and one must therefore be content with placing within reach of the poorer classes a supposed slightly inferior but much cheaper commodity.

At the request of Messrs. Arbuthnot and Co. of Madras, 2,000 lb. of bark were sent to Calicut to be there manufactured into quinine and febrifuge by their expert, Dr. Cleaver. The results, so far as they have gone, are not very satisfactory; and no account has yet been given of the proportionate amount of the alkaloids which have been extracted from the bark. But I do not see why further experience should not be productive of better results. There can, I think, be now little doubt that the cinchona alkaloids can be isolated as well and much more cheaply in India as in any other part of the world.

16. Maps of Estates.—I enclose three maps showing the amount of planting and coppicing which has been done, since the year 1882, on the Dodabetta, Naduvatam and Hooker estates.

—

Enclosures.

Letter from D. HOOPER, Esq., F.C.S., Government Quinologist, Ootacamund, to the Director, Government Cinchona Plantations, Parks and Gardens, Nilgiris, dated Ootacamund, 6th July 1885.

I have the honor to make the following report on the analytical work conducted in the Government Laboratory for the half-year ending 31st March 1885.

2. I arrived at Madras on the 6th October 1884 and proceeded to Ootacamund. A building had been provided for me, which, after certain adaptations and fixtures made in it, became converted into a moderately efficient laboratory. The chemicals and apparatus which I had used in the special study at The Hague were brought out with me; I was therefore able to commence work about a fortnight after arrival.

3. My appointment was made with a view to advance the practice of cinchona culture at the Government Plantations "by analysing the bark of a very large number of their trees in different stages of their growth, when treated under different systems, and when grown at different altitudes."

4. The periodical sales of bark which are now made by public auction at Madras have been accompanied with analyses of the various samples. In November, 18 samples were reported upon, and for the February and March sales four samples were tested. Of these, 16 were crown and 6 red bark. The percentages of sulphate of quinine in the former were —

Natural, average of	5	analyses	...	3·18
Mossed	3	"	...	4·09
Renewed	4	"	...	4·22
Branch	3	"	...	1·60
Root,	one analysis		...	4·40

The percentages of total alkaloids in the Red barks were Natural 5·10, Mossed 6·87, Renewed 6·81, Branch 4·45, 3·07, Root 8·17.

These analyses were printed and circulated amongst the buyers at the sales, and have enabled a reserve price to be placed on the various lots.

5. With reference to paragraph 62 of your last annual report, Dr. W. R. Cornish, the then Surgeon-General, suggested that a liquid preparation might be made of the red bark, which you say does not command a remunerative price in the market, and the preparation might be similar to those of DeVrij, Schacht, Paul and Umney advertised in the British Medical papers. When in Holland I was conversant with the process for making "Cinchona Liquida" of Dr. J. E. DeVrij, the well-known Quinologist, and had made a sample before Dr. Cornish's suggestion arrived. At his request a further supply of a gallon was made, and this was distributed to various dispensaries in the Presidency, in districts where fever was most prevalent. Such good reports on the efficacy of the liquid extract were sent in by the resident medical officers that a much larger supply was called for. Having no appliances in this station for manufacture on a large scale, in accordance with a Government order, I went to Madras to see if this could be done in the Medical Store Department. After an inspection of the laboratories, I reported that such a quantity as a 1,000 lb. could be made, but a continuous manufacture would seriously interfere with the arrangements of the department. This quantity has now been ordered, and as soon as I have analysed a sample of the mixed powder, I will be prepared to go to Madras and superintend the manufacture of the first batch, which, according to Dr. Cornish's request, shall contain 40 grains of alkaloids to the fluid ounce.

6. When samples are taken for analysis from trees in the Government Cinchona Plantations, I have always endeavored to be present, so that observations as to situation, soil and habit of the trees might be noted. Most of my visits have been to Dodabetta where the Crown barks chiefly grow, but I have also been to Naduvatam, the home of the Red barks, and to the estates of Hooker and Wood at Pykara.

I should like it to be understood that all my analytical results are calculated in percentage on the air-dried barks as they are received.

7. The following table comprises 40 analyses showing the alkaloidal value of the principal species of cinchona growing in Government and other estates :—

—	Quinine.	Cinchonidine.	Quinidine.	Cinchonine.	Amorphous Alkaloids.	Total.
C. officinalis, Natural	2·71	1·28	·18	·45	·55	5·21
Do. Mossed	3·58	1·39	·16	·34	·60	6·07
Do. Renewed	4·11	·90	·13	·20	·60	5·94
C. Humboltiana (crispa) corky bark	2·24	1·55	trace	·49	·90	5·18
C. officinalis, var. angustifolia, Natural ..	3·97	1·32	·12	·12	·87	6·40
Do. do. Mossed ..	5·60	1·41	·33	·04	·97	8·35
Do. do. Renewed ..	4·91	·89	·38	·19	1·14	7·51
C. magnifolia, Natural	2·73	3·48	..	·70	·59	7·50
Do. Mossed	3·21	2·68	..	·21	·67	6·77
Do. Renewed	3·24	1·40	..	·47	·75	5·86
C. pubescens, Natural	3·32	1·93	..	·25	·50	6·00
C. Pitayensis, 12 years old..	2·83	·62	1·31	1·78	·38	6·92
Do. do.	1·86	·51	·89	2·10	·40	5·76
C. Ledgeriana, old tree, narrow leaf, cream-white flower	5·58	1·24	..	·23	·62	7·67
C. Ledgeriana, broad leaf, red flower	2·40	·50	trace	3·17	·91	6·98
Do. narrow leaf, cream-white flower..	3·28	·55	trace	1·85	1·14	6·82
Do. from South Wynaad	8·41	·34	·09	·15	·92	9·91
C. morada, 20 months	1·53	1·13	..	1·16	·96	4·78
C. verde, 20 months	1·32	·90	..	1·16	1·19	4·57

8. *C. officinalis.*—The samples of this species were selected from typical trees growing on the Dodabetta plantations. The analysis of the natural bark is the average of eight analyses made on trees of 22, 19, and 14 years of age, and differing in having broad and narrow leaves. The mossed and renewed are each the average of three analyses made on trees of different ages. As far as these few results go, it appears that, on the whole, the younger trees are superior to the older ones, and the narrow-leaved variety than the broad leaved. The following amounts of quinine were determined in three kinds of crown bark from trees of the same age :—

	Narrow leaf.	Broad leaf.
Natural	2·85	2·95
Mossed	4·03	3·47
Renewed	4·48	3·85

These experiments were repeated on three trees of a younger growth which showed a marked difference in shape of leaf. The trees had been planted in 1869, and coppiced in 1879. The respective barks gave the following percentages of quinine :—

Very Narrow.	Narrow.	Broad.
3·15	2·71	2·44

9. The variety of this species, named *Angustifolia*, some years ago created a widespread interest on account of the extraordinary amount of quinine found in it by Broughton and Howard. The samples were taken from a tree 20 years old ; it was 10 feet high with a circumference of 18 inches. The results of the analysis show its superiority over ordinary crown barks, but in its present condition it appears to have no claim whatever to be a prodigy in cinchona culture.

10. The bark from hybrid trees between *C. officinalis* and *C. succirubra* has received of late a great deal of attention from planters. There are two kinds, named respectively *C. magnifolia* and *C. pubescens*. The first approaches in general appearance the *Officinalis*, and the second very much resembles in growth and shape and size of the leaf the peculiarities of *Succirubra*. But as regards the alkaloidal composition, as far as my analyses have gone, the reverse seems to be the case, for in the alkaloids of the *Magnifolia* bark the cinchonidine predominates as in *Succirubra*, but the *Pubescens* bark forms chiefly quinine, and so exhibits a relation to the *Officinalis*. In the accompanying table, the analyses of the Natural Magnifolia bark is the average of seven analyses made on selected trees at Naduvatam. The chief alkaloids are cinchonidine and quinine, and the totals very often reach as much as 8 per cent. The highest total in a bark, I have met with, was from a hybrid tree grown in the Ouchterlony valley ; it gave on analyses 4·4 per cent. of quinine, the other alkaloids bringing the sum up to 10 per cent. This bark very readily yields more quinine by stripping, mossing and renewing, a fact which is seen in the table where the increase appears to take place at the expense of the cinchonidine. This feature will be observed more distinctly by quoting the analyses of some samples lately received, also grown in the Ouchterlony Valley :—

—	Quinine.	Other Alkaloids.	Total.
Original bark	1·35	5·87	7·22
Once renewed	2·46	4·22	6·68
Twice renewed	3·60	3·99	7·59

11. The analysis of the *Pubescens* was made on a natural tree planted in the year 1865 ; there is a fair amount of total, more than half of which is quinine.

12. The *Pitayensis* bark is characterised by yielding an unusual quantity of the alkaloid quinidine. The first sample is from a tree twelve years old raised from seed brought by Mr. Cross from Pitayo in New Granada ; the second sample had been raised from seeds not from Pitayo, but from a district passed on his return journey. These two varieties will be subjected to further consideration.

13. The analysis of the *Ledgeriana* tree at Naduvatam is fairly representative. The bark, although old, is very thin. This demonstrates from a commercial point of view, that a planter should not only look for a large alkaloid yield, but he should consider a poorer tree producing rapidly a large quantity of bark to be of equal importance to a richer tree producing slowly a very thin bark. The broad and narrow-leaved varieties were from Coonoor and of three years' growth. The cinchonine is so high in each of them that they cannot be regarded as pure types of a Ledger. The Ledger bark from the South Wynaad was an average sample of shavings taken from 21 trees of 5½ years old ; the amount of quinine is equivalent to 11·31 per cent. of the crystallised sulphate ; this is one of the highest results obtained in South India.

14. The samples of *C. morada* and *C. verde* were from young trees grown in the same estate near Calicut. The first was taken from "20 average trees, with a girth of 5½ inches, broad leaf, dark olive green, red midrib, and under surface purple or flesh colored." The second was taken from "20 average trees with a girth of six inches, narrower leaf, color light green, yellowish midrib, and upper surface of the leaf smooth." The analysis and thickness of stem are exceedingly good for such young plants, and these results apparently contradict the unfavorable statements made in certain quarters respecting them.

15. *Complete analysis of a tree.*—In December last a tree of *Cinchona succirubra* growing at Naduvatam was submitted to a thorough examination, in order to discover the distribution of alkaloids in its various parts. The tree was 23 years old and 31 feet high; it had grown in an exposed situation, and had never been barked or mossed. The stem was cut into 11 equal lengths from base to summit. The whole yielded of dry bark—

	LB.	OZ.
Root	2	8
Stem	20	14
Branch	3	2
Twig	1	6
Total ...	27	14
Leaves dried	2	...

A portion of the bark from each length was then examined separately, also samples of the root, branch, twig and leaves.

In the following table the results are recorded; the amount of moisture in each is reduced to the same, so that the whole may be comparable. The first seven are each the mean of two analyses:—

—	Quinine.	Cinchonidine.	Quinidine.	Cinchonine.	Amorphous Alkaloids.	Total.	Ash.
Root Bark	·93	·66	·45	2·09	1·17	5·30	3·25
Stem below ground	·73	1·15	trace.	1·39	·94	4·21	3·88
2nd portion of stem	·66	1·04	..	1·52	·75	3·97	3·42
3rd do. do.	·63	·97	..	1·29	·92	3·81	3·42
4th do. do.	·65	·95	..	1·30	·77	3·67	3·35
5th do. do.	·72	1·00	..	1·21	·78	3·71	3·33
6th do. do.	·75	1·01	..	1·11	·73	3·60	3·20
7th do. do.	·78	1·11	..	1·17	·80	3·86	3·16
8th do. do.	·87	1·23	..	1·13	·82	4·05	3·22
9th do. do.	·97	1·32	..	1·30	·60	4·19	3·31
10th do. do.	·98	1·36	..	1·42	·65	4·41	3·56
11th do. do.	1·01	1·37	..	2·28	·51	5·17	3·83
Branch	·95	1·35	..	2·10	·60	5·00	4·86
Twig	·29	·34	..	·34	2·42	3·39	5·61
Leaves	·23		..	·02	·45	·70	5·74

The table shows that the minimum yield in the stem was in that part at which the branches were given off, and that the smaller and thinner bark of the summit and branches contained more than the thicker bark at the base. The ratio between the quinine and cinchonidine remains constant throughout the stem and branches. The root is an exception to this rule as the quinine is in the ascendant, and as usual is rich in quinidine. The whole examination is a proof that trees when neglected and exposed deteriorate very perceptibly in their alkaloidal value; also that in fast-growing cinchonas a maximum yield of alkaloids is reached at a somewhat early period, and unless the yield is encouraged by removal of the natural bark and renewing under shelter, a decrease of the alkaloids takes place.

16. The effect of sun-light and shade upon the amount of quinine in cinchona bark was the subject of an investigation by my predecessor Mr. John Broughton, but to know if these influences were still at work, and if so, to what extent, the following experiment was made. A tree of *C. pubescens* of twenty years' growth was taken at Naduvatam. It was on the margin of a plot, and so situated that its south side was freely exposed to the sun, the north side was protected and shaded by the other trees in its vicinity. A strip of bark from each side was taken, dried and analysed. The percentage composition was as follows:—

	South.	North.
Quinine	2·63	4·00
Cinchonidine	1·81	2·05
Cinchonine	0·28	0·22
Amorphous	0·50	0·50
Total ...	5·22	6·77

17. *Mossing and Renewing.*—The process of "mossing" has now been adopted in the plantations for about twenty years, and has been most valuable in increasing the amount of alkaloids and especially of quinine in cinchona bark. But whether the system is still successful when applied to older trees under cultivation, appeared to be an important subject for inquiry. The following experiments were made upon trees of *C. officinalis* nearly twenty years old from Plot 12, Dodabetta. Early in October last samples were taken for analysis from three individual trees, as natural, mossed and renewed bark in strips. The trees were respectively covered with moss and labelled, and the samples analysed. After six months interval the trees were again visited and samples taken. The renewals had not sufficiently developed to enable them to be tested, they were very thin and adhered closely to the wood. A portion of the bark which had been under moss six months, and further portions of the mossed and renewed barks were separated. The analyses of the six samples are annexed:—

—	Natural Bark.	Mossed six months.	Mossed Bark.	Mossed six months.	Renewed Bark.	Mossed six months.
Quinine	3·32	4·21	3·98	4·22	3·80	4·33
Cinchonidine	1·65	1·88	1·94	1·77	0·84	0·67
Quinidine	0·24	0·21	0·33	0·30	0·31	0·34
Cinchonine and Amorphous	0·66	1·03	0·91	1·04	0·68	1·52
Total ..	5·87	7·33	7·16	7·33	5·63	6·86

It will be seen that the mossing has improved in each case the three varieties of bark, and the improvement has not only been in the total alkaloid but also in quinine. From the analyses of such a small number of trees it would be injudicious to form too strong an opinion; but I think it shows generally (1) that old and original trees still increase their alkaloids by mossing, (2) that mossed barks are increased by further mossing, (3) that renewals continue to improve.

18. The scales which form on the outside of Ledger barks, and which are readily detached when the sample is dry, have been considered by some planters to be the richest portion. From the sample of Ledger received from the Wynaad, I was able to remove sufficient of the scales to analyse. It afforded quinine 3·16, cinchonidine 0·62, quinidine 0·11, cinchonine 0·06, amorphous alkaloids 0·63; total 4·58 per cent. The analysis is very characteristic of this species, but it will be seen that the total alkaloids only amount to about half the quantity found in the entire bark.

19. *The ash of Cinchona bark.*—In every analysis of bark it has been my custom to determine the amount of ash. The average of over 100 estimations of all the kinds of bark that have come under my notice, I find to be 3·50 per cent. As a rule young and branch barks are the highest, and old barks are lowest in their amount of mineral matter.

20. Besides the work of a quinological nature I have to report on the investigation of some other plant products which you have from time to time forwarded to me. The apparatus and chemicals I have at my disposal are not sufficient to make complete researches into these specimens as I think the nature of the work requires. But as there might be some interest in the work already done, the following notes are given.

21. *Waras.*—The resinous and powdery glands covering the pods of *Flemingia congesta* afford a very permanent dye and much resemble in appearance the Kamala of the Pharmacopœias. A proximate analysis of this substance gave the composition as follows:—

Moisture	3·44
Resins	73·10
Matters soluble in water	8·20
Cellulose	9·60
Volatile oil	trace.
Ash ... ... Total ...	6·03
	100·37

The coloring principle resides in the resin which is soluble in ether, alcohol, benzol, chloroform and caustic soda solution. When a concentrated ethereal solution was allowed to stand for a day it deposited a mass of granular crystals, similar to those discovered by Doctor Anderson in "Kamala" (glands from the fruit of an Euphorbiaceous plant). When the coloring matter of Waras was examined side by side with that of Kamala by means of a spectroscope, the amount of absorption was identical in each case, all the spectrum was darkened throughout except the red end which alone was visible. A dye-bath was made of the Waras, and pieces of cotton, linen, wool and silk were immersed. The color formed was that of a

bright orange-brown, and the tint obtained was much superior in the animal fabrics as silk and wool, than in the vegetable tissues of cotton and linen. In these respects it resembles the dyeing properties of Kamala. As a commercial undertaking, however, it would not be profitable to collect Waras, as the amount obtained from the plants is so small in proportion compared with the yield of Kamala.

22. *The leaves of Erythroxylon Coca.*—The uses to which cocaine has been put in surgery by the Faculty has rendered it desirable to test the amount and nature of alkaloid from plants grown in India. Some leaves which had been carefully dried in the shade from trees in Bariyár have on three occasions been analysed by me. The first sample was examined by Trupheme's method; it yielded ·2 per cent. of an alkaloid which gave no characteristic results in physiological action. The second sample was treated according to Castaing's method and gave about the same amount of alkaloid which produced distinct numbness on the tongue, but Dr. Drake-Brockman of the Eye Infirmary, Madras, reported that it produced a smarting when applied to the mucous surface. A third sample had been tested by Dr. Squibb's process which afforded ·50 per cent. crude alkaloid, and ·30 per cent. cocaine hydrochlorate. This had a very marked numbness on the tongue and has been sent to Dr. Brockman who has kindly promised to report upon its value

23. *Moringa Gum.*—The gummy exudation of the Horse-radish tree (*Moringa pterygosperma*) consists chemically of a large quantity of bassorin or insoluble gum with a small proportion of arabin or the soluble kind and a trace of moringa-tannic acid. It swells up to a remarkable extent when steeped in water, gelatinizes with ferric chloride, gives an abundant precipitate with subacetate of lead, and is soluble in caustic alkalies. In these and other respects it resembles the Gum-Hogg of America. Gum-Hogg is derived from an unknown source and imported from the East Indies; it is used in marbling paper for binding books. It seems not improbable that Moringa gum if not identical with it, could be used for the same purpose in the arts.

24. *The funicles of the Black Wattle* (*Acacia melanoxylon*)—are in the shape of pink contorted bands, and were supposed to contain a dye. They were free from starch and tannin and yielded 6 per cent. of moisture and 2 per cent. of ash. Their chief constituent is an albuminous matter similar to the white of an egg. About 30 per cent. is readily extracted by macerating the funicles in water. When this solution is heated, the albumen coagulates and the pink coloring matter is destroyed. Being of no use as a dye, their peculiar office seems to be that of affording nourishment to the seed.

25. *Deposit from the milky secretion of the Jack fruit* (*Artocarpus integrifolia*).—This was a thick white tenacious substance similar to bird-lime, with no marked odour and taste. It contained 20 per cent. water and the residue burnt with a bright flame giving off a sooty smoke. It was insoluble in water, partly so in alcohol, and entirely in benzol. It was a variety of caoutchouc, and as such would be useful as a bird-lime, and a cement for broken articles.

26. I have lately received a large quantity of indigenous gums, and other vegetable substances for examination. These will be tested whenever an opportunity is afforded, and a report forwarded upon them in due course.

(True Copy.)

(Signed) M. A. LAWSON,
Director.

No. 1.

STATEMENT showing the Rainfall at the several Government Cinchona Plantations, Nílgiris, during the Official Year 1884-85.

Months.	DODABETTA.				NADUVATAM.				HOOKER.				WOOD.			
	For 1883-84.		For 1884-85.		For 1883-84.		For 1884-85.		For 1883-84.		For 1884-85.		For 1883-84.		For 1884-85.	
	Rainfall.	Number of Wet Days.	Rainfall.	Number of Wet Days.	Rainfall.	Number of Wet Days.	Rainfall.	Number of Wet Days.	Rainfall.	Number of Wet Days.	Rainfall.	Number of Wet Days.	Rainfall.	Number of Wet Days.	Rainfall.	Number of Wet Days.
April 1884.	2·72	9	3·59	7	2·45	9	3·37	6	3·95	9	2·85	8	4·28	9	2·79	8
May ,,	7·58	19	5·05	12	3·78	15	3·85	8	3·85	14	5·76	10	3·91	11	8·59	11
June ,,	3·97	14	5·20	14	15·13	27	7·34	18	11·45	25	5·62	15	11·07	23	5·37	14
July ,,	9·35	24	1·87	12	32·48	30	19·38	28	30·23	27	15·63	24	28·24	28	11·42	25
August ,,	6·47	26	6·39	20	27·76	31	30·03	27	22·95	28	33·67	24	21·30	30	19·80	24
September ,,	2·39	7	3·28	10	5·04	13	9·23	24	3·11	12	10·16	22	2·31	9	6·61	22
October ,,	12·63	23	20·09	19	8·89	24	14·80	15	9·46	23	19·63	15	12·19	22	19·72	16
November ,,	2·95	10	11·68	19	3·43	8	2·58	8	4·19	9	5·07	13	5·66	7	6·43	14
December ,,	2·34	5	3·85	8	3·10	5	1·54	5	2·72	5	4·68	3	3·85	7	4·05	3
January 1885.	1·09	3	..	..	..	..	..	..	..	..	..	..	0·45	2	..	..
February ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
March ,,	..	..	0·20	2	..	..	0·84	2	..	..	1·20	2	..	..	1·28	2
Total ..	51·49	140	61·20	123	102·06	162	92·96	141	91·91	152	104·27	136	93·26	148	86·06	139

OOTACAMUND,
9th July 1885.

(Signed) M. A. LAWSON,
Director.

No. 2.

STATEMENT showing the Receipts on account of the Government Cinchona Plantations, Nilgiris, for 1884-85.

Particulars.	Sanctioned and Revised Budget Estimate for 1884-85.	Actuals for 1884-85.
	RS.	RS. A. P.
Value of Bark sent Home	...	...
Do. sold locally	45,000	82,344 2 0
Do. supplied to Bombay Medical Department ...	...	1,007 8 0
Do. supplied to Madras Medical Department ...	150	...
Sale proceeds of seed and plants	700	1,033 2 0
Miscellaneous	50	510 11 5
Total ...	45,900	84,895 7 5

No. 3.

STATEMENT showing the Expenditure of Office and General for the Official Year ending 1884-85.

Months.	SALARIES.			TRAVELLING ALLOWANCE.		CONTINGENCIES.		
	Pay of the Director.	Pay of the Quinologist.	Office Establishment.	For Director.	For Subordinates.	Service Stamps.	Service Telegram.	I (b) Contingencies.
1	2	3	4	5	6	7	8	9
	RS.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
April 1884.	600	..	151 0 0	..	118 8 0	5 0 0	..	18 5 0
May ,,	639	..	150 12 0	135 0 0	..	..	..	..
June ,,	600	..	151 0 0	..	..	10 0 0	2 0 0	18 15 0
July ,,	600	..	151 0 0	84 0 0	..	..	..	4 3 0
August ,,	600	..	151 0 0	..	143 4 0	..	..	..
September ,,	600	..	151 0 0	59 0 0	140 8 0	5 0 0	3 1 0	35 0 0
October ,,	600	..	151 0 0	438 10 8	..	..	..	..
November ,,	600	676 10 8	151 0 0	..	80 0 0	20 0 0	5 14 0	9 0 0
December ,,	600	350 0 0	151 0 0	..	..	..	..	..
January 1885.	600	350 0 0	151 0 0	199 0 0	..	..	4 0 0	9 12 6
February ,,	600	350 0 0	51 0 0	207 0 0	60 0 0	..	..	..
March ,,	600	350 0 0	51 0 0	..	41 12 6	15 0 0	6 0 0	25 6 9
Total ..	7,239	2,076 10 8	1,611 12 0	1,122 10 8	584 0 6	55 0 0	20 15 0	120 10 3

Months.	CONTINGENCIES—(*Continued*).		UNFORESEEN CHARGES.		CARRIAGE OF CROP.		Amounts communicated by the Accountant-General.	Total.
	Printing Charges.	Miscellaneous.	Assessment.	Land and Village Cess.	Gunnies.	Carriage of Bark, &c.		
	10	11	12	13	14	15	16	17
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
April 1884.	..	..	..	..	..	..	..	892 13 0
May ,,	..	..	..	..	..	..	..	924 12 0
June ,,	..	..	..	80 15 7	..	..	..	862 14 7
July ,,	..	..	..	..	1,750 8 0	..	..	2,589 11 0
August ,,	..	..	..	..	..	175 0 0	..	1,069 4 0
September ,,	..	..	118 4 0	..	..	..	..	1,111 13 0
October ,,	..	..	..	..	..	..	..	1,189 10 8
November ,,	..	..	..	..	..	100 0 0	..	1,642 8 8
December ,,	..	..	126 0 0	..	..	..	..	1,227 0 0
January 1885.	9 3 0	466 14 7 39 7 8	..	..	1,426 15 0	..	2,681 6 2	5,937 10 11
February ,,	..	..	..	..	..	..	6,386 12 4	7,654 12 4
March ,,	28 10 2	..	..	161 15 2	..	242 1 0	351 12 5	1,873 10 0
Total ..	37 13 2	506 6 3	244 4 0	242 14 9	3,177 7 0	517 1 0	9,419 14 11	26,976 8 2

OOTACAMUND,
9th July 1885.

(Signed) M. A. LAWSON,
Director.

No. 4.

STATEMENT showing the Expenditure in Detail of the Government Cinchona Plantations, Nilgiris, for 1884-85.

Name of Plantation.	Establishment.	NURSERIES. Propagation.	NURSERIES. Labor.	NURSERIES. Collection of Seed.	NURSERIES. Various.	UPKEEP. Working Charges. Fitting and Planting.	UPKEEP. Working Charges. Weeding.	UPKEEP. Working Charges. Roads and Bridges.	UPKEEP. Manure. Various.	UPKEEP. Manure. Repair of Building.	UPKEEP. Peons' Clothing.	UPKEEP. Firewood Plantation.	Total.
	1	2	3	4	5	6	7	8	9	10	11	12	13
	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.
Naduvatam	2,629 7 0	542 0 0	755 12 7	357 2 0	1,033 13 0	4,602 13 4	3,327 13 8	1,162 7 5	2,835 11 1	431 3 9	25 0 0	814 7 9	25,050 7 8
Dodabetta	3,161 3 2	667 12 0	430 0 0	118 12 6	2,306 14 6	2,554 12 9	2,526 4 0	547 11 3	2,922 12 11	270 5 7			20,530 2 3
Hooker	600 0 0	..	726 9 11	8 0 0	241 15 0	1,354 11 0	1,893 6 9	325 1 6	823 8 11	466 6 2			9,873 0 1
Wood	648 10 8	..	302 13 9	8 0 0	258 8 6	483 12 9	4,249 8 1	160 10 0	957 3 4	13 6 6			5,473 2 8
Total ..	7,039 4 10	1,209 12 0	2,215 4 3	491 14 6	3,841 3 0	97 11 7	647 14 1			259 5 9			
						11,855 0 3	8,635 8 2	2,194 14 2	7,539 4 3	1,440 11 9	25 0 0	814 7 9	60,926 12 8
						17 4 0			6,364 5 5	174 11 6			
										4,491 14 7			

* New cooly lines.

OOTACAMUND,
9th July 1885.

(Signed) M. A. LAWSON,
Director.

No 8.

A.—STATEMENT showing the Total Yield of the Government Cinchona Plantations, Nílgiris, for the Official Year 1884-85.

1	2	3 Bark.													4	5 Propagation.		
		a Under-stripping and Mossing system.			b Uprooting.			c Coppicing.			d Scraping.			Total quantity of Green Bark collected during the Year.	Quantity when dry.	Seed.	a Plants.	b Seedlings.	c Rooted cuttings.
Name of Plantation.	Species of Produce.	No. of Plots.	No. of Trees decorticated.	Outturn of Green Bark.	No. of Plots.	No. of Trees decorticated.	Outturn of Green Bark.	No. of Plots.	No. of Trees decorticated.	Outturn of Green Bark.	No. of Plots.	No. of Trees decorticated.	Outturn of Green Bark.						
				LB.			LB.			LB.			LB.			LB.	NO.	NO.	NO.
Dodabetta	Cinchona Bark	7	27,056	78,366	3	200	2,111	8	5,618	51,725	3	2,042	3,750	135,952	58,803	$116\frac{5}{8}$	240,500	400,000	..
Naduvatam ..	Do.	1	56	246	3	5,052	41,947	4	1,837	28,365	3	9,253	40,858	111,416	38,700	217	194,719	32,500	6,500
Hooker	Do.	..	..	..	2	2,685	33,258	..	..	..	..	..	..	33,258	8,800	..	523,000	121,800	..
Wood	Do.	..	..	..	1	1,222	14,704	4	1,410	15,548	..	..	..	30,252	11,714	..	99,823	..	..
	Total ..	8	27,106	78,612	9	9,159	92,020	16	8,865	95,638	6	11,295	44,608	310,878	118,017	$333\frac{5}{8}$	1,058,042	554,300	6,500
	Add last Balance on 31st March 1884	..	..	..	..	..	..	..	..	..	..	..	..	..	92,526	..	..	..	..
		..	..	..	..	..	..	..	..	..	..	..	..	..	210,543	..	..	..	..

B.—STATEMENT showing the disposal of Bark and other Produce collected in the Government Cinchona Plantations during the Official Year 1884-85.

1	2	3 Bark.								4 Seed.			5 Propagated Plants and Seedlings.					Remarks.
		a Supplied to Dr. Cleaver.		b Sold in the Country.		c Supplied to the Medical Department, &c.		d Total.		a	b	c	a Plants.		b Seedlings.		c Rooted Cuttings.	
Name of Plantation.	Name of Species.	Bales.	Quantity.	Bales.	Quantity.	Bales.	Quantity.	Bales.	Quantity.	Sold to the Public.	Used for Nurseries.	Total.	Sold to Public.	Permanently put up in the Plantations.	Sold to Public.	Transplanted.	Transplanted to Nurseries.	
		NO.	LB.	NO.	LB.	NO.	LB.	NO.	LB.	LB.	LB.	LB.						
Dodabetta ..	Cinchona Bark ..	5	500	615	61,500	5	500	625	62,500	$55\frac{3}{16}$	4	$59\frac{3}{16}$	..	150,000	..	3,000	..	
Naduvatam ..	Do.	5	500	195	19,480	5	500	205	20,480	$195\frac{3}{64}$	14	$209\frac{21}{64}$	..	140,370	..	32,500	6,500	
Hooker	Do.	..	..	..	..	..	..	..	..	..	2	2	..	223,000	..	121,800	..	
Wood	Do.	10	1,000	9	900	..	..	19	1,900	..	..	..	..	45,165	..	..	..	
	Total ..	20	2,000	819	81,880	10	1,000	849	84,880	$251\frac{19}{64}$	20	$271\frac{19}{64}$	..	558,535	..	157,300	6,500	
	Add balance on 31st March 1885	..	..	..	..	..	..	..	125,663	..	..	..	..	..	..	..	..	
		..	..	..	..	..	..	..	210,543	..	..	..	..	..	..	..	..	

OOTACAMUND,
9th July 1885.

(Signed) M. A. LAWSON,
Director.

No. 9.

Statement showing the Receipts and Expenditure of the Government Cinchona Plantations, Nílgiris, during 1884-85.

Name of Plantation.	Receipts.		Expenditure.					
			A. Conservancy and Works.		B. Establishment.		Budget Estimate.	Grand Total.
	Budget Estimate.	Total.	Budget Estimate.	Total.	Budget Estimate.	Total.		
	Rs.	Rs. A. P.	Rs.	Rs. A. P.	Rs.	Rs. A. P.	Rs.	Rs. A. P.
Office and General.	45,900	84,895 7 5	6,350	13,601 9 8	15,112	13,374 14 6	21,462	26,976 8 2
Naduvatam ..	..	..	25,196	22,421 0 8	2,916	2,629 7 0	28,112	25,050 7 8
Dodabetta ..	..	..	23,325	17,368 15 1	3,516	3,161 3 2	26,841	20,530 2 3
Hooker	..	..	7,750	9,273 0 1	600	600 0 0	8,350	9,873 0 1
Wood	..	..	5,640	4,824 8 0	840	648 10 8	6,480	5,473 2 8
Total ..	45,900	84,895 7 5	68,261	67,489 1 6	22,984	20,414 3 4	91,245	87,903 4 10

Ootacamund,
9th July 1885.

(Signed) M. A. LAWSON,
Director.

Read—the following memorandum from the Joint Secretary to Government, Public Works Department, to the Secretary to Government, Revenue Department, dated Ootacamund, 27th July 1885, No. 379-E :—

In reply to memorandum from the Revenue Department, No. 408, dated 17th July 1885, the undersigned has the honor to state that the expenditure incurred from the Provincial Public Works Budget in 1884-85 on account of cinchona buildings in the Nílgiri division was as follows :—

	Rs.	A.	P.
Drying shed and bark store for cinchona plantation at Naduvatam	1,558	14	8
Repairing doors of the new store shed at Naduvatam ...	43	9	0
Total	1,602	7	8

(Signed) J. O. HASTED, Col., R.E.,
Joint Secy. to Govt., P.W.D.

Read—the following letter from Major A. C. SMITH, R.E., Executive Engineer, Nílgiri Division, to the Chief Engineer, Public Works Department, dated Ootacamund, 20th August 1885, No. 1429 :—

In returning herewith your endorsement, No. 472-E, of 17th instant, I have the honor to report that the cinchona buildings at Naduvatam therein referred to were completed in August 1884, and the required completion report with certificate were submitted to the Chief Secretary to Government on the 26th September 1884. The latter was duly returned signed to this office.

No. 494-E.

Forwarded to the Revenue Department with advertence to its memorandum, No. 460, dated 15th August 1885.

Ootacamund,
21st August 1885.

(Signed) J. SHAW-STEWART, Col., R.E.,
Secy. to Govt., P.W.D.

Read—the following letter from M. A. LAWSON, Esq., Director, Government Cinchona Plantations, &c., Nílgiris, to the Secretary to Government, Revenue Department, dated Ootacamund, 22nd August 1885, No. 42 :—

With reference to official memorandum, No. 467, dated the 21st August 1885, Revenue, I have the honor to inform you that the total amount of cinchona bark, which has been given to Mr. Hooper for analyses, has been only a few pounds and the outside value of this will be under Rs. 10.

Read—the following letter from M. A. LAWSON, Esq., Director, Government Cinchona Plantations, Ootacamund, to the Secretary to Government, Revenue Department, dated Ootacamund, 2nd September 1885, No. 44 :—

With reference to official memorandum in the Revenue Department, No. 488, dated the 26th August 1885, I have the honor to forward a statement showing the description, quantity and value of the 20 bales or 2,000 lb. of bark supplied to Dr. E. L. Cleaver under the terms of G.O., No. 5389, of 2nd December 1884.

2. I have calculated the value of the bark after taking the unit of quinine at 5·35 pence, and then deducting 25 per cent.

Enclosure.

Statement showing the Quantity and Value of the Bark supplied to Dr. Cleaver under G.O., No. 5389, dated 2nd December 1884.

Description of Bark.	Number of Bales.	Quantity of Bark.	Number of units of Sulphate of Quinine.	Value per Bale in Rupees at 5·35 per unit.	Value per Bale reduced by 25 per cent.	Total Value.
		lb.		Rs. A. P.	Rs. A. P.	Rs. A. P.
Dodabetta Renewed Crown .	5	500	4·06	109 0 0	81 12 0	408 12 0
Pykara Natural Red ..	5	500	1·56	41 0 0	30 12 0	153 12 0
Naduvatam Branch Red ..	5	500	1·29	31 0 0	23 4 0	116 4 0
Pykara Renewed Red ..	5	500	2·54	68 0 0	51 0 0	255 0 0
Total ..	20	2,000	..	249 0 0	186 12 0	933 12 0

Order—dated 11th September 1885, No. 1016, Revenue.

Miscellaneous.

In the first of the papers read above, the Director of Government Cinchona Plantations, Parks and Gardens, Nílgiris, submits his report on the cinchona plantations for the official year 1884-85 and the report of the Government Quinologist for the latter half of the same year.

2. *State of the Season.*—The season was on the whole not unfavorable, although on the Dodabetta estate some damage resulted in the earlier months of the year from drought and in the months of October and November from unusually heavy rain. At Naduvatam nearly the whole of the June plantings were destroyed by violent winds in the following month, but the damage done was easily repaired later in the season. On the Hooker and Wood estates the weather was all that could be desired.

3. *Condition of the Plantations.*—The plantations on the Dodabetta and Naduvatam estates were generally in fair condition, the trees coppiced last year having thrown up shoots satisfactorily. At Naduvatam the plantings of 1882 and 1883 are described as looking remarkably well, the result of their having been liberally manured. It is presumed that in replanting vacant plots the intention announced last year of confining particular varieties to particular plots has been carefully carried out. In

his present report Mr. Lawson proposes to convert a small portion of the Naduvatam estate into a kind of botanical garden for the use of students by grouping therein all the different species and the principal varieties of cinchona now growing in Southern India. The suggestion commends itself to Government and will be carried out, as proposed, by means of cuttings from the trees originally introduced from South America. It is presumed, however, that the Nílgiri hybrids will also be represented.

4. No mention is made of the plants of *C. Carthagena* planted out in former years at Dodabetta, but it seems clear that the climate does not suit them, and that they do much better at Naduvatam and Coonoor (Sim's Park).

5. The one surviving plant of *C. Santa Fé*, which was removed from Dodabetta to the Government Gardens and subsequently planted out at Naduvatam, has grown considerably and is in perfect health. A dozen cuttings from this plant are now in the propagating house at the Government Gardens, and will, it is hoped, be fit for planting out before the end of the season. About two hundred plants of *Remijia Purdieana*, which yields the *Cuprea* bark, have been raised from the seed received from Kew, and will also be planted out shortly at Naduvatam.

6. The Hooker estate has much improved, but the condition of the Wood estate on the other hand is described as "increasingly miserable." This is ascribed partly to the ravages of the Sambur (*Rusa Aristotelis*), to counteract which it is intended to fence the entire estate with barbed wire, and partly to the inefficiency of the overseer, Mr. Burrows. On the latter point the Government desire to receive a full report. It is observed that Mr. Burrows has been called upon to take two years' furlough, but the Government cannot regard this as a sufficient remedy for proved inefficiency. By a recent order, the Wood and Hooker estates, which have hitherto been supervised by the head overseers of Dodabetta and Naduvatam respectively, have been combined and constituted a separate head overseer's charge. Mr. Burrows' appointment has thus been abolished, and the Government desire to know whether it is intended to retain him in the public service.

7. The development of private plantations and the present depreciation in the value of cinchona bark have together brought about the extinction of the demand which used formerly to exist for plants and seedlings from the Government estates. The Director has therefore reduced the number of nurseries to one for each estate, which will suffice to meet the requirements of the plantations and will also suffice for the growth of seedlings enough to meet any external demand that is likely to arise. Of seed about 251 lb. were sold during the year, realising Rs. 1,033.

8. The drying house and store at Naduvatam commenced by the Public Works Department in 1881-82 were completed during the year under report at a total cost of Rs. 37,893. The only new work carried out departmentally during the year was the construction, at a cost of Rs. 270, of a set of cooly lines from the materials of the old jail recently dismantled.

9. Excluding the Wood estate, for which no accurate return can be furnished, the number of trees standing on the plantations on the 31st March 1884 was 1,122,766. Of these 7,937 were uprooted and 7,455 coppiced, and 513,370 trees were planted in the course of the year. The total number on the 31st March 1885 was thus 1,620,744. The report does not specify the varieties to which the newly-planted trees belonged. Some information on this point seems desirable.

10. *Use of Manures, &c.*—The stock of cattle manure collected during the previous year was utilized as usual during the year under report, but the supply proved insufficient, and arrangements have since been made for the proper storage of a sufficient quantity in the future. No allusion is made in the report to the effect of the artificial manures applied in April 1883. In the report for 1883-84 it was stated that samples of bark had been collected from the trees so treated and would be analysed in due course. The Government desire to know whether this has been done, and, if so, with what result.

11. It is noted that in consequence of the want of grass experienced during the last cold weather the Director has constructed *silos* for the preservation of fodder on

the Dodabetta and Wood estates. The result of the experiment will be watched with interest by the general public, and should be carefully reported. A file of papers on the subject of ensilage will be forwarded to the Director from the Government office.

12. *Crop.*—The crop of the year was 118,017 lb. of dry bark against 183,765 lb. in 1883-84. The high figure in the latter year was due, as was noted at the time, to the unusual amount of coppicing and uprooting that was found to be necessary. Adding the balance remaining over on the 31st March 1884, the total available quantity was 210,543 lb., of which 84,880 lb. were disposed of as marginally noted, leaving a balance in stock of 125,663 lb. Five local sales were held during the year at which 81,880 lb. were sold for Rs. 82,344, the prices realised comparing favorably with those of the English market.

	LB.
Sold by auction in Madras	81,880
Supplied to Bombay Medical Department	1,000
Supplied to Dr. Cleaver for experiment	2,000
Total ...	84,880

13. Towards the close of the year Messrs. Jenkins and Phillips drew the attention of the Right Honorable the Secretary of State for India to an improvement in the English prices of bark. A copy of their letter having been forwarded for the information of this Government, the present policy of local sales was reconsidered with the result that it was decided to continue it as it gives a wholesome stimulus to local trade, while, from a comparison of English and Indian prices, it would seem to entail no loss, at present at least, on the Madras Government. In order, however, to give certainty and stability to the market it was proposed to appoint fixed dates for the sale of bark and to guarantee that for the next two years not less than 70,000 lb. of bark should be offered for sale each year. These proposals were accepted by the Right Honorable the Secretary of State for India, and arrangements have now been made to carry them into effect.

14. *Subordinate Staff.*—In December last the Director reported that extensive defalcations and frauds had been discovered in connection with the Naduvatam estate. The Collector of the Nílgiris was at once directed to institute a thorough inquiry and scrutiny of the accounts with the assistance of Mr. Lawson, whose establishment was not suited for such work. It appeared from the Director's report that Mr. Hillier, the head overseer of the Naduvatam estate, was unable to account satisfactorily for sums received by him on account of the estate, amounting in the aggregate to Rs. 1,605-5-10, and that he had also misappropriated about eighty pieces of corrugated iron, besides timber, window frames, &c., from the materials of the dismantled jail. The result of the Collector's inquiry was that Mr. Hillier was prosecuted for criminal breach of trust as a public servant and sentenced to rigorous imprisonment for two years and a fine of Rs. 155. Sums aggregating Rs. 1,227-7-3 had to be written off the accounts as irrecoverable, while, as regards an outstanding advance of Rs. 242-13-8, a final report is still awaited. The Manager of the Director's office, Venkataratnam Naidu, was also prosecuted for misappropriating Rs. 200, the property of Government, and for accepting an illegal gratification from a contractor. On the first charge he was convicted by the Sessions Court, but was eventually acquitted by the High Court on appeal. A departmental code of rules and forms of account is now under preparation by the Treasury Deputy Collector of the Nílgiris, who has also been requested to undertake the annual audit of the head office accounts.

15. *Manufacture of Quinine, &c.*—Proposals have from time to time been made for the establishment of a private quinine factory in this country. Certain concessions were asked for in regard to fuel and the supply of bark from Government estates, but these the Right Honorable the Secretary of State was not prepared to grant. Certain English capitalists resolved, however, to send out a scientific chemist, Dr. E. L. Cleaver, for the purpose of conducting experiments; and from a letter addressed to Government by Messrs. Arbuthnot and Co. of Madras, it appears that, in consequence of certain experiments made by him at Calicut with 2,000 lb. of bark supplied to him from the Government estates, the gentlemen who sent him out will now in all probability proceed to form a company for the establishment of a private factory.

16. *Quinology.*—The Government note with pleasure the very useful work done since his arrival in this country by Mr. Hooper. His report shows that a satisfactory start has been made in the scientific investigation of cinchona culture and of the conditions which affect its alkaloidal value. During the year under report, however, his attention has been largely devoted to the practical question of manufacturing at a minimum of cost the liquid extract of cinchona devised by Dr. de Vrij of the Hague. A sample of this preparation manufactured under Mr. Hooper's directions has been tested in some of the hospitals with the most satisfactory results, and instructions have been issued for the preparation of 1,000 lb. of the extract in view to further trials. It has been found experimentally that the liquid extract can be produced at a price about 30 per cent. lower than that of the febrifuge obtained from Bengal, and there appear to be good reasons for believing that eventually the cost will be found to be still lower. In view, partly, of this fact, the question of establishing agencies under the Local Fund Boards for the distribution of cheap medicines to the poorer classes has been referred to those Boards for consideration.

17. *Receipts and Expenditure.*—The receipts of the year amounted to Rs. 84,895-7-5 as detailed on the margin against a revised estimate of Rs. 45,900. The bulk of the increase is due partly to the sale of a larger quantity of bark than was anticipated, partly to the inclusion in the lots sold of a larger proportion of crown bark than was at first intended, and partly to a slight recovery in prices. It was expected that some 600 bales would be sold for an average price of Rs. 75 per bale, but eventually 819 bales were disposed of for a fraction over 100 rupees each.

	Rs.	A.	P.
Value of bark sold locally ...	82,344	2	0
Value of bark supplied to Bombay Medical Department...	1,007	8	0
Sale-proceeds of seed, &c. ...	1,033	2	0
Miscellaneous	510	11	5
Total ...	84,895	7	5

18. The expenditure, as reported by the Director, was Rs. 87,903-4-10 against a budget estimate of Rs. 83,800 and a revised estimate of Rs. 91,240. This includes a sum of Rs. 2,681-6-2 adjusted during the year and representing the cost of manufacture of the 393 lb. of febrifuge advised in the Secretary of State's despatch recorded in G.O., No. 705, dated 4th June 1884. Of this amount, however, a sum of Rs. 101-11-1, representing the three latter items noted on the margin, has already been deducted from the receipts of 1883-84 in taking credit for the net value of the 393 lb. of febrifuge. The balance, viz., Rs. 2,579-11-1, should have been deducted at the same time, but was by an oversight omitted from the calculation. The deduction will now be made and the receipts of 1883-84 will then stand at Rs. 85,080-13-2. The charges for the year under report will consequently be reduced by the whole amount, viz., Rs. 2,681-6-2. To the figure thus arrived at must be added the charges (Rs. 1,602-7-8) incurred by the Public Works Department in the construction and repair of cinchona buildings. The whole charges for 1884-85 will thus amount to Rs. 86,824-6-4.

	£.	s.	d.
393 lb. febrifuge at 8*d.* per oz. ...	209	12	0
Packing	4	18	3
Analysis	3	3	0
Labels	0	4	0
Total ...	217	17	3

Equivalent at 1*s.* 7½*d.* per rupee. Rs. 2,681-6-2

19. The tabular statements which accompany the Director's report have been remodelled as directed in G.O., 17th September 1884, No. 1050. It is observed, however, that statement III still shows the expenditure of the head office for each *month* of the year. This is not necessary, a statement of annual charges being alone required, which should be compared with the budget and revised estimates. The Director is requested to report whether it would not be possible in future years to prepare statements, similar to those furnished in connection with the Bengal plantations, showing the number and distribution of the different varieties of plants on the several estates. A comparative statement should, also, be furnished showing the quantity of bark *of the different kinds* in store at the commencement of the year, collected and disposed of during the year, and remaining in store at its close.

20. The statement of capital and revenue account appended shows the financial results of the cinchona enterprise from its commencement to the end of 1884-85. The net result is a surplus of Rs. 5,51,743-4-7. In future the exact amount and value of bark supplied to the Government Quinologist should be reported for inclusion in this statement. A statement is also appended showing the receipts and charges of the year calculated in the manner directed in the Secretary of State's despatch, dated 14th September 1882, No. 31.

(True Extract.)

(Signed) W. WILSON,
Ag. Secretary to Government.

To the Director, Government Cinchona Plantations,
Parks and Gardens, Nilgiris, with file of papers on ensilage.
" Director of Revenue Settlement and Agriculture.
" Board of Revenue.
" Accountant-General.
" Public Works Department.
" Financial Department.
" Military Department.
" Surgeon-General with the Government of Madras.
" Superintendent, Government Central Museum.
" Honorary Secretary, Agri-Horticultural Society.

No. I.

STATEMENT showing the Capital and Revenue Account of the Government Cinchona Plantations, Nilgiris, from the commencement up to the Official Year 1884-85.

Year.	Charges.					
	Establishment including Superintendent's Salary.	Building and Plant.	Working Charges.		Total.	Total outlay to end of Year.
			Departmental Labor.	Convict Labor.		
1	2	3	4	5	6	7
	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	4,821 15 0
1861-62	..	..	22,914 15 4	..	22,914 15 4	27,736 14 4
1862-63	..	..	48,390 0 0	..	48,390 0 0	76,126 14 4
1863-64	12,726 14 7	..	53,173 9 2	..	65,900 7 9	1,42,027 6 1
1864-65	24,444 8 11	..	59,666 12 0	..	84,111 4 11	2,26,138 11 0
1865-66	25,449 14 0	3,700 0 0	68,887 5 0	..	88,037 3 0	3,14,175 14 0
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
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
1868-69	25,674 7 10	2,030 0 0	30,636 1 0	48,666 10 8	1,07,004 3 6	6,69,957 2 1
1869-70	25,783 5 4	5,334 5 8	19,163 0 0	..	50,280 11 0	7,20,237 13 1
1870-71	23,730 5 4	300 0 0	6,143 0 0	..	30,173 5 4	7,50,411 2 5
1871-72	17,157 5 4	3,250 0 0	13,160 4 9	..	33,567 10 1	7,83,978 12 6
1872-73	12,724 0 0	550 0 0	16,441 0 0	..	29,715 0 0	8,13,693 12 6
1873-74	12,574 0 0	2,758 0 0	15,091 14 0	..	30,423 14 0	8,44,117 10 6
1874-75	16,406 8 0	1,700 0 0	17,417 0 0	..	35,523 8 0	8,79,641 2 6
1875-76	17,234 0 0	1,550 0 0	27,423 0 0	..	46,207 0 0	9,25,848 2 6
1876-77	8,064 5 4	6,715 8 11	44,850 3 0	..	59,630 1 3	9,85,478 3 9
1877-78	8,061 5 4	5,468 13 8	56,241 10 3	..	69,771 13 3	10,55,250 1 0
1878-79	9,637 2 8	10,090 14 1	53,954 10 8	..	73,682 11 5	11,28,932 12 5
1879-80	10,092 0 0	6,537 4 9	63,095 0 3	..	79,724 5 0	12,08,657 1 5
1880-81	11,879 1 0	11,367 0 4	72,858 15 3	..	96,105 0 7	13,04,762 2 0
1881-82	16,375 14 6	6,278 4 9	90,921 2 1	..	1,13,575 5 4	14,18,337 7 4
1882-83	15,094 14 1	32,247 11 5	50,049 11 5	..	1,06,392 4 11	15,24,729 12 3
1883-84	20,083 7 5	35,348 14 5	69,128 8 6	..	1,24,560 14 4	16,49,290 10 7
1884-85	20,413 3 4	6,220 10 5	60,190 8 7	..	86,824 6 4	17,36,115 0 11
Total ..	3,83,494 7 11	1,47,072 8 5	10,59,548 0 7	1,46,000 0 0	17,36,115 0 11	..

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.
	8	9
	Rs. A. P.	Rs. A. P.
1860-61	108 7 11	4,930 6 11
1861-62	732 9 2	23,647 8 6
1862-63	2,336 15 0	50,726 15 0
1863-64	4,908 7 7	70,808 15 4
1864-65	8,283 11 9	92,395 0 8
1865-66	12,157 1 4	1,00,194 4 4
1866-67	17,020 12 6	1,45,148 1 0
1867-68	22,618 3 6	1,43,267 15 7
1868-69	27,740 7 8	1,34,744 11 2
1869-70	31,279 6 2	81,560 1 2
1870-71	33,089 9 8	63,262 15 0
1871-72	34,523 12 5	68,091 6 6
1872-73	35,947 10 2	65,662 10 2
1873-74	37,300 12 2	67,724 10 2
1874-75	38,784 9 2	74,308 1 2
1875-76	40,623 8 3	86,830 8 3
1876-77	43,004 13 6	1,02,634 14 9
1877-78	45,916 6 3	1,15,688 3 6
1878-79	49,144 1 10	1,22,826 13 3
1879-80	52,595 12 4	1,32,320 1 4
1880-81	56,551 14 11	1,52,656 15 6
1881-82	61,269 11 11	1,74,845 1 3
1882-83	66,219 0 3	1,72,611 5 2
1883-84	71,415 7 4	1,95,976 5 8
1884-85	76,171 10 0	1,62,996 0 4
	8,69,744 14 9	26,05,859 15 8

Statement showing the Capital and Revenue Account of the Government Cinchona Plantations, Nilgiris, &c.—(*Continued*).

Years.	Receipts.				Net Revenue (Difference between Columns 9 and 13).	
	Value of Bark supplied to Quinologist, or for experimental purposes.	Value of Bark sent to England, sold or supplied to other Governments or Departments.	Sale of Plants, Seeds, &c.	Total.	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 9 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
Total ..	62,873 4 4	30,24,548 10 9	70,181 5 2	31,57,603 4 3	5,51,743 4 7	..

No. II.—STATEMENT showing the receipts and charges on account of the Government Cinchona Plantations, Nilgiris, for 1884-85 calculated in accordance with orders of the Secretary of State (*vide* G.O., No. 1163, dated 23rd October 1882).

	Rs.	A.	P.		Rs.	A.	P.
To value of stock on 31st March 1884 of 92,526 lb., at 8 annas 2·402 pies per pound	47,420	8	7	By value of stock on 31st March 1885 of 1,225,663 lb., at 11 annas 6·646 pies per pound...	90,743	1	4
To establishment and working	85,221	14	8	By value of 25,681 lb. of bark at cost price awaiting disposal in England ...	18,544	10	0
Profit on the year's working.	62,474	7	6	By value of 2,000 lb. of bark supplied to Dr. Cleaver ...	933	12	0
				By value of 81,880 lb. of bark sold locally	82,344	2	0
				By value of 1,000 lb. of bark supplied to Bombay Medical Department ...	1,007	8	0
				By sale-proceeds of seed ...	1,033	2	0
				By miscellaneous receipts ...	510	11	5
Total ...	1,95,116	14	9	Total ...	1,95,116	14	9

In 1884-85 the cost price of 1 lb. of bark is 11 annas 6·646 pies per pound, *i.e.*, Rs. 85,221-14-8, expenditure ÷ 118,017 lb. of bark, the crop of the year.

Exd. W. J. Lewis.

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