

(1) Number of pages

96

(2) Date of repair

7-2-38

(3) Initials of the Referencer

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MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No.

463

Press
Mis.

Dated

24.2.1879.

Not to be folded or roughly handled

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

24th February 1879, No. 463.

Read the following papers :—

No. 483. From R. W. BARLOW, Esq., Acting Commissioner, Nilgiris, to C. G. MASTER, Esq., Secretary to Government, Revenue Department, Ootacamund, dated Ootacamund, 16th July 1878, No. 133.

I HAVE the honor to forward for submission to Government, Captain Campbell Walker's report on the Cinchona plantations, received by me on the 10th instant, and retained for a few days to show to the members of the Cinchona Committee; but, as I learnt yesterday that Government require it emergently, I forward it at once.

2. The report itself will be carefully considered by the Cinchona Committee now sitting, and I abstain therefore from any remarks at present. The question of a special officer, however, to be in charge of Cinchona plantations under the Commissioner or Conservator of Forests, for some time to come, may possibly be taken up by Government at once. I beg, therefore, to submit that I very strongly support the proposal that some duly qualified officer may be appointed as recommended by Captain Campbell Walker at pages 130, 131 and 132, head "System recommended" of this manuscript report.

ENCLOSURE No. 1.

REPORT from Captain C. Walker on the Government Cinchona Plantations on the Nilgiris, dated 10th July 1878.

No. 484. From R. W. BARLOW, Esq., Commissioner, Nilgiris, to C. G. MASTER, Esq., Secretary to Government, Revenue Department, Ootacamund, dated Ootacamund, 15th October 1878, No. 136.

I HAVE the honor to submit by the bearer the report of the Cinchona Committee appointed by G.O., No. 830, of the 1st June last.

ENCLOSURE No. 2.

REPORT from the President and Members of the Cinchona Committee, dated 31st August 1878.

No. 485. ORDER THEREON, 24th February 1879, No. 463.

Miscellaneous.

THE Government have now before them the report of Captain Campbell Walker who inspected the Cinchona plantations early in the year 1878, and the report of the Cinchona Committee whose investigations were carried on during July and August with the valuable assistance of Dr. King, Superintendent of the Botanical Gardens, Calcutta, and Government Cinchona Plantations in Bengal.

2. *The Plantations.*—Captain Walker devotes fifteen pages of his report to a history of the enterprise and the circumstances under which the Ootacamund, Neddivattum, Pykara and Maikkonda estates were formed, and the last was abandoned. All the facts are known to Government, and there seems nothing therein requiring remark.

3. This section of the report includes a financial statement of the capital account which it is proposed to close at the end of 1875-76, but a revised statement has since been submitted by the Accountant-General, and a copy having been furnished to the Committee appears in Appendix E, page 51, of their report. In this is included on the credit side a sum of Rs. 61,939-3-4, being the value of the bark supplied to the quinologist. The data for the valuation of this bark were supplied from the Government Office, and are the same as those which were given by the Committee of 1874, and then accepted. The quantity and kind of bark supplied was ascertained from the records and checked by reference to the Commissioner's Office.

4. The rest of the statement has been prepared in accordance with the instructions of Government. The amount under the head "Buildings" is so small as apparently to indicate that this item may not have been always distinguished; but, as a statement of the Government expenditure and the recorded receipts, the return may be accepted. Interest at $4\frac{1}{2}$ per cent. on the yearly balance of charges is included and the result is—

Total charges up to 1875-76	RS.	A.	P.
Receipts	12,96,287	15	11
	1,74,171	0	5
Net charges...	11,22,116	15	6
In 1876-77 the charges were	1,21,371	10	3
And the receipts	4,36,804	14	10
So that the Capital expenditure was by 31st March 1877 reduced to	8,06,683	10	11

In a foot-note to page 3 of their report the Committee note that the bark sent home in 1877-78 has realized £33,231, and that when the charges of the year are paid there will be a balance of upwards of two lakhs to set towards the further diminution of the capital expenditure.

5. *Number and Classification of Trees.*—Captain Walker next reports the area now under cultivation to be by the revised survey 842.92* acres, and the result of his enumeration of the trees in the existing plantations to be 569,031 trees, viz:—

Red Bark	260,837
Crown	305,432
Yellow	552
Grey	1,874
Other species	336

Of these he considers only 450,000 to be fully established, and states that this "is certainly not a sufficient crop, for the area under cultivation being only 530 trees per acre." Captain Walker intimates that his classification is of no accurate scientific value as varieties and hybrids are "classed with the parent whose growth they most resemble." The oldest trees were planted in 1862, and the tallest Red bark was one of that year's planting at Neddivattum, and measured $37\frac{1}{2}$ feet. The tallest Crown bark was found at Dodabetta. It was planted in 1863 and measured $26\frac{1}{2}$ feet. The greatest girths at $4\frac{1}{2}$ feet from the ground were—Red bark 28 inches and Crown bark $23\frac{3}{4}$, both at Neddivattum.

6. *Present System of Cultivation.*—In regard to the cultivation of estates the present system is considered satisfactory, but there seems to be a danger of "wash" and consequent denudation in some of the steeper parts of Dodabetta.

It is generally agreed that in the original planting the trees were placed too far apart, and that sufficient attention was not paid to renewals or "supplies." The estates do not thus bear as many trees as they might.

7. *Present Condition.*—The present condition of the plantations is not uniform. This is shown to arise—

1. from certain species being grown at elevations or aspects which have proved unsuitable;
2. from Red barks being grown in situations which experience has proved to be exposed to strong winds;
3. from Red barks having been tried in places on grass land.

This want of uniformity is the necessary result of experimental culture, and it is satisfactory to find that Dr. King saw nothing on private estates better than portions of the Neddivattum plantation and very little that could beat "patches of Crown bark at Dodabetta."

8. The Pykara plantations are not favorably spoken of. Parts are much exposed to the south-west monsoon, and being beyond the reach of daily direct supervision, cultivation has suffered. Manuring also has not been attempted there from various causes.

The Wood estate which is cut off from Neddivattum by the Pykara river is the estate that is thought least well of, and its sale is recommended.

9. *Future Prospects.*—The future prospects of the Government plantations are considered by Captain C. Walker to be "most encouraging," and he sees nothing to denote decline of vigor among the healthy trees. Drs. King and Bidie on the other hand noticed even among the best parts of the plantations numerous trees of sickly foliage carrying dead twigs and bearing "an enormous amount of flower and seed." This last they consider a sign of deficiency of health and attribute it to the barking, for it seemed most prevalent where the trees have been barked oftenest.

10. Captain Walker estimates that there are 200,000 trees of the more valuable and 250,000 of the less valuable varieties of Cinchona.

The yield of the former he puts at $\frac{1}{2}$ lb. dry bark, and the yield of the latter at $1\frac{1}{2}$ lb. dry bark per tree per annum.

The former kinds, he remarks, have recently realized an average of 7s. 6d. per lb., and the latter he thinks may safely be valued at 2s. 6d. per lb.

The result is an estimated annual harvest of 391,666 lbs., realizing a gross income of £80,208-5-0.

11. This estimate of yield is considered by the Committee as over sanguine. They remark that "the estates are probably now in full bearing," and they do not think it likely that they will "in their present state yield more than 200,000 lbs. (dry) bark yearly." This view the Government observe is supported by the fact that the harvest of 1877-78 was*

* G.O., 15th November 1878, No. 1,828.

† G.O., 6th January 1879, No. 20.

138,838 lbs., and that of the current year is† expected to be only about 100,000 lbs.

12. *Mossing.*—The present inquiries establish the fact that with care the stripping of the bark under the mossing system can be frequently repeated with all varieties. It is however now found that renewed bark is rarely fit for removal until the third year, and it is then by no means of uniform thickness but fetches a higher price than natural bark.

13. At the time of Captain Walker's inspection harvesting operations were not in progress, but the Committee had the advantage of witnessing them, and the use of the mossing system for a term is recommended.

It is pointed out that the danger lies in the process being persisted in too long; for if a tree is injured or becomes sickly its bark is of little or no value. Drs. King and Bidie think many of the trees on the various plantations are at that stage when to secure a profit from them they should either be cut down or grubbed up.

14. *Coppicing.*—Unbarked trees have been cut down in small numbers at different times, and though the method of coppicing that was followed is condemned

by all it is generally agreed that both Red and Crown barks have been successfully coppiced. An interesting experiment was made by Drs. Bidie and King. A tree that had been coppiced five years ago was grubbed up in order to examine the root development, which was found to be much larger than in the case of two trees of the same planting which had been allowed to grow up but had been barked. It is to be regretted that comparison was not also made by them with the roots of an unbarked or maiden tree.

15. In view of the above results it is suggested that mossing may probably be profitably conducted until a tree shows signs of declining vitality, and that then coppicing should be resorted to. It is however very doubtful whether coppicing will or can be well expected to succeed in the case of trees that have been barked to an extent inducing decay. If not, the trees must be grubbed up and the bark including that of the roots, which is also valuable, be secured before the tree dies.

16. Of the comparative yield under either system pursued separately there is no sufficient evidence nor yet of the value of the bark of shoots from the stool of a coppiced tree.

17. *Future Management*—The Committee and Captain Walker are a like averse to Government abandoning their plantations, and recommend the appointment of a special officer as Superintendent. The former point has already been decided, but the remarks of the Committee (paragraphs 56 and 57) condemning the supposition that Government thus injures or retards private enterprise invite and deserve attention.

18. *Local Manufacture of a Febrifuge*.—In considering the question of the resumption of the local manufacture of a febrifuge that shall be cheap and efficient, the Committee start with the statement that "to produce a cheap manufactured article the raw material must, first, be obtainable at a low price; secondly, the process of manufacture must be inexpensive and exhaustive; lastly, the product must be efficient and economical in use." They then show that the late quinologist's manufactory was a failure because the bark supplied to it was costly and the method of manufacture did not prove exhaustive in practice. They, therefore, endeavor to ascertain what the cost of Nilgiri bark now is, and whether by the light of the experience gained in the manufactory in Bengal, a product that shall exhaust the precious constituents of the bark can be made in India.

19. The first point is settled by means of the Accountant-General's financial statement, and it is demonstrated that, assuming an annual yield of 200,000 lbs. dry bark, its cost after 1878-79 will be about 7 Annas a lb., and that if sold and the proceeds applied to the reduction of capital expenditure, the bark might in a few years "be produced and harvested for something like 4 Annas a lb." This is about the cost of production of Sikkim bark at the present time, and is the reason why the febrifuge there manufactured is sold at so low a price. But though sold cheap it is not, as at present manufactured, an economical product, for only about 50 per cent. of the alkaloids known to be present in the bark have been recovered, whereas 85 to 90 per cent. ought to have been extracted. The loss of febrifuge has therefore in three years been at the lowest computation 7,792 lbs., or in money value at the present price of the febrifuge, Rs. 1,55,840.

20. The quinologist in Bengal admits that imperfect and crude appliances are of no avail, but he estimates that in a proper factory at Calcutta $\frac{2}{3}$ ths of the alkaloids in the bark could be recovered, and that, with bark supplied at $3\frac{1}{2}$ Annas a lb. a febrifuge could be produced at Rs. 11-9-0 per lb. Experience has yet to confirm this anticipation.

21. But there is a further point. The Bengal and Madras barks have different qualities and different commercial values. Sikkim bark contains but a small amount of crystallizable quinine and is therefore of low commercial value. Nilgiri bark on the other hand containing a large proportion of crystallizable quinine is of high commercial value. Quinine is the most effective of all the Cinchona alkaloids, although the others are practically efficient in the cure of ordinary fevers. The Bengal febrifuge may therefore be medicinally as useful as a similar preparation

made from Nilgiri barks would be; but commercially it is of small value, and is now sold at about its real value in the market though the price put on it is determined only by its cost.

A Nilgiri febrifuge if sold at a price similarly determined, would be disposed of much below its commercial value, and the inevitable result would be that it would be bought up for the purpose of resale at its real and materially higher value.

22. The Committee thus show clearly that there is no present probability of the Madras Government being able to work up their bark economically or exhaustively, and that even if it were otherwise the benefits of a cheap febrifuge could not be secured as long as Nilgiri bark (and therefore any preparation from it) is of high commercial value.

23. It has been shown that all the Cinchona alkaloids are, in general practice, of about equal therapeutic value. If therefore the Government wish to utilize their bark to the best advantage this, the Committee point out, will be effected by selling it at the high price which its quinine-yielding qualities command, and with the proceeds buying and distributing the cheaper but sufficiently efficient alkaloids. These also it would be desirable to obtain not in the crude form of the present Bengal febrifuge, which, though undoubtedly efficient, has certain disadvantages (such as want of solubility, unpleasant appearance and taste, and nauseating effects), but as sulphates or crystalline salts which cannot in appearance and taste be distinguished from sulphate of quinine. The Committee show that the cost of a mixture of quinine and these sulphates "in the proportion of the composition of the Bengal febrifuge" would at recent prices have been Rs. 21-0-5 a lb. against Rs. 20 the price of the Bengal febrifuge. By reducing the proportion of quinine which has been unusually expensive, a still cheaper febrifuge could be obtained.

24. Dr. King objects to this suggestion, giving it as his opinion that with an increased demand the price of the (now) cheaper sulphates will rise; but the Committee think otherwise, for the supply of the bark which produces them is very abundant and capable of being increased. Moreover, it may be assumed that the price of quinine will fall either with lessened demand or with that increase in production of the better barks which the spread of Cinchona cultivation in India and Ceylon renders probable.

25. It follows then that the Committee are opposed to the suggestion of the Government of India, for Nilgiri bark being sent to Bengal for manufacture either into a febrifuge or sulphate of quinine. They further point out that the cost of carriage and freight of the bark would probably be nearly as high as to England.

26. Preparations of bark of a simple nature the Committee consider cannot be "economically substituted for the cheaper Cinchona alkaloids of European manufacture." They are, moreover, shown to be unsuitable for general use from various causes connected with their bulk or liability to spoil. Reference is made to the report of the Surgeon-General, Indian Medical Department, on the experiments made by order of Government with the tincture prepared by Mr. J. W. B. Money. "The results," it is said, "are not favorable to the use of such a preparation for public purposes."

27. As the Committee do not recommend the resumption of local manufacture they do not think a quinologist necessary, provided that a Superintendent such as they recommend is placed in charge and permitted to refer to and communicate with "an European chemist of repute."

28. Lastly, the Committee point to the importance of scientific culture and experiment, attention being specially directed to artificial hybridization.

How far this was practised by the late Mr. McIvor is not known, but in the letter quoted by the Committee, he intimated that it had been attempted successfully and that important results might be expected from its prosecution.

Dr. King has a similar belief, but the Committee and he agree that the experiments must extend over many years and be the work of a person "thoroughly trained in the theory and practice of scientific gardening."

29. His Grace the Governor in Council agrees generally with the conclusions of the Committee as above reviewed, which will accordingly be submitted to the Secretary of State with reference to the questions raised as to the retention of the Cinchona plantations, the appointment of a successor to Mr. McIvor, the re-employment of a quinologist, and the resumption of the local manufacture of a febrifuge.

30. In reply to the letter of the Government of India in connection with the same subject, it will be intimated that in view of the facts elicited by the Committee His Grace in Council does not consider it advisable, under existing circumstances, to have Nilgiri Red bark converted into febrifuge or the Crown bark into sulphate of quinine in India.

31. The desirability of obtaining the services of a scientific but yet practical horticulturist, His Grace considers to be fully established.

It will be the duty of this officer on the one hand not only to see that the best results are secured from the existing plantations by bringing to bear his practical acquaintance with the most approved methods of cultivation, but especially to conduct those experiments in hybridization which carefully pursued will, it is hoped, result in the production of valuable varieties that can be remuneratively grown by planters at lower elevations and in varying climates, and thus increase the supply of bark and familiarise the people with its cultivation and uses. In the mean time the management and conduct of the plantations will remain as at present subject to the following remarks.

32. Inspections of the plantations and examination of sections of trees that have been felled after frequent barkings have led His Grace the Governor in Council to entertain serious doubts as to the health of trees that have for any length of time been subjected to the stripping and mossing process. The undue proportion of flower and seed noticed by all observers is, in the opinion of His Grace in Council, more noticeable in the case of barked than of unbarked trees, whether of the Red or Crown bark species, and microscopic examination of sections of the former when felled showed that the cells of the wood had hardened and had assumed the appearance of dry seasoned wood.

33. Under these circumstances and in view of the fact that coppicing has not yet been really tested on the Government plantations, His Grace resolves to direct its being tried on a sufficient scale and with unbarked as well as barked trees. It is especially important to ascertain—

- (1.) Whether barked trees that have been rebarked until signs of decay are perceptible will shoot from stool with any certainty.
- (2.) Whether the young shoots so produced will yield bark of any richness or be comparatively worthless.

The Commissioner of the Nilgiris will accordingly arrange for coppicing experiments at all the plantations. He will bear in mind the defects in the methods hitherto followed in many of the experiments as pointed out by* Captain Walker and Dr. King, and as to extent, cultivation and treatment generally, will conform to the advice of the latter whose valuable opinion in regard to the future working of the plantations as founded on his own experience, is recorded by the Committee. It will be seen that "at

* Page 35, paragraph 61.

least 5 acres should be done in one place," and suitable blocks should be at once selected.

† Pages 33—35.

place," and suitable blocks should be at once selected.

The period most favorable for coppicing is stated to be "when the trees are most at rest," but this is a point on which the Conservator of Forests will be requested to advise Government.

34. In conclusion His Grace in Council desires that the Commissioner of the Nilgiris will convey to the Committee the thanks of Government whose obligation to the Government of Bengal for placing Dr King's services at their disposal, and to that gentleman for the ready and valuable assistance rendered by him, will also be acknowledged.

(True Extract.)

(Signed) J. H. GARSTIN,
Ading Secretary to Government.

To the Commissioner of Nilgiris.
,, the Captain J. C. Walker.
,, the Board of Revenue.

Exd. W. H. French.

REVENUE DEPARTMENT.

Miscellaneous,
Forests.

No. 4 of 1879.

TO THE RIGHT HONORABLE
THE SECRETARY OF STATE FOR INDIA.

MY LORD,—With reference to your Lordship's despatch of the 17th January 1878, remarking on the Annual Report on the Cinchona Plantations for 1875-76, we have the honor to forward herewith a report by Captain C. Walker, who was deputed by us to inspect the plantations and enumerate the trees, and also the report of the Committee which was directed to investigate and advise on the questions raised by your Lordship.

These were, briefly, the retention by Government of the plantations, the appointment of a successor to the late Mr. McIvor, the re-employment of a Quinologist, and the resumption of the local manufacture of a febrifuge.

2. We have already intimated that we are altogether opposed to the general relinquishment of the plantations, and are strengthened in our opinion by the papers now under consideration. We would invite your Lordship's special attention to paragraphs 56, 57, and 66 of the Committee's report. The fact that the action of Government in continuing the enterprise is not injurious to the Indian planter is shown by the increase in Cinchona cultivation in this Presidency and Ceylon—an increase which is due to the assured success of the Government plantations and the prices realised by their bark in the Home market.

3. That success, however, has not been so complete as might have been hoped, for a large proportion of the plants put out on the estates have perished. Captain Walker, after a careful and accurate enumeration, has found but 569,031, whereas according to the computation of the late Mr. McIvor there should have been

1,125,204.* Moreover, only two of the

* Excluding Melkoonda abandoned plantation. Cinchona species have as yet been found

to thrive on the Nilgiris. The varieties

of the *Cinchona calisaya* which are of much higher repute have hitherto failed. Further experiment with the latter is needed, and also in hybridization, and the systematic cultivation of such hybrids as appear to be of value. This subject opens up a wide field for research, and may possibly be the means of extending the cultivation to districts where Cinchonas cannot now be grown. The best method of harvesting the bark is also as yet open to question, and varied experiments on a scale of some magnitude are needed for its satisfactory determination. Investigations of this kind are necessarily too costly and protracted to be undertaken by private persons; and as their aim is to provide the people of India with a febrifuge

Cinchona Plantations.—Reporting and progress of the Cinchona Committee, 1875-76, and the Cinchona Committee, 1876-77, have been carried on during July and August with the assistance of Dr. King.

RECEIVED
NOV. 489—1879.

G.O. 214 February 1879, No. 489.

For the Secretary
to the Committee

THE COMMISSIONER OF NILGIRIS

RECEIVED

1879, 11 (1879) 1879.

Original

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bark of the highest quality, and one that can be abundantly grown by them, they are a fit object for Government experiment.

4. To obtain a sufficient scope for the inquiry it is necessary to retain the plantations with their varied elevation, aspect and rainfall. Moreover, without a considerable annual harvest of bark it would not be possible to meet the requisite expenditure or to defray the interest of the money already sunk and reproduce the capital.

A careful statement of the capital account of the plantations has been prepared by the Accountant-General, and is appended to the Committee's report. This carries the account up to 1876-77, and the figures for the following year having been added by the Committee, the result is to leave a debit balance of about six lakhs of rupees.

5. Assuming that the estates are to be retained by Government, it remains to consider whether their produce should be sent to England or worked up in India, or whether both plans should be followed.

The information now available has forced us to the conclusion that the only course at present advisable is to send the bulk of the bark for sale in the Home market. We are satisfied that this course in no way injures the Indian planter, and that without it it will be impossible to make any approximation to the end in view, viz., the placing of a really cheap and efficient febrifuge within the reach of the people of this country.

6. If the bark is to be worked up in India, it is in the first place necessary to cheapen its production, and next to discover a method of manufacture that shall at a reasonably moderate outlay extract a due proportion of the alkaloids.

The Committee show that so far no such method has been discovered, though the officers in charge of the inquiry in Bengal are sanguine of future success.

7. There is also the further difficulty that if these preliminary obstacles were overcome a febrifuge from Nilgiri bark sold at the lowest price at which it could be produced would be immediately bought up and exported to be resold at the true commercial value of its constituents.

8. We are therefore as yet unable to recommend the resumption of the local manufacture of a febrifuge, and will consequently not require the services of a Quinologist.

9. The Government of India have suggested that we should send bark to Calcutta to be converted into a febrifuge or quinine by the local Quinologist, but, apart from the fact that a satisfactory method of manufacture has still to be found, there are obvious objections to the adoption of their suggestion, such as the cost of transport, &c., which we shall lay before them.

10. In regard to the future management of the plantations we are fully of opinion that it is desirable to appoint a person in succession to the late Mr. McIvor. We also think with the Committee that what is wanted is a scientific but practical horticulturist who shall be capable of working the plantations to the best advantage, and of experimenting, particularly in the direction of careful artificial hybridization, and the modes of propagating the several varieties. In one of his last official communications Mr. McIvor expressed his conviction of the importance of such experiments, and intimated that his experience led him to anticipate the best results. These fruits of his labors unfortunately perished with him, and it becomes all the

more desirable that the inquiry should be started afresh by one trained and experienced in such cultivation and competent to record and act upon the results obtained.

11. We shall therefore be glad if your Lordship will set on foot inquiries for a suitable person at such salary as may be necessary.

12. In regard to the Committee's remarks* as to the more extended use of sulphates of cinchona alkaloids other than quinine, we may here mention, for your Lordship's information, that we have sanctioned the issue by the Medical Department of 50 per cent. of cinchonidine and 25 per cent. of cinchonine against 25 per cent. of quinine. This measure, which will considerably lighten the expenditure in Civil and Military Hospitals, will make the cheaper alkaloids more generally known, and more readily obtainable by the people of the country. We have also directed a further systematic trial of the Sikkim febrifuge.

* Paragraphs 36—48.

Proceedings, Public Department, Nos. 42 and 43, dated 22nd January 1879.

We have the honor to be,

My Lord,

Your Lordship's most obedient, humble servants,

(Signed) W. HUDLESTON.
(„) DAVID F. CARMICHAEL.

FORT ST. GEORGE,
14th March 1879.

Exd. A. F. Goodall.

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* Paragraphs 36—48.

Proceedings, Public Department, Nos. 42 and 43, dated 22nd January 1879.

We have the honor to be,

My Lord,

Your Lordship's most obedient, humble servants,

(Signed) W. HUDLESTON.
(„) DAVID F. CARMICHAEL.

FORT ST. GEORGE,
14th March 1879.

FORT ST. GEORGE.
REVENUE DEPARTMENT.

Miscellaneous.
Forests.

Copy

Letter to the Right Honorable
the Secretary of State for
India.

Dated 14th March,
No. 4 of 1879.

FORWARDING, with observations, reports by
Captain C. Walker and the Cinchona Committee
on matters connected with the Cinchona Plan-
tations, &c.

No. 133

COMMISSIONER'S OFFICE,

Nilgiris, 16th July 1878

FROM R. W. Barlow Esquire
AG. COMMISSIONER, NILGIRIS.

TO C. L. Maiter Esquire
Secretary of Government
Revenue Department
SIR, Nilgiris

I have the honor to forward
for submission to Government, Captain
Campbell Walker's report on the
Cinchona Plantations, received by me
on the 10th instant, and retained for
a few days to show to the members
of the Cinchona Committee, but
as I learnt yesterday that Govern-
ment require it emergently
I forward it at once.

2. The report itself will be
carefully considered by the Cinchona

Committee now sitting, and I abstain
therefore from any remarks at
present. The question of a Special
officer, however, to be in charge
of Cinchona Plantations, under
the Commissioner or Conservator
of Forests, for sometime to come,
may possibly be taken up by
Government at once. I beg, therefore,
to submit that I very strongly
support the proposal that
some duly qualified officer may
be appointed as recommended
by Captain Campbell Waller
at pages 130, 131 and 132, head
"System recommended" of this
manuscript report.

I have the honor to be
Your most obedt^{Sir} servant

M. W. Moore
Commissioner

Page 45
of
copy

No. 136

FROM

R. W. Barclay Esquire
COMMISSIONER, NILGIRIS.

TO

The Secretary to Government
Revenue & Finance Department
Ootacamund

SIR,

I have the honor to sub-
mit by the bearer, the report
of the Church & Committee
appointed by Government
under No. 830 of the 1st June
last.

I have the honor to be,
Sir,

Your most obdt. Servant

M. W. Barclay

Commissioner

Encl.

For the Committee of the Church
of the Nilgiris, Ootacamund, 31 Aug 78

No. 136

Date: 16th July 1878
1878. 15th July 79

Commissioner's Office,
Ootacamund.

To

The Secretary to
Revenue Dept.
Ootacamund

Enclosures. 1/1

Revenue

SUBJECT.

Submitting to Government

the report of the

Church & Committee

appointed by Government

under No. 830 of the 1st June

last.

No. 483

fifteen pages of his report
to a history of the enterprise
and the circumstances under
which the Colacumund, Ma-
divutium, Pylara and Maie
Moonda Estates were formed,
and the last was abandoned.
The facts are known to Govt.

and there seems nothing ~~therein~~
requiring ~~any separate~~
remark ~~upon~~

This section of the report includes
~~concludes with~~ a financial
statement of the Capital ac-
count which it is proposed
to close at the end of 1876/76,
but a revised statement
has since been submitted
by the Accountant General
and

it as I read it
as the Draft ~~of the~~

I did not ~~value~~
until I had read it

that it was only a
Memo for orders - but

subject to the notes -
concerning the same

agree generally
see Memo

requiring ~~any separate~~
note
18/12

21
and a copy having been fur-
nished to the Committee ap-
pears in Appendix E page
51 of their report. In this
is included on the credit side
a sum of Rs 61939-8-4 being
the value of the bark sup-
plied to the Quinologist.
The date of valuation was
supplied from the Govt. Office
It is the same as that given
by the Committee of 1874 &
which were
then accepted. The quan-
tity and kind of bark sup-
plied was ascertained from
the records and checked by
reference to the Commission-
Office. The rest of the statement
has been prepared in accordance
with

and states that this "is cer-
tainly not a sufficient crop
for the area under cultivation
being only 530 trees per acre."

Captain Walker intimates
that his classification is of
^{acoustic} no scientific value as it has
sight of varieties and hybrids
[which] are "classed with the
parent where growth they
most resemble". The oldest trees

were planted in 1862 and
the tallest red bark ^{was one of that year's planting} at Nedravattam and

survived (37 1/2 feet) ~~one of that~~
~~year's planting at Nedravattam~~

where the tallest crown bark
(26 1/2 feet) was found at So-

dabettai. ^{It} was planted
and measured
in 1863. The greatest girth ^{was}
~~either species~~ were at 4 1/2 feet
from

Red bark
from the ground 28 inches and
bark 23 1/4 inches at Nedravattam.
Present system of culti-
vation. In regard to the cul-
tivation of the estates the pre-
sent system is considered

satisfactory but there seems
to be a danger of "wash" ^{and consequent damage} in
some of the steeper parts of
Dodaletta.

It is generally agreed
that in the original plant-
ing the trees were placed
too far apart and that sufficient
attention ^{was} not paid to remove
als or "supplies". The estates do
not thus bear all the trees
they might.

5. Present Condition. The
present condition of the plan-
tations is not uniform.

This

with the instructions of Govt.
 The amount under the head
 buildings is so small that it
 as apparently ~~indicate~~ ^{may} ~~show~~ ^{be taken as} that this item ~~has been~~ ^{has not}
 not always distinguished; but
 as a statement of the Govt. ex-
 penditure and the recorded
 receipts it may be accepted.
 The statement
 includes interest at $4\frac{1}{2}\%$
 on the yearly balance
 of charges. The result is
 Total charges up to
 1875/76 — Rs 12,96,287-15-11
 Receipts — " 17,41,71-0-5
 Net charges — 11,22,116-15-6
 In 1876/77 the charges
 were — 12,13,71-10-3
 and the receipts — 1,36,804-11-10
 so that the Capital
 expenditure was by 31 March 77
 that date reduced to 8,00,683-10-11.
 In a foot note to page 3 of
 their report the Committee
 note

note that the bark sent home
 in 1877/78 has realized £33,231,
 and that when the charges of the
 year are paid there will be a
 balance of upwards of two lacs
 to set towards the diminution
 of the Capital expenditure.

3. Number and Classifi-
cation of trees. Captain
 Walker in his report the area
 now under cultivation to be
 by the revised survey 848,470 acs
 and the result of his enumera-
 tion of the trees in the existing
 plantations to be 56,9031 trees
 viz: Red Bark — 260,837.
 Brown — 305,432.
 Yellow — 552.
 Grey — 1874.
 Other species — 336.
 Of these he considers only
 4,30,000 to be fully established
 and

This is shown to arise

1. from certain species being grown at inappropriate elevations or aspects; which have proved

2. from red barks being grown in unsuitable situations; exposed to strong winds

3. from ^{Red barks} the same species having been tried in places on grass land.

[Crown barks will grow on grass land and can stand wind but the combination of poor soil and wind is too much even for this hardy variety.]

This want of uniformity is the necessary result of an experimental culture

and it is satisfactory to

find that Dr. King saw nothing on private estates better than portions of the Neddivattam plantation and very little that could beat patches of Crown

Crown bark at Dodabetta."

6. The Pyhara plantations are not well spoken of. Away from daily direct supervision cultivation has suffered; manuring also has not been attempted, ^{the} ~~and~~ ^{some} ~~and~~ ^{various} ~~and~~ ^{causes} are exposed to the South West monsoon.

The Wood Estate which is cut off from Neddivattam (where the Assistant Super. resides) by the Pyhara river is the estate that is thought least well of and its sale is recommended.

7. Future prospects. The future prospects of the Govt. plantations are considered by Captain C. Walker to be "most encouraging." He sees nothing to denote decay among the healthy trees and estimates that

La Hara Division

that there are 200,000 trees of
the more and 250,000 of the less,
valuable varieties.

The yield of the former he
puts at $\frac{1}{2}$ lb dry bark and
the yield of the latter at $\frac{1}{3}$ lb
dry bark per annum.

The former ^{quality} he remarks
has recently realized an
average of $\frac{8}{7}$ sh. 8 p. per lb and
the latter he thinks may safe-
ly be valued at 2 sh. 6d. per
lb.

The result is an ^{estimated} annu-
al harvest of 391,666 lbs re-
sulting a gross income of
£ 80,208 - 5 - 0.

8. This estimate of yield
is considered by the Commis-
sioners as over sanguine. They
remark that the estates
are probably now in full
bearing

bearing" and they do not think
it likely that they will in their
present state yield more than
200,000 lb (dry) bark yearly.
According to Captain Walker
last year's harvest was 138,807 lb
of dry bark.

Estimates of the present
year's yield are given by the officers
in charge but are based on
insufficient and unreliable
data.

9. Dr King and Bidie re-
ported even among the best
parts of the plantation many
one trees of sickly foliage car-
rying dead twigs and bearing
"an enormous amount of
flower ^{and} seed." This last they
consider a sign of deficiency
of health and they attribute
it to the barkling for it is
most

most prevalent where the trees
have been barked oftenest.

In these views they differ
from Captain Walker but it
must be borne in mind
that they visited the planta-
tions at a different season.

10. Mossing. The present
inquiries establish the fact
that with care the stripping
of the bark under the mossing
system can be frequently
repeated with all varieties.

The Committee had the
advantage of witnessing the
harvesting operations and
Dr Bidie and King are both
prepared to recommend
the mossing system for a
term.

It is ^{now} found that
removed bark is rarely fit
for removal until the
third

third year and it is
then by no means un-
common thicknesses but it
fetches a higher price
than natural bark.

The only danger is in
persisting in it too long.
If a tree gets sickly its
bark is of little or no va-
lue. Dr King and Bidie
think many of the trees
are at that stage when
to secure a profit from
them they should either be
cut down or grubbed up.

11. Coppicing. Rubbed
and trees have been cut
down in small numbers
at

at different times and though the method of copying that was followed is condemned by all it is generally agreed that both rad and crown barks have been successfully copied. An interesting experiment was made by Dr Bidie and King, to ascertain the root development in a tree that had been copied five years ago. It was found to be much larger than in the case of two trees

Note.
The stump & roots of all these 3 are in for office in case of should wish to inspect them.
22/10.

I would add it is suggested that comparison was not also made by them with the roots of an unbarbed & uncopied, a maiden tree -

be very doubtful

may however [still to be seen]

whether copying will or can be well expected to succeed in the case of

trees of the same planting which had been allowed to grow up but had been barbed.

12.15 Under these circumstances it is suggested that no more may profitably be conducted until a tree shows signs of declining vitality and that the copying should be resorted to. It has

of trees that have been ^{to an extent inducing decay}
barked. If not the
trees must be grubbed
up and the bark in-
cluding that of the roots
be secured before the
tree dies.

13. Of the comparative
yield under either sys-
tem pursued separately,
there is no evidence,
nor yet of the value of
the bark of ^{shoots} ~~trees~~ that have
sprung from the
stool of a coppiced tree.

14. Future Management.
The Committee and
Capt. Walker are alike averse
to Govt. abandoning their
plantations & recommend
the appointment of a spe-
cial officer as Superinten-
dent. The former point
has already been decided,
but attention is requested
to the remarks of the Com-
mittee (para 56 & 57) con-
demning the supposition
that Govt. thus injures or
retards private enterprise.
The Committee lay special
stress on the necessity of
the special officer having
a practical & scientific
knowledge of horticulture
and being capable of
investigating the subject
of

quite & deserve attention

of natural hybrids and
affecting artificial hy-
bridization

15. Local manufacture

of a fibrifuge. In con-

sidering the question of

the resumption of the

local manufacture of

a fibrifuge that shall

be cheap and efficient

the Committee first lay

down the thesis that to

produce a cheap manu-

-factured article the raw

material must, first, be

obtainable at a low price;

secondly, the process of

manufacture must be

unexpensive and exhaustive;

lastly, the product must

be efficient & economical

in use. They then show

that the late Lunologists

manufacture was a failure

because

because the bark supplies
to it was costly and the
method of manufacture
did not prove exhaustive
in practice. They, therefore,
endeavour to ascertain
what the cost of Kilgiri
bark now is, and whether
by the light of ^{the} experience
gained in the manufactory
in Bengal, a product that
shall exhaust the precious
constituents of the bark
can be made in India.

16. The first point is settled
by means of the Accountant
General's financial state-
ment & it is demonstrated
that assuming an annual
yield of 200,000 lbs dry
bark, its cost after 1878/79
will be about 7 annas a
lb and if sold and the
proceeds applied to the
reduction

reduction of capital ex-
penditure, the bark might
in a few years "be pro-
duced and harvested for
something like 4 annas
a lb. This is about the
cost of production of
Sikhim bark at the
present time and is the
reason why the febrifuge
there manufactured is
sold at so low a price.
But though sold cheap
it is not, as at present
manufactured, an econ-
omical product for only
about 50 per cent of the
alkaloids known to be
present in the bark
have been recovered.
Now 85 to 90 per cent
ought to have been ex-
tracted and the loss of
febrifuge has in three years
been

note

This is freely admitted
by Dr. King who says
like to the bark
of the bark of the bark
a proper process that
was followed was
admittedly imperfect
Plantation L

been at the lowest computation
4,792 lbs or in money value
at the present price of the
febrifuge Rs 1,55,81,0. There
has thus been obvious waste.

17. The Lunologist in
Bengal is forced to admit
that imperfect and crude
apparatus are of use avail-
but he estimates that in
a proper factory at Calcutta
1/3 of the alkaloids in the
bark could be recovered and
that with bark supplied
at 3 1/2 annas a lb a febrifuge
could be produced
at Rs 11,9,0 per lb. Experience
has yet to confirm this
anticipation.

18. But there is a further
point. Sikhim bark has of
low commercial value be-
cause it contains but a
small

The Bengal & Madras
Banks have different qualities
and different commercial
values -

and with the proceed buy
and distribute the cheap
but efficient alkaloids.
These should be obtained
not in the crude form
of the present Bengal feb-
rifuge which though
undoubtedly efficient has
certain disadvantages (such
as want of solubility, un-
pleasant appearance and
taste, nauseating effects)
but as sulphates or crystal-
line salts which though
cannot in appearance
and taste be distinguish-
ed from sulphates of
quinine. The Committee
show that the cost of a
mixture of quinine and
these sulphates "in the
proportion of the composition
of the Bengal febrifuge"

would at recent prices
have been Rs 2 1/2 0 5 a lb
against Rs 20 the price
of the Bengal febrifuge.
By reducing the proportion
of quinine which has been
~~very~~ expensive, a still
cheaper febrifuge could
be obtained.

21. Dr King objects to
this suggestion that with
an increased demand,
the price of the (now) cheaper
sulphates will rise. The
Committee think ^{otherwise} not, for
the supply of the bark which
produces them is very
abundant and capable
of being increased. More-
over it may be ^{considered} pointed out
that the price of quinine
will fall with a increased
demand.

small amount of crystallizable *Sand* is therefore of
gummi-tilgiri bark on the commercial value
the other hand, is of a large proportion of crystallizable
high commercial value.

[For the opposite reason.]

Quinine is the most effective of all the Cinchona alkalis ^{although}

[but] the others are practically

[as efficient in the cure of

ordinary fevers - The Bengal

febrifuge so therefore medi-
cinal ^{useful}

usually as [valuable] one

made from Nilgiri bark,
but common in Nilgiri.

commercially it is of small value.

value, and is now
sold at about 1/2

about its real
value in the market.

the finer part on it is 1/1

mined by its cost

U. Virginica febrifuge if
sold at

at a price similarly determined

... would be [affairs]

commercial value



I hardly think this paper
is good logic - cheaply -
entirely are comparative times
which are nowhere dependent on
this paper - ?
at least

This paper -
 Govt. could sell at what
 price they please if below its
 value - R

and the inevitable result
would be that it would
be bought up ^{for the purpose of} ~~and sold~~
again ^{materially higher} at its real value.

19. At present therefore

Govt cannot manufacture

for their hospital, from
H. L. to the machine

their bark without wasting
15 them so cheaply.

1. The bank is still costly

for the bark is still costly,
until they could manufac-

more if they could manufac-
-ture economically could

keep ^{in the market} ^{as long as the consumer} the product at a

low price

20. It has been shown

that all the Cinchona alkaloids

oids are (medicinally) of

about equal value. If there

for the Government wish
to buy this book & \$

to utilize their bark to the
 best advantage the way is

best advantage the way is
to sell it with its valued

qualities at a high price

and

small amount of crystallizable said is the purpose of
gumming it in bark on the other hand is of a gum
in the other hand is of a gum
a high commercial value.

as [the affluence of commerce] is
a diminution in the market [value] of
all the Cinchona alkaloids
[but] the others are practically
as efficient in the cure of
the ordinary fever - the Peruvian
febrifuge is therefore much
so [valuable] as [a similar preparation]

As originally as [valuable] as [a similar preparation]
it made from Peruvian bark,
and but commercially it is of
small value, and is now
at sold at about its real
at value in the market though
for the price paid for it is deter-

mined by its cost.
A Peruvian febrifuge if
sold at a price similar to
of the determined would be [offered] sold much
below its commercial value

and the inevitable result
would be that it would
be bought up [at a high price] and
resale again at its real value.

I hardly think this paper
is good logic - cheaply -
costly are comparative terms
which are nowhere defined in
this paper - ?

Govt. could sell at what
price they please if below its
value - But

and the inevitable result
would be that it would
be bought up [at a high price] and
resale again at its real value.

19. At present therefore
Govt cannot manufacture
for their hospitals from
their bark without wasting
it [nor can they do so cheaply
for the bark is still costly,
nor] if they could manufac-
ture economically could
they [keep the product at a
low price]

20. It has been shown
that all the Cinchona alkaloids
are (medicinally) of
about equal value. If there-
fore the Government wish
to utilize their bark to the
best advantage the way is
to sell it with its valued
qualities at a high price
and

demand and with that
^{in part a close}
increase of the better barks
which the spread of Cin-
chona cultivation in India
Ceylon renders probable.

22. It follows from the ^{then}
above that the Committee
condemns the suggestion
of the Government of India
for Kilgiri bark being
sent to Bengal for manu-
facture either into a febrifuge
or quinine. They
further point out that
the cost of carriage and
freight of the bark would
probably be nearly as
high as to England.

23. Preparations of bark
of a simple nature, the
Committee considers cannot
be economically ^{substi-}
tuted for the cheaper Cinchona
alkaloids

48
alkaloids of European
manufacture. They are
moreover shown to be
^{so} inevitable. This is ex-
emplified by the results
of the trials of the tincture
made up by Mr. Hony-
^{Committee}
24. As they do not recom-
mend the resumption of
local manufacture they
~~Committee~~ do not think
a quiniologist necessary,
provided that a Superintendent
of the kind they recommend
is placed in charge and
permitted to ^{refer to} communicate
with "an European Chemist
of repute."

Received of Mr.
H. H. H. H. H.
1877 of \$100
Grace H. H. H.
H. H. H. H.

However much I
agree generally in
the conclusions of the
reports -
One or two points I
am unable to pass
without note -
I looked very carefully
at the Hedderwicken
Plantations in 1876.
I visited also the
private plantation
of Deer Shola in
the same season.
Major McLeod
has since taken careful
notice of Bodabeta -
I again visited Hedderwicken
this autumn.

c 23-10-78
R.C. 15. 1900/78.
R. 30-12-78
R.F. 31-12-78
R 3 Jan 79

Specialy noticed
these at particular
spots which I had
before observed —
My observation leads
me to doubt. The
specimen especially
Capt. Walker that
there is ^{no sign of} ~~nothing~~
decayed decay or
want of health and vigour
in the Barbed trees —
and to consider
that there is a
want of vigour in
the young wood
a want of plumpness
in the leaf buds

As well as an ~~exception~~
~~under~~ proportion of
flowers in the Barbed
trees —
Capt Walker rightly
points out. That all
the trees appear to
give an under
proportion of flowers
but my observation
leads me to consider
that the disproportion
is much greater in the
case of the Barbed trees
of both sorts — red & green.
Thorough examination
of sections carefully
cut — showing a
dry & diseased condition
of the wood

immediate behind
 the denuded surface
 and - in some cases
 an almost-~~entirely~~
 dry triangular
 section - in which
 the microscope showed
 the cells of the wood
 to be hardened to
 have assumed the
 appearance of dry
 seasoned wood -

& this appearance
 existed in wood which
 was overlaid by new
 bark spreading over
 from the adjacent
 unwarmed strips

^{of six to ten}
 These sections at the
 collar showed ~~no~~
 signs indicating any
 of the ~~signs~~ ^{of decay} ~~seen~~
 elsewhere -
 a blackened wood
 heart - and ring
 is ~~seen~~ ^{seen} ~~in~~ ⁱⁿ
 appearance - ~~as~~ ^{as}
 in young healthy trees.
 The ~~appearance~~ ^{appearance}
 of ~~the~~ ^{the} ~~wood~~ ^{wood}
 was ~~of~~ ^{of} ~~the~~ ^{the} ~~seasoned~~ ^{seasoned}
 wood.

2^d with regard to
 copying I am of
 opinion that an
 extensive experiment
 will be made at once
 out of isolated patches
 out of an extensive
 area -
 both of barked &
 unbarked trees -

There are several points
 of importance to be
 tested -
 1st ~~the~~ ^{the} with barked
 trees - which have been
 watched until signs
 of decay are
 perceptible ~~to~~

from store at all
with certainty?
Dr. H. H. Thayer
cut by me in 1876. did
not.

2^d with the young
wood so produced
be good genuine
yielding plants. or
with the products
be of comparative
little value. - ?

I should strongly
urge the immediate
selection of & the
copying of a
sufficient area
for this purpose -

for it is only by a
large experiment
that the facts
can be ascertained

Nov 27/12

I most readily accept
H. H. Thayer's suggestion
as a subject of his is
competent & from a valuable
opinion & I confess to
superior ignorance.

I must face it as
I stand & reason that
as far as we know
naturally formed - Marsyas
fashion. without differing
in constitution. & I am
ago with my opinion &
that we have by no
means attained yet a
satisfactory account
of the country. & until
we do so - we are
running great
risk of destroying
a valuable property
created at considerable
expense & with the knowledge
in cases so far as plants
& growing are concerned

The somewhat peculiar
argument lately advanced
in favor of checking the
clearing of Bill Woods
that he needed to maintain
the supply of moss for
the Cinchona plantations
points to the excessive
artificiality of the
Barkling system.

Revenue Department

Proceedings of the Madras Government

I have passed the
deposition before me
of the latest crime? from the
4th of 1878. I am however that London
be now in 1878. I am however that London
of the Commission? I have he I have
times. & I continue to doubt the
planning the 4th of 1878. I have he I have
I had killed him. But this had
any further evidence on 1878. I have
as 2 date for the thing 1878. I have

Recd the following letters
from Commissioner Kellogg dated 16
July and 15. October 1878 No. 133 &
136 regarding Cinchona Reports.

The Govt. have now before them the report of Captain Campbell Walker who inspected the Cinchona Plantations early in the year 1878 and the report of the Cinchona Comm. miller whose investigations were carried on during July and August with the valuable assistance of Mr. King Superintendent of the Botanical Gardens Calcutta and Government Cinchona Plantations in Bengal.

The Plantations.

2. Captain Walker devotes fifteen pages of his report to a

history

I think that the Daffie all
 right so far as it goes
 in towards the close
 I think the qualifications of
 the present Capt. & the
 special task to be assigned
 to him of planting fully
 up. & hybridizing
 should be set for the
 as regards the officiating

history of the enterprise and the circumstances under which the Ootacamund, Keddiamattam, Pykara and Inailkonda estates were formed, and the last was abandoned. All the facts are known to Government and there seems nothing therein requiring remark.

3. This section of the report includes a financial statement of the Capital account which it is proposed to close at the end of 1875/76, but a revised statement has since been submitted by the Accountant General and a copy having been furnished to the Committee appears in Appendix E page 51 of their report. In this is included

Experiment I think to make further instructions sh. be given to the results & the observance noted from the remarks. I am strongly disposed to advocate this experiment in thing without Capt Walker if it is to be carried out before the advent of special Lupt. The other forms here. I don't think that the Comm. or Mr. Lowerd can safely be entrusted to do this officious on a large scale without risk of disappointment.

25.7.74

on the credit side a sum of Rupees 81,939-8-4 being the value of the bark supplied to the Quinslogist. The data for the valuation of this bark were supplied from the Government offices and are the same as those which were given by the Committee of 1874 and which were then accepted. The quantity and kind of bark supplied was ascertained from the records and checked by reference to the Commissioner's office.

4. The rest of the statement has been prepared in accordance with the instructions of Govt. The amount under

The least buildings is so small
 as apparently to indicate that
 this item may not have been
 always distinguished, but as
 a statement of the Government
 expenditure and the recorded re-
 cepts it may be accepted.

Interest at $4\frac{1}{2}$ per
 cent on the yearly balance of charges
 is included and the result is

Total charges up to
 1875/76 Rs. 1296,387-15-11
 Receipts " 1,741,711-0-5
 Net charges 1,122,116-15-6

In 1876/77 the charges
 were 1,212,711-10-3
 and the receipts 436,804-14-10

so that the Capital
 expenditure was by
 31st March 1877 reduced to 806,683-10-11.

In a foot note to page 3 of
 their Report the Committee
 note

note that the bark sent home in 1877/78
 has realized £ 33,231 and that
 when the charges of the year are paid
 there will be a balance of upwards of
 two lacs to set towards the further
 diminution of the capital expendi-
 :ture.

5 Number and Classification
of trees. Captain Walker next
 reports the area now under cultiva-
 :tion to be by the revised survey
 84,292 acres and the result of his
 enumeration of the trees in the
 existing plantations to be 5,69,031

trees viz: Red Bark 250837
 Brown 305432
 Yellow 552
 Gray 1874
 Other species 386

Of these he considers only 650,000
 to be fully established and
 states that this is certainly not
 a sufficient crop for the area
 under

* Vide Errata 5.55 are under ten

under cultivation being only
530 trees per acre. Captain
Walker intimates that his
classification is of no accurate
scientific value as varieties
and hybrids are "classed
with the parent whose growth
they most resemble." The
oldest trees were planted
in 1862 and the tallest
red bark was one of
that year's planting at
Neddivattum and measured
(37 1/2 feet). The tallest
crown bark was found at
Dodabetta. It was planted
in 1863 and measured
26 1/2 feet. The greatest
girth at 4 1/2 feet from
the

461
the ground were Red bark
28 inches and Crown bark
23 3/4 both at Neddivattum.
6. Present system of
cultivation. In regard to
the cultivation of estates
the present system is considered
satisfactory but there
seems to be a danger of
"sack" and consequent
denudation in some
of the steeper parts
of Dodabetta.

It is generally agreed
that in the original planting
the trees were placed too far
apart & that sufficient
attention was not paid
to renewals or "supplies"
the estates do not thus
bear

bear as many trees as they
might.

7. Present Condition. The
present condition of the
plantations is not uniform.
This is shown to arise.

1. from certain species being
grown at elevations or
aspects which have proved
unsuitable.
2. from red barks being grown in
^{which exposure} ~~situations~~ ^{It was proved to be} exposed to strong wind;
3. from Red barks having
been tried in places on grass
land.

This want of uniformity is the
necessary result of
experimental culture
and it is satisfactory
to find that S. King
saw nothing on private
estates better than
portions of the *Neodivattum* planta-

tion and very little that
could beat patches of

Crown bark at Doddabatta.

8. The Pykara

Plantations are not
~~generally~~
well spoken of. Parts

are much exposed
to the South West
^{beyond the wall}
Monsoon, and being away from

of daily direct super-
vision, cultivation
has suffered. Ma-
nuring also has
not been there
attempted from
various causes.

The Wood Estate
which is cut off
from cultivation
by the Pykara
river is the Estate
that is thought
least

least well of and
its sale is re-
commended.

9. Future prospects.

The future prospects
of the foot planta-
tions are considered
by Captain C. Walker
to be "most encouraging"
and he sees nothing
to denote decline
of vigor among the
healthy trees. Dr.

Key and Bidie
on the other hand
noticed even among
the best parts of
the plantations
numerous trees
of sickly foliage
carrying

and bearing "an
enormous amount
of flower and seed."
This last they
consider a sign
of deficiency of
health and attribute
it to the barking
for it seemed most
prevalent where
the trees have
been barked often-
est.

10. Captain Walker
estimates that
there are 20,000 trees
of the more ^{valuable}, and
25,000 of the less,
valuable varieties
of Cinchona.

The yield of
the former he

put at $\frac{1}{2}$ lb dry
bark and the
yield of the latter
at $\frac{1}{3}$ lb dry bark per
per annum.

The former kinds,
he perhaps, have
recently realized
an average of $\frac{1}{2}$ d
per lb and the
latter he thinks
may safely be valued
at $\frac{1}{2}$ d per
lb.

The result is an
estimated annual
harvest of 391,656 lbs
realizing a gross
income of £80,208.5...

11. This estimate
of yield is con-
sidered by the
Committee

Committee as ¹⁵⁷ver-
sanguine. They
remark that the
estates are probably
now in full bear-
ing" and they do
not think it likely
that they will in
their present state
yield more than
200,000 lbs (dry) bark
yearly." This view
the foot observer is
supported by the
fact that the
harvest of 1877/78
was ^T138,838 lbs and
that of the current
year is ^Texpected to
be only ^{foot}100,000 lbs.
12. Crossing. The
present inquiries
establish the fact
that

T p. 15 Nov 78 No. 1828.

T p. 10, 6 Jan 79 No. 20.

that with care the
stripping of the bark
under the mopping
system can be
frequently repeated
with all varieties. It
is however now found
that renewed bark
is rarely fit for
removal until the
third year and it
is then by no means
of uniform thickness
but fetches a higher
price than natural
bark.

13. At the time of
Captain Walker's inspection
harvesting operations were
not in progress but
the Committee had the
advantage of witness-
ing them and the
use of the mopping
system for a time
is recommended.

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It is pointed out
that the danger lies in
the process being persisted
in too long, for if a tree
is injured or becomes sickly
its bark is of little or
no value. Drs. King and
Bidie think many of the
trees on the various plan-
tations are at that stage
when to secure a profit
from them they should
either be cut down or
grabbed up.

14. Coppicing. Unbarked
trees have been cut
down in small numbers
at different times and
though

though the method of
coppicing that was follow-
ed is condemned by all
it is generally agreed
that both red and Crown
barks have been success-
fully coppiced. An interest-
ing experiment was made
by Drs Bidie and King.
A tree that had been
coppiced five years ago
was grubbed up in order
to examine the root de-
velopment which was found
to be much larger than
in the case of two trees
of the same planting
which had been allowed
to grow up but had
been

1271
been barked. It is to be
regretted that comparison
was not also made by
them with the roots of an
unbarked or maiden tree.

15. In view of the
above results it is suggested
that mowing may pro-
bably be profitably con-
ducted until a tree shows
signs of declining vitality
and that then coppicing
should be resorted to. It
is however very doubtful
whether coppicing will
or can be well expected
to succeed in the case
of trees that have
been barked to an
extent

extent inducing decay.

If not the trees

must be grubbed

up and the bark

including that of

the roots be secured

before the tree dies.

b. Of the comparative

yield under either sys-

tem pursued separately

there is no ^{sufficient} evidence nor

yet of the value of the

bark of shoots that have

sprung from the stool

of a coppiced tree.

Future

14. Future Management.

The Committee and

Capt. Walker are alike

averse to Govt. abandoning

their plantations and

recommend the appoint-

ment of a special officer

as Superintendent. The

former point has already

been decided but

the

remarks of the Committee

(para 56 & 54) condemning

the supposition that

Government thus injures

or retards private enterprise

invite and deserve attention.

The Committee lay special

stress on the necessity of

the special officer having

a practical and scientific

knowledge of horticulture

and being capable of

investigating the subject

of natural hybrids

and effecting artificial

hybridization.

Local

extent inducing decay.

If not the trees
must be grubbed
up and the bark
including that of
the roots be secured
before the tree dies.

16. Of the comparative
yield under either sys-
tem pursued separately
there is ^{sufficient} evidence nor
yet of the value of the
bark of shoots that have
sprung from the stool
of a coppiced tree.

Future

14. Future Management.

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the special officer having
a practical and scientific
knowledge of horticulture
and being capable of
investigating the subject
of natural hybrids
and effecting artificial
hybridization.

Done

18. Local manufacture
of a Febrifuge. In con-
sidering the question
of the resumption
of the local manufacture
of a febrifuge that shall
be cheap and efficient
the Committee start with
the statement that
"to produce a cheap manu-
factured article the
raw material must,
first, be obtainable at
a low price; secondly, the
process of manufacture
must be inexpensive,
and exhaustive; lastly,
the product must be
efficient and economical
in use." They then
show that the late
Quinologists manu-
factory was a failure
because the bark
supplied

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supplied to it was costly
and the method of
manufacture did not
prove exhaustive in
practice. They, therefore,
endeavour, to ascertain
what the cost of Kilgiri
bark now is, and whether
by the light of the experience
gained in the manufactory
in Bengal, a product that
shall exhaust the precious
constituents of the bark
can be made in India.
19. The first point is
settled by means of the
Accountant General's
financial statement &
it is demonstrated that
assuming an annual
yield of 20,000 lbs dry bark,
its cost after 1848/49 will
be about 4 annas a lb and
if sold and the proceeds
applied

applied to the reduction of capital expenditure, the bark might in a few years be produced and harvested for something like 4 annas a lb. This is about the cost of production of Sikkim bark at the present time and is the reason why the febrifuge thus manufactured is sold at so low a price. But though sold cheap it is not, as at present manufactured, an economical product for only about 50 per cent of the alkaloids known to be present in the bark have been recovered, whereas 85 to 90 per cent ought to have been extracted. The loss of febrifuge has therefore in three years been

1877
been at the lowest computation 7,792 lbs or in money value at the present price of the febrifuge Rs 1,55,840.

20. The Quinologist in Bengal admits that improved and crude appliances are of no avail but he estimates that in a proper factory at Calcutta 78% of the alkaloids in the bark could be recovered and that with bark supplied at 3 1/2 annas a lb a febrifuge could be produced at Rs 11-9-0 per lb. Experience has yet to confirm this anticipation.

21. But there is a further point. Bengal and Madras barks have different qualities and different commercial values. Sikkim bark contains but a small amount.

amount of crystallizable quinine and is therefore of low commercial value. Nilgiri bark on the other hand containing a large proportion of crystallizable quinine is of high commercial value. Quinine is the most effective of all the Cinchona alkaloids, although the others are practically efficient in the cure of ordinary fevers. The Singal febrifuge may therefore be medicinally as useful as a similar preparation made from Nilgiri bark, ^{however} but commercially it is of small value, and is now sold at about its real value in the market though the price put on it is determined by its cost.

A Nilgiri febrifuge if sold at a price similarly determined

22. The Committee thus show clearly that at present there is no probability of the Madras Government being able to work up their bark economically, or exhaustively, and that even if it were otherwise the benefits of a cheap febrifuge could not be secured as long as Nilgiri bark (and therefore any preparation from it) is of high commercial value.

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determined would be disposed of much below its commercial value, and the inevitable result would be that it would be bought up for the purpose of resale at its real and materially higher value.

It is thus demonstrated that there is at present no likelihood of the Madras Government being able to manufacture from their bark without wasting it, and that even if it were otherwise a low-priced article cannot be produced while Nilgiri bark is of high value.

23. It has been shown that all the Cinchona alkaloids are, in general practice, of about equal therapeutic

therapeutic value. If
therefore the Govern-
-ment wish to utilize
their bank to the
best advantage
this, the Commit-
-tee point out, will
be effected by
selling it at
the high price which
its genuine gold-
-ing qualities
command, and
with the proceeds
buying and dis-
-tributing the
cheaper but suf-
-ficiently efficient
alkaloids. These
also

2781
also it would
be desirable
to obtain not
in the crude
form of the
present Bengal
febrifuge, which,
though undoubtedly
efficient, has
certain disadvantages
(Such as want of
solubility - unpleasant
appearance, and
taste & nauseating
effects) but as
Sulphate

salphates or
crystalline salts
which cannot
in appearance
and taste be
distinguished
from sulphate of
quinine. The Com-
mittee show that
the cost of a mixture
of quinine and
these sulphates
"in the proportion of
the composition of
the Bragal febrifuge"
would

785
would at present prices have
been Rs 21-0-5 a lb. against
Rs 20 the price of the Bragal
febrifuge. By reducing the
proportion of quinine which
has been unusually expensive,
a still cheaper febrifuge could
be obtained.

24. Dr King objects to
this suggestion, that with
an increased demand the price
of the (more) cheaper Sulphates
will rise but the Committee
think otherwise, for the supply
of the bark which produces
them is very abundant and
capable of being increased -
Moreover it may be assumed
that the price of quinine will
fall with increased demand and
with that increase in produc-
tion of the better bark
which the spread of
Cinchona

Cinchona cultivation
in India & Ceylon is
rendered probable.

25. It follows then
that the Committee are
opposed to the sugges-
-tion of the Government
of India for Nilgiri
bark being sent to
Bengal for manufacture
either into a febrifuge
or sulphate of quinine.
They further point out
that the cost of carriage
and freight of the bark
would probably be nearly
as high as to England.

26. Preparations of
bark of a simple nature
the Committee consider
cannot

1885
cannot be "economically
substituted for the
cheaper Cinchona Alkaloids
of European manufacture."
They are moreover shown to be
unsuitable for general use
from various causes con-
-nected with their bulk
or liability to spoil. Reference
is made to the report of the
Surgeon General Indian Med. &
Dept. on the experiments
made by order of Government
with the tincture prepared
by Dr. J. W. B. Murray. The
result, "it is said," was not
favorable to the use of such
a preparation for public
purposes.

27. Lastly, as the Committee
do

29. His Grace the Governor in Council
agrees generally with the conclusions
of the Committee as above reviewed
which will accordingly be sub=
mitted to the Secy. of State
with reference to the questions
raised as to the retention of the
Cincona plantations, the appoint=
ment of a successor to
Mr. M. J. J. the re-employ=
ment of a Linguist,
and the resumption of the
local manufacture of a
felice fuge.

Vide Despatch in L. O.
1. June 78 No. 820.

How far this was practised
by the late Mr. McIver is
not known but in the letter
quoted by the Committee
he intimated that it had
been attempted successfully
& that important results
might be expected from
its prosecution.

Dr. King has a similar belief but the Committee & he agree that the experiments must extend over many years and be the work of a person "thoroughly trained in the theory and practice of scientific gardening."

do not recommend the
resumption of local manu-
-factures they do not think
a Quinologist necessary,
provided that a Supdt
such as they recommend
is placed in charge
and permitted to refer
to and communicate with
"an European Chemist of
repute."

29. This from the Gov. in Council
agrees generally with the conclusions
of the Committee as above reviewed
which will accordingly be sub-
-mitted to the Secy of State
with reference to the questions
raised as to the retention of the
Cinchona plantations, the appoint-
-ment of a successor to
Mr. McIver, the re-employ-
-ment of a Quinologist,
and the resumption of the
local manufacture of a
febrifuge.

28
30 Sept 1890
Vide Despatch in L. P.
1: June 1890 No 830.

28. ~~Returning to the subject of~~
~~the Committee~~
point to the importance
of scientific culture and
experiment, attention being
specially directed to artificial
hybridization.

How far this was practised
by the late Mr. McIver is
not known but in the letter
quoted by the Committee
he intimated that it had
been attempted successfully
& that important results
might be expected from
its prosecution.

Dr. King has a similar
belief but the Committee
do agree that the experiments
must extend over many
years and be the work
of a person "thoroughly
trained in the theory
and practice of scientific
gardening."

4th March/78 No 82
in G.O. Letter/78
No 830.

demanded

11/31/78

24th. In reply to the letter
of the Government of
India in connection
with the same subject
it will be intimated that
in view of the facts elicited
by the Committee His
Grace in Council is
not prepared, under
existing circumstances,
to have Nilgiri^{red} bark
converted into febrifuge
nor the Crown bark into
sulphate of Quinine
[either in this Presidency
or elsewhere] in India.

30. In the meantime
the management & conduct
of the plantations will
remain as at present
subject to the following
remarks.

Constant

32. *Constant Inspections*
of the ^{the} plantations and
examination of sections
of trees that have been
felled after frequent
barkings have led His
Grace the Governor in
Council to entertain
serious doubts as to the
health of trees that
have for any length
of time been subjected
to the stripping and
mossing process. The
undue proportion of
flower and seed noticed
by all observers is in
the opinion of His
Grace ^{very} more noticeable
in the case of barked than
of unbarked trees whether
of the Red or Crown bark
species

The desirability of obtaining the services of a scientific but yet practical horticulturist His Grace considers to be fully established.

It will be the duty of this officer on the one hand to secure the best results from the existing plantations by utilizing fully the space at his command and by bringing to bear his practical acquaintance with the most approved methods of cultivation, and on the other to conduct those experiments in hybridization which will it is hoped result in the production of valuable varieties that can be remuneratively grown by planters at varying elevations and thus increase the supply of bark. and furnish the people with domestic

specimens of the former
I am filled I know
that the call of the
bark has hardened
and assumed the
appearance of dry
hardened wood.

It is especially important to ascertain

(1) whether barked trees that have been rebarked until signs of decay are perceptible will shoot from stool with any certainty

(2) whether the young shoots so produced will yield bark of any richness or be comparatively worthless.

Page 35 para 1

species. & microscopic fungi.

32. Under these circumstances and in view of the fact that coppicing has not yet been really tried on the Government plantations His Grace resolves to direct its being tried on a sufficient scale, not in small patches but over a somewhat extensive area and with unbarked as well as barked trees. The Council of the Nilgiris will accordingly arrange for carrying out experiments thus being done at all the plantations. He will bear in mind the defects in the method of coppicing hitherto followed as pointed out by Captain Walker and as to extent, cultivation and

and treatment generally,
will conform to the advice
of ^{the latter} ~~the latter~~ whose valuable
opinion as to the future
working of the plantations
founded on his own experience
is recorded by the Committee.

33. In conclusion His
Grace in Council desires
that the Commt^{ee} of the
Virginis will convey to
the Committee the thanks
of Government whose
obligation to the Gov^t of
Bengal for placing D^r King's
services at their disposal
and to that gentleman
for the ready & valuable
assistance rendered by
him, will also be acknowledged.

pages 33-35
It will be seen that
"at least 5 acres should
be done in one place"
and suitable blocks
should be at once
selected.

The period
most favourable for
lopping is stated to be
"when the trees are nearly
at rest" but this is a
point on which the Conservator
of Forests will be requested
to advise Government.

17. A. W. Barlow Esq. on 17-3-79.
1. W. R. Crum Esq. 1
1. G. H. H. Esq. 2
1. R. A. Campbell Esq. 1
6. S. J. J. Esq. 1

Capt. (M. B. ...)
 ...
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 ...
 ...

...
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 ...
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R.C. 5 Feb/79 R. 20/2/79
 R.C. 27 Jan/79 R. 29 Jan/79
 C. 26 Jan/79 R. 27 Jan/79 R. 29 Jan/79