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MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No. 73
(143-44)

Press
~~Mis.~~

Dated 11-1- 1872

Not to be folded or roughly handled

*Proceedings of the Madras Government, Revenue Department,
11th January 1872.*

No. 143. Read the following letter from the Commissioner of the Nilgiris, to the Secretary to Government, Revenue Department, Fort St. George, dated Ootacamund, 13th December 1871, No. 91 :—

In accordance with the Under-Secretary's letter of the 27th October 1871, No. 1,865-A., I drew Mr. McIvor's attention to the statement made by Mr. Munro at page 982 of the Supplement to the *Gazette of India*, dated 8th July 1871, namely, "We received our first (Cinchona) cuttings from the Nilgiris, and these were "extensively affected with canker;" and to the remark in paragraph 4 of Mr. Secretary Hume's letter (page 1,000 of Supplement), to the effect that the canker, which has attacked the plants at Rungbee, "is shown to have existed in the plants "originally sent up from the Nilgiris as stock for the Sikkim plantations."

2. As directed I forward Mr. McIvor's remarks which are pertinent and, to my mind, conclusive.

The weight due to Mr. Munro's statement is not difficult to determine with the aid of Mr. McIvor's explanation, that the Darjeeling Association never received any cuttings from the Nilgiris in Mr. Munro's time, and that Mr. Munro did not arrive at Pomong until the Nilgiri plants originally supplied had been nearly two years, and the last supply fully ten months in Bengal.

It was not the object of the Cinchona Commission to discover whether the disease came from this or that district, and, therefore, Mr. Munro's statement passed unchallenged; nor is it worthwhile now, I apprehend, to ask him to refresh his memory by the light of Mr. McIvor's letter.

3. There remains Mr. Hume's statement.

I have read the Cinchona Commissioners' report, and am at a loss to understand how Mr. Hume arrives at the conclusion that the disease "is shown to have existed "in the plants originally sent up from the Nilgiris."

Mr. Munro's random assertion is the only evidence that the Nilgiri plants were cankered. Yet this single unexamined statement, made seven or eight years after the last supply of Nilgiri plants to Bengal, by a witness who could not speak from his own experience is accepted by Mr. Hume as conclusive, and is made public, with the authority of the Government of India, in the face of Dr. Anderson's testimony at the time to the "vigorous growth and excellent condition" of the Nilgiri plants imported by him.

4. Such a hasty statement is hardly creditable to a department lately created,* in order that "special attention might be devoted to many "branches of administration now "unavoidably more or less neglected, or but imperfectly dealt with."

* *Vide* Supplement to the *Gazette of India*, dated 10th June 1871, page 923.

ENCLOSURE No. 1.

From Mr. W. G. McIVOR, Superintendent, Government Cinchona Plantations, to the Commissioner of the Nilgiris, dated Ootacamund, 6th December 1871, No. 115.

I HAVE the honour to acknowledge your letter No. 61 of the 31st ultimo, calling my attention to pages 982 and 1,000 of the Supplement to the *Gazette of India* of 8th July 1871, in which is published the Report of the Bengal Cinchona Commission, and asking me for an explanation of the evidence given by Mr. Munro, namely, that "we received our first cuttings from the

"Nilgiris, and these were extensively affected with canker," and to paragraph 4 of the Proceedings of the Governor-General in Council, where the canker in the Cinchona plants in Sikkim is said to be "a disease which is shown to have existed in the plants originally sent up from the Nilgiris as stock for the Sikkim plantations."

2. In reply, I beg to state that I am not aware of the facts on which the Government of India have come to the above conclusion, but if the original 204 plants of Cinchona selected by Dr. Anderson in December 1861 from our stock on the Nilgiris, and conveyed by that gentleman to Bengal, were really cankered plants, it is remarkable that there should have been no mention of this fact until 1871. The reports by the gentlemen in charge of the Bengal plantations describe the plants to be in the "highest health" and "growing most vigorously." It appears impossible that responsible, scientific, and practical gentlemen should have continued for years to furnish such favourable reports on plants which were affected with disease from the first.

3. When viewed in connection with recorded facts many of the statements made before the Cinchona Commission appear contradictory and impossible. This is especially the case with reference to the evidence of Mr. Munro. It is, therefore, to be regretted that that gentleman was not asked to explain the facts on which he made the statement above quoted. It is quite certain, from a careful examination of the records, that Mr. Munro never received any cuttings from the Nilgiris. In fact, Mr. Munro did not arrive at Pomong until December 1863, or when the original plants sent from the Nilgiris as stock for the Sikkim plantations had been nearly two years, and the last supply fully ten months in Bengal. Thus it was impossible for him to know whether such plants were healthy or otherwise when they left the Nilgiris.

4. At page 981, in reply to question No. 2, Mr. Munro states, "but my present plantation of 500,000 (*C. Succirubra*) plants have been raised by cuttings from 92 plants." This is an error, as I supplied a quantity of excellent seeds to the proprietors of the Pomong plantations, Mr. Lloyd and Colonel Angus. These seeds germinated freely, and probably produced from 50,000 to 100,000 seedlings. The seeds were gathered from plants which never had an indication of disease, and at the present moment are fine forest trees.

5. Another instance of the manner in which the evidence given before the Cinchona Commission is ill considered, and likely to mislead, occurs at page 985, where Mr. Mann, in referring to the plants planted out in Sikkim in 1864, says "ten per cent. were old exhausted stock plants from the Nilgiris." Mr. Mann did not arrive in India till the 14th March 1864, or one year and two months after the last supply of Nilgiri plants arrived in Bengal.

6. It appears to be assumed that the Sikkim plantations were stocked with plants from the Nilgiris only. But the records show that the stock was obtained as follows:—Dr. Anderson raised in April and May 1861 in the Calcutta Botanic Gardens 120 seedlings* from seeds of *C. Micrantha*, *C. Succirubra*, and *C. Peruviana*, obtained by Mr. Markham from South America. Of *C. Pahudiana* 548 seedlings were raised in Calcutta in December 1861, and the early part of January 1862 from Java seeds. Two hundred and four plants reached Calcutta from the Nilgiris on the 13th January 1862, and the second and last supply of 350 plants from the Nilgiris† arrived in Calcutta on the 30th January 1863. Of *C. Officinalis* 11 plants‡ were received from Ceylon on the 28th January 1863, and 1,373 additional plants of *C. Pahudiana* from Java seed had germinated on 1st April 1863. In March 1866 Dr. Anderson raised 3,100 seedlings§ of *C. Officinalis* from seeds received in January 1866 from Mr. Thwaites, Ceylon, and 8,000 seedlings¶ from seeds received from the same source in March 1866. During 1866-67, 38,500 seedlings, and in 1867-68, 101,175 seedlings were raised in the Sikkim plantations.

7. Thus the Sikkim plantations received large supplies of seeds and plants from other sources than the Nilgiris; the Nilgiris merely furnishing the principal stock of *C. Calisaya* and

* Report of Botanical Gardens, Calcutta, from April 1861 to April 1862, by T. Anderson, Esq.

† Annual Report of Cinchona cultivation in British Sikkim, dated 30th April 1863.

‡ T. Anderson, Esq., to Junior Secretary to Government of Bengal, 1st May 1866.

§ Report of the Sikkim plantations from 1st April 1865 to 31st March 1866, by T. Anderson, Esq.

¶ Report on the cultivation of Cinchona in Bengal for the year 1867-68.

C. Succirubra. The Sikkim stock of *C. Officinalis* was raised principally from seeds from Ceylon, and it is worthy of note that the entire stock of this species has been so seriously affected with canker as to cause the cultivation to be abandoned. The Sikkim stock of *C. Pahudiana* raised solely from Java plants and seeds has also been destroyed by canker. The Java variety of *C. Calisaya* (*C. Josiphiana*) has been so affected by canker that only one plant existed on the Sikkim plantations at the date of my visit in February 1871 out of all the plants received of this variety. It is thus a matter of record that disease in the Sikkim plantations has not been confined to plants produced from the Nilgiri stock; disease, in fact, having made even more serious inroads on the plants and seedlings from South America, Ceylon, and Java. The *C. Succirubra* and *C. Calisaya*, the principal stock of which were supplied from the Nilgiris, are the only species which give a hope of successful culture in Sikkim. It, therefore, may be fairly assumed that the stock of these plants were at least as healthy as any procured elsewhere.

8. I shall now notice what Dr. Anderson states to have been the condition of our plants. That gentleman visited the Nilgiris on the 17th December 1861, and that he was not favourably impressed with anything we had done is abundantly illustrated in his report to the Secretary to the Government of India of 14th February 1862. In this report Dr. Anderson condemns all the sites on the Nilgiris as unsuited to the growth of Cinchona. He asserts that the plants require "dense shade," and that our attempt to grow a "shade-loving tree" in such "unnatural places as cleared gardens" will end in "complete failure." This depreciation also extends to our plants, as Dr. Anderson, in the same report at paragraph 8, states, "the season is now too far advanced for the despatch of plants to Java, and the plants at the Nilgiris are not at all adapted for transmission to a distance, as plants artificially propagated, as they have been, cannot bear the risk of a long journey without a few months' preparation. Of those I brought, the short journey from the Nilgiris to this, I lost nearly ten per cent., while the plants from Java, which were seedlings, can hardly be said to have suffered at all." Again, at paragraph 6, Dr. Anderson, referring to the Nilgiri plants, says, "These arrived in tolerable order, considering the loose manner in which Mr. McIvor, from want of time, was obliged to pack them. About 13 plants out of 204, the entire number received, have been seriously damaged, the remainder, in the present genial climate of Calcutta, have quite recovered, and are as healthy as at Ootacamund." Again, at paragraph 20, Dr. Anderson states that "193 plants" out of the 204 were "growing most vigorously" in the Calcutta Botanical Gardens on 19th January 1862. This reduces the loss to less than 5½ per cent.

9. The whole of the above gives a most erroneous impression, as the loss of the plants was neither owing to artificial propagation or to being carelessly packed, but was wholly caused by an accident which Dr. Anderson describes in his report on the Botanical Gardens, Calcutta, from April 1861 to April 1862, in these words, "while I was at Ootacamund I procured 204 plants belonging to four other species of Cinchona, besides those I obtained in Java. Several of these plants were destroyed between the foot of the Nilgiris and the Railway Station by the upsetting of one of the carts on which the Wardian cases were carried."

10. The last batch of plants forwarded from the Nilgiris as stock for the Sikkim plantations were prepared by me in December 1862, and are thus mentioned by Dr. Anderson in his report on the Sikkim plantations from 1st April 1862 to 30th April 1863. "These plants were obtained from Madras on the 31st January 1863, and of the original number 350, obtained from Madras, only 23 had been lost between Calcutta and Darjeeling during the two months that had intervened from the date of their arrival in Calcutta and their reaching Darjeeling." Dr. Anderson speaks of the same plants in his letter to Sir William Denison, dated 9th March 1863 as follows:—"You will probably like to hear that the Cinchona plants supplied to me from Ootacamund arrived here in excellent condition; they are still in the gardens, and have grown much; most of them having made three pairs of leaves since their arrival here. The weather is now getting too hot for all of them, except *C. Succirubra*."

11. On the Nilgiris we received on the 9th April 1861 in all 463 plants of *C. Succirubra* from South America, and those plants had been about eight months on these Hills at the time

*Proceedings of the Madras Government, Revenue Department,
11th January 1872.*

Dr. Anderson selected the plants for Bengal. Dr. Anderson thus describes our plants at the date of his visit (December 1861) : " With the exception of a few plants recently placed in the open air, nurseries at Neddivuttum, all the Cinchona plants on the Nilgiris are growing in the Conservatories in the Government Gardens at Ootacamund, where, protected from the vicissitudes of the weather, and in a recently erected house, even under the influence of artificial heat, they are growing luxuriantly." Dr. Anderson selected his 204 plants from 3,500, which were prepared to be sent to the Neddivuttum Nurseries, and the whole of the remainder of these plants, namely, 3,296, were subsequently planted on the first Denison plantation, and now form a fine Cinchona forest. No disease has ever appeared among any of these plants. During this year we have taken the bark from the stems of 1,000 of these trees, and they have yielded upwards of three pounds of dry bark each ; the trees, notwithstanding the removal of the bark, still continue to maintain their usual health and vigour.

12. In conclusion, I would desire to bring prominently forward the following facts :— First, for many years, subsequent to the receipt of the Nilgiri plants, Dr. Anderson and the other gentlemen in charge of the plantations speak of them as in the "highest health" and "growing most vigorously," etc. ; * second, the plants and seedlings received from other places

* From THOMAS ANDERSON, Esq., M.D., Officiating Superintendent, Royal Botanic Gardens, to W. GREY, Esq., Secretary to the Government of India, 11th February 1862.

20. * " The plants are in very good health and *C. Succirubra*, *C. Calisaya*, and *C. Pahudiana*, are growing most vigorously, and seeds *C. Pahudiana* are coming up daily."

First Annual Report on Cinchona cultivation in British Sikkim from 1st April 1862 to 30th April 1863 by T. ANDERSON, Esq., M.D., Officiating Superintendent of the Botanic Gardens, Calcutta.

" I am glad to be able to report that on my visiting the Cinchona Nursery at Lebong in the end of May, I found all the plants in the highest health, and that the propagation of all the species, except *C. Pahudiana*, was advancing rapidly."

Report on Cinchona cultivation at Darjeeling from 1st April 1863 to 15th July 1864, by T. ANDERSON, Esq., M.D.; Superintendent, Botanic Gardens, Calcutta.

" It is, however, deserving of notice as showing the great suitability of the climate of Darjeeling for the species, *C. Officinalis*, (var *Bouplandiana*) that the rate of increase of that species has been nearly 2,000 per cent. during the same period. The rate of increase is now most satisfactory, and the cuttings obtained monthly are large and healthy."

From T. ANDERSON, Esq., M.D., Superintendent of the Botanic Gardens, Calcutta, to S. C. BAYLEY, Esq., Junior Secretary to the Government of Bengal, 13th February 1865.

" The condition of the plants is in the highest degree satisfactory, considering the removal of almost all from Lebong to Rungbee, a distance of about 20 miles."

Report on the cultivation of Cinchona at Darjeeling during the month of April 1865.

2. " The growth of the plants has everywhere been most satisfactory, and especially at the lowest plantation the condition of the plants of all species could hardly be surpassed."

Report on the cultivation of Cinchona at Darjeeling, from the 1st April 1865 to 31st March 1866, by T. ANDERSON, Esq., M.D., Superintendent, Royal Botanic Gardens, Calcutta.

" I am glad to be able to report that the cultivation of Cinchona at Darjeeling has, during the past year, been attended with the greatest success."

*Proceedings of the Madras Government, Revenue Department,
11th January 1872.*

than the Nilgiris, are, if anything, more extensively diseased than those raised from the Nilgiri stock ; third, that Dr. Anderson selected his own plants (204) out of 3,500, the remaining 3,296 were planted out on the Nilgiris. No trace of disease has ever shown itself in these plants and they are at the present time as fine trees for their age as any in the world ; fourth, the loss of the 11 plants mentioned by Dr. Anderson was owing to an accident, and not to artificial propagation or loose packing.

" The stock plants of all the species are in the finest condition, and the 37,000 plants of *C. Succirubra* and *C. Officinalis* intended for the permanent plantations to be commenced in April, are strong and healthy."

Report on the cultivation of Cinchona in Bengal for the year 1867-68.

" The cultivation of Cinchona has been most successfully carried on during the year. The number of plants propagated has far exceeded the amount added to the Cinchonas during any previous year."

From C. B. CLARKE, Esq., M.A., Officiating Superintendent, Botanic Gardens, and in charge of Cinchona cultivation in Bengal, to the Secretary to the Government of Bengal (Botanic Gardens, 27th May 1869.)

7. * " The growth made by the plants in the Rungbee and Rishap plantations during the year has far exceeded that during the preceding year."

(True Copy.)

(Signed)

W. HUDLESTON,

Secretary to Government.

Exd. F. R. Bantleman.

REVENUE DEPARTMENT.

FORT ST. GEORGE,

11th January 1872.

No. 144.

No. 72.

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,

DEPARTMENT OF AGRICULTURE,

REVENUE, AND COMMERCE.

Miscellaneous.

SIR,—The Government of Madras,
when lately on the Nilgiris, made inquiry
as to the foundation for the statement

published at pages 982 and 1,000 of the Supplement to the *Gazette of India*, dated
8th July 1871, to the effect that the Cinchona plants, when originally supplied
from the Nilgiris to Darjeeling, were affected with canker; and I am now directed
to forward copy of Mr. McIvor's reply on the subject, and to request that, in
justice to him and to this Government, the same publicity may be given to his
statement as was given to the unfavourable report above alluded to, which, this
Government consider, is conclusively shown to have been unfounded in fact and
hastily accepted. I am to add that the copy of this letter and of Mr. McIvor's
defence will be communicated to the Secretary of State.

I have the honour to be,

Sir,

Your most obedient servant,

(Signed) W. HUDLESTON,
Secretary to Government.

Exd. F. R. Bantleman.

Agriculture 1872 Department.

From Government of
Fort St. George.

Dated 11th January.

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No. 73.
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FORWARDING copy of Mr. McIvor's letter, refuting the statement that the Cinchona plants originally supplied from the Nilgiris to Darjeeling were affected with canker, and requesting that publicity may be given to it for the reason stated.

No. 25

of 1871.



SUPPLEMENT TO The Gazette of India.

SIMLA, SATURDAY, JULY 8, 1871.

OFFICIAL PAPERS.

A SUPPLEMENT to the GAZETTE OF INDIA will be published from time to time containing such Official Papers and information as the Government of India may deem to be of interest to the Public, and such as may usefully be made known.

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No Official Orders or Notifications, the publication of which in the GAZETTE OF INDIA is required by Law, of which it has been customary to publish in the CALCUTTA GAZETTE, will be included in the SUPPLEMENT. For such Orders and Notifications the body of the GAZETTE must be looked to.

GOVERNMENT OF INDIA.

DEPARTMENT OF AGRICULTURE, REVENUE, AND COMMERCE.

PAPERS RELATING TO THE CULTIVATION OF CINCHONA AND THE MANUFACTURE OF QUININE IN INDIA.

Extract from the Proceedings of the Government of India in the Home Department (Public).—
No. 645, under date Fort William, the 2nd February 1871.

READ again the following papers on the subject of the manufacture of quinine in India:

From the Government of Bengal	No. 478, dated 21st February 1871.
From ditto	ditto No. 3088, dated 4th November 1870.
To ditto	ditto No. 5524, dated 16th December 1870.
To ditto	ditto No. 5679, dated 24th December 1870.
From ditto	ditto No. 3232, dated 15th November 1870.
To ditto	ditto No. 5680, dated 24th December 1870.
To ditto	of Madras No. 5681, dated 24th December 1870.
From ditto	ditto (telegram), dated 19th January 1871.
To ditto	of Bengal No. 418, dated 21st January 1871.
From ditto	ditto No. 229, dated 23rd January 1871.
To ditto	of Madras (telegram), dated 24th January.

RESOLUTION.—Ever since the introduction of the cultivation of the cinchona plant in this country, the Government of India has watched with the deepest interest the progress of the experiment, feeling convinced that its success would be fraught with the most beneficial results to the whole population.

of India. The advantages to be derived from the successful cultivation of cinchona cannot be over-estimated, as the object is to secure to the country at large the greatest medical boon that could be afforded to it, that is, to place within the reach of the masses of the people, at the lowest possible rates, the only effective specific that science has yet discovered for the commonest of Indian diseases.

2. That the cinchona plant, *C. Succirubra* at any rate, can be grown to any extent in British Sikkim has now been indisputably established by the results that have already been achieved at the Government plantations. And the Governor General in Council fully believes that at little present cost, and with a certainty of considerable future revenue, forests of cinchona may be reared in Sikkim which, by furnishing large quantities of quinine, may hereafter prove a blessing not only to India but to the civilized world.

3. Already the Government plantations in Sikkim yield a considerable supply of excellent bark, and year by year a rapid increase in this supply may be looked for; the Governor General in Council, therefore, thinks that the time has come for a preliminary decision as to how this supply can best be utilized. This view of the case is confirmed by a very interesting report submitted by Mr. Clarke in regard to the experimental manufacture of amorphous quinine at Darjeeling. His Excellency in Council is of opinion that the best mode of settling the many doubtful points connected with this important question is the appointment of a commission to enquire into and report on the whole subject: and in communication with His Excellency the Governor of Madras and His Honor the Lieutenant-Governor of Bengal, he is pleased to nominate the gentlemen named in the margin to form the proposed commission.

Dr. Campbell Brown, President.
Mr. Clarke,
Dr. Simpson,
Mr. Broughton,

Members.

4. His Excellency in Council is well aware that any conclusions that may now be arrived at will doubtless need considerable modifications when a larger experience affords better data than at present exist. He is at the same time of opinion that it is essential to adopt without delay some regular system, the best that can be devised in the existing state of our knowledge, for dealing with the yearly increasing produce of the cinchona plantations.

5. The commission will have to consider, among other matters, whether, on general as well as economical grounds, it would be best—

- (1) to send Home the whole of the bark which bears a marketable value; or
- (2) to extract by a single process all soluble matter from the bark, and send Home the gross proceeds of the first precipitation; or
- (3) to proceed further with the manufacture in India; and, if so, how much further; whether (a) only so far as is necessary to separate the several alkaloids from the resin, coloring matter, and other foreign elements which the first precipitate will contain; or (b) as far as the manufacture of the pure sulphate of quinine?

6. Should the commission recommend the second or third alternative, they will have to consider what processes will, under all the circumstances of the case, be most likely to prove appropriate.

7. A certain percentage of the total yearly yield of bark will, owing to extreme poverty in alkaloids, always be unfit for the Home market; and it will be for the commission to decide how this bark may be most profitably dealt with here.

8. It is also believed that a valuable febrifuge can be readily extracted from the leaf of some species of the cinchona; and this point also, as well as many other kindred questions which will suggest themselves as the enquiry proceeds,

will appropriately form subjects for the consideration of the commission, whose sittings should be, in the first instance, in Calcutta, but who may later, if it be considered desirable, be deputed to visit the plantations themselves.

9. The commission will carry on their enquiries under the orders of the Lieutenant-Governor of Bengal, and will submit their final report to that authority.

ORDER.—Ordered, that a copy of this Resolution be forwarded to the Government of Bengal for information and guidance.

(True Extract.)

A. O. HUME,

Offg. Secy. to the Govt. of India,
Home Dept.

Extract paragraphs 4 and 5 of a letter from the Right Hon'ble the Secretary of State for India, to His Excellency the Right Hon'ble the Governor General of India in Council, —No. 28 (Public), dated India Office, London, the 4th April 1871.

4. THERE is one circumstance that should be borne in mind with reference to the bark trade. The supply of ordinary cinchona barks is practically unlimited from South America, and the only barks that will yield a permanently remunerative return, if imported from India, are those of the best description. The ordinary kinds of bark and that of *C. Succirubra*, will be suitable for the supply of amorphous quinine in large quantities for use in India; but bark intended for exportation should be of superior quality, such as would really meet the demands of the European markets. The efforts of cinchona cultivators in India, who merely undertake the work as a commercial speculation, should be turned to the production of barks having the richest yield of crystallizable quinine.

5. I observe, among the papers forwarded with your despatch dated 15th February 1871, a letter from the Honorary Secretary of the Darjeeling Cinchona Association, complaining that its members were induced to stake their capital in an undertaking in which they only expected competition with private individuals, while, in fact, they have been brought into ruinous competition with the Government itself. I have already expressed my opinion on this point to the Government of Madras. It should be clearly understood that the Government have no intention of embarking permanently in the bark trade. In sending their cinchona bark to the London market, one object is certainly to repay the cost of introduction and experimental cultivation of the plants; but the principal intention of the Government, in sanctioning this measure, is to act as a pioneer in establishing the reputation of Indian-grown barks, and not to injure the prospects of private planters, whose success would give the Government very great satisfaction.

From R. H. WILSON, Esq., Officiating Under Secretary to the Government of Bengal, General Department, to the Secretary to the Government of India in the Home Department, —No. 1309, dated Fort William, the 8th May 1871.

WITH reference to the orders of the Government of India quoted on the margin, I am directed to forward herewith copy of a letter No. 1412, dated 30th March, from Dr. J. C. Brown, President of the Cinchona Commission, submitting with enclosures the report of the

Home Department, No. 615, dated 2nd February 1871.
Home Department, No. 467, dated 2nd February 1871.

Commission on the results of the inquiry held by them into matters connected with the experimental manufacture of quinine at Darjeeling.

2. I am to add that the Lieutenant-Governor has been pleased to accept the recommendations of the commission, and has issued orders for giving effect to those contained in paragraphs 12, 17, and 20 of the report.

3. Upon the main question as to the advisability of a local manufacture of bark into alkaloid, or the alternative of packing and England, the commission pronounce no definite opinion. The cost of a manufactory on the spot is still most uncertain, and for the next season's produce the Lieutenant-Governor has determined to act on the suggestion made by the commission, and to send Home for sale the bulk of the stem bark, reserving the inferior residue for the local manufactory. It has been ascertained that the manufacturing season will begin on the Rungbee Plantations by the middle of October, and enquiries are being made for a competent person to undertake the work.

4. The question of working the leaves of the cinchona may, as proposed in paragraph 19 of the report, await the result of the experiments in progress on the Nilgherries.

From DR. J. C. BROWN, Inspector General of Hospitals, Indian Medical Department, and President of the Cinchona Commission, to RIVERS THOMPSON, Esq., Officiating Secretary to the Government of Bengal,—No. 1412, dated Fort William, the 30th March 1871.

I HAVE the honor to forward, for submission to His Honor the Lieutenant-Governor of Bengal, and ultimate transmission to the Supreme Government, the report of the cinchona commission appointed under Home Department Resolution No. 645 of 3rd February 1871, and convened under your letter No. 471 of the 18th of that month.

Proceedings of the commission, with Appendices A to H, accompany.

Report of the commission appointed by the Supreme Government of India (Resolution No. 645, proceedings of the Home Department, Fort William, 3rd February 1871) to inquire how the supply of bark from the Cinchona Plantations in Sikkim might be best utilized, and into other matters connected therewith.

WE are appointed to inquire, among other matters, how the supply of bark from the Government plantations at Rungbee, in British Sikkim, might best be utilized, and we received a separate instruction to examine Mr. McIvor, the Superintendent of the Government Cinchona Plantations in the Nilgherries.

2. We found that, as has been officially reported, *Cinchona Officinalis* has never grown well on the Government plantations in Sikkim, and is now largely dying out, and we recommend that what remains of it be cut during the present season, except a few experimental patches, which will serve, moreover, to supply seed. That portion of the bark which is worth carriage to England, and which will amount, perhaps, to 500lbs, may be sent for sale in London, and the twig bark may be worked up at Rungbee by the machinery now there.

3. We found that several years must elapse before any considerable supply of *Cinchona Calisaya* will be given by the Government plantations, and in the whole of the following report it will be understood that we refer to *Cinchona Succirubra* alone.

4. Mr. McIvor's examination was first taken. Mr. McIvor's opinion was that *Cinchona Succirubra* will never form a permanent forest plantation at

Rungbee; that, as a rule, it grows splendidly for the first two years, and, where there is a good depth of soil, for the first three years; but that as soon as it reaches the cold sub-soil it is attacked by canker, and that one in three of all the existing plants more than three years old will die out within the ensuing year, hence, that the quantity of bark now upon the plantation is greater than will ever be hereafter obtainable from the existing trees.

5. Though we were not appointed with the express object of inquiring into the cultivation and prospects of the Rungbee Plantation, yet it seemed to us that, unless some reply was furnished to the opinion of Mr. McIvor, it would appear almost frivolous to enter upon a difficult inquiry as to how certain bark should be worked up, while it seemed unlikely that such bark would ever be produced. We also considered that, after having added general terms to their instructions, Government would fairly expect that we should not pass, without investigation, such an opinion as that of Mr. McIvor—a most accomplished gardener, and of more experience in Indian cinchona culture than any other man.

6. We accordingly collected the opinions of all other competent and experienced persons whom we could reach. These witnesses differ widely among themselves as to the nature, cause, name, and number of the diseases found among the cinchona plants; but they all coincide upon the one point of vital importance, viz., that *Cinchona Succirubra* is not likely to die out at Rungbee, but that it will form forest there, and yield from existing plants a continually increasing supply of bark.

7. It appears to us that in the case of the introduction of an exotic tree, its rapid propagation by cuttings, and its planting out under circumstances of soil and climate, which can hardly be supposed other than very different from those subsisting in its native land, it might be dangerous to predict absolutely whether the tree will stand ten or twenty years, far more so to assume that it will stand sixty or a hundred years, as it does in its indigenous state. We are nevertheless sanguine that no such complete failure and disappearance of the trees as that contemplated by Mr. McIvor is to be apprehended.

8. A small patch of trees, 374 in all, was planted out in 1864. Of these at least 100 died during the first year, and 230 are still alive, of which number about 90 were cut to the ground in December 1870 in the process of thinning; but diseased trees are stated to have been selected for thinning out. It therefore appears to us safe to entertain a strong expectation that the trees will stand seven or eight years; and should they stand no longer, a large supply of bark might be obtained by coppicing the plantations at that age.

9. It may be seen from Mr. McIvor's evidence that against this argument he would urge that in his opinion disease is rapidly increasing over the plantations, and that the present trees of three and four years old will not stand so long as those planted in 1864 and 1866 have stood. But, again, the opinion of the gardeners in charge of the plantations is unanimous that disease is not increasing on the plantations.

10. The reasons given by Mr. McIvor (in reply to questions Nos. 30 and 30* of his evidence—vide Appendix A, No. 1) for supposing that disease is now spreading on the plantations, do not appear to us to be satisfactory. We therefore have not thought ourselves relieved from the duty of carrying out the main instructions of Government, viz., the inquiry how the future supply of bark at Rungbee may be best utilized.

11. The stems of a few trees have been attacked by borers, of which two kinds have been observed; also a caterpillar attacks the leaves. But we do not consider that either of these agricultural pests is present in such numbers as to cause anxiety.

12. We recommend that some method be adopted at Rungbee for obtaining every six months more exact statistics regarding the condition of the plantations.

The President, Dr. Simpson, and Mr. Broughton, agreed that a tabular schedule, somewhat like that given in Appendix G, might be adopted for a return of each year's planting, and that it was undesirable that the duty of filling these up should be entrusted to the gardeners only.

Mr. Clarke thought the form of schedule suggested by him, and given with his minute in Appendix H, would be better for the reasons therein given.

13. During the cold season of 1870-71 the Rungbee Plantations have produced about 12,500lbs. of dry bark of *Cinchona Succirubra*. Of this, 5,000lbs. of the best, which is expected to fetch 1s. 9d. per pound in London, has been despatched thither for sale, the remaining 7,500lbs. have been boiled down at Rungbee.

With regard to the stem bark which will be produced in 1871-72, the question of economical advantage between manufacturing it into cinchona alkaloid by Mr. Broughton's process on the spot, and the alternative plan of drying and packing it for sale in London, will ultimately depend on the cost at which such manufacturing process can be carried out on the large scale, and we do not feel that at present we are supplied with sufficiently exact data at Rungbee to enable us to report on this point.

14. We remark, for instance, that alcohol, 80 per cent. absolute, has cost from the Medical Store-keeper. Calcutta, ten annas per pound, and the carriage to Rungbee costs three annas per pound. Mr. Gammie has reported that, with the aid of the Coffey fractional still now at Rungbee, he can make alcohol, 80 absolute, from hill maize at a cost of 2½ annas per pound; and if this can be done on the large scale, an entirely new economic aspect would be given to the whole question under consideration.

15. We therefore recommend that the bulk of the stem bark be packed next cold season for sale in London, but that experiment on a considerable scale be made in manufacturing some of this bark at Rungbee, and that an accurate record of the outlay on manufacture at Rungbee be henceforth kept.

16. We recommend that the inferior bark be worked up at Rungbee.

The cost of working 1,000lbs. of bark is not materially different, whether such bark contains five per cent. of alkaloid or only .5 per cent. of alkaloid; and hence the economic value of Mr. Broughton's process is hardly tested by trying it on the twig bark alone, from which all the finer bark has been picked out.

17. The President, Dr. Simpson, and Mr. Broughton, are strongly of opinion that the manufacture of cinchona bark, whatever process be adopted, ought not to be entrusted to other than a qualified person, and this opinion is much strengthened by the very serious admixture of copper found in the product last sent down from Rungbee. They are also of opinion that the present work by the two gardeners should be stopped immediately.

18. We are of opinion that it is of the highest importance that some method of working the bark without boiling (if such a method remains to be discovered in the case of young red bark) should be devised. We recommend that further investigation of the method of infusion, proposed by Dr. Simpson, be therefore carried out by a competent person.

19. Cinchona leaves do not appear to contain alkaloid in quantity at all likely to repay the expense of working. They contain quinovic acid to the extent of one or two per cent. their dried weight, which can be probably extracted and issued as quinoicates of lime and magnesia. The febrifugal value of these quinoicates has not yet been satisfactorily proved; their tonic

properties are established: they are also said to be useful in bowel complaints. The Madras medical authorities are now experimenting with such preparations furnished them from the Nilgherries by Mr. Broughton. Pending the result of these experiments, we do not recommend that any attempt to manufacture the quinoicates be engaged upon at Rungbee.

20. We learn that the Medical Store-keeper is still obtaining from Europe, at high prices, considerable quantities of red bark to be used in decoctions, &c. We recommend that the indents for red bark in future should be made upon the Rungbee Plantations. It is possible that, as red bark can be furnished thence at very small cost, the employment of such decoctions may be extended advantageously in the Government medical service.

21. We have appended a very full report of our proceedings and discussions, with appendices containing the examinations of the witnesses, and various others papers, so that the whole of the information upon which our report is grounded is thus placed at the disposal of Government for reference. We have, therefore, supposed a long report unnecessary, and hope the present will supply a convenient summary of the results which we have been able to arrive at.

J. CAMPBELL BROWN,	} President.
Offg. Insp. Genl. of Hospitals.	
C. B. CLARKE,	} Members.
Offg. Supdt., Botanic Garden, Calcutta.	
B. SIMPSON, M. D.,	
Civil Surgeon of Patna.	
JOHN BROUGHTON,	
Govt. Quinologist, Madras.	

APPENDIX A.

Examination of Witnesses.

THE questions put to the witnesses were framed with the sole object of eliciting the desired information in the most direct way, and some questions were put by individual members of the commission as the examination proceeded.

No inference, therefore, must be drawn from the wording of the questions as to the opinion which the commission accepted on any contested point.

APPENDIX A.—No. 1.

Examination of Mr. McIVOR, who has had the direction of the Government Cinchona Plantations in the Nilgherries from 1860 to the present time.—(taken 28th February 1871).

ARE you of opinion that *Cinchona Succirubra* can be grown to any extent in British Sikkim?—It can be grown to any extent.

2. Are the plants of *Cinchona Succirubra* likely to attain the size of forest trees?—From the appearance of the plants I do not think that they will form at Rungbee and Rishap a permanent forest plantation. The majority of the plants are now diseased, and thousands of them have already died of canker. As a rule, the plants have grown splendidly during the first two years, and in places where the surface soil is deep during the first three years.

On patches of damp land they have not grown at all. The disease among the plants appears to me to be caused by the roots getting into a cold, damp sub-soil.

Have you any of this canker on your plantations in the Nilgherries?—Yes; but to a very limited extent.

Then you consider the condition of the Nilgherry *C. Succirubra* Plantations to be more healthy than that of the plantations here?—Yes; certainly.

Is the average vertical growth during the first three years of the *C. Succirubra* trees in Sikkim greater than in the Nilgherries?—A few exceptional plants have a much greater growth here, in Sikkim, than any in the Nilgherries, but the average growth at the Nilgherries is greater than in Sikkim even during the first three years.

What do you suppose to be the cause of the great growth of the few exceptional plants?—It appears to be due to their having been planted over pits that have been made by the natives in digging for the roots of wild yams, and that have been afterwards washed in with fine vegetable mould.

17. May a rapid increase in the supply of bark be looked for from existing plants?—No; I think the plantations would yield more bark now than ever they will hereafter. If this question refers to the plantation of from four to six years' growth, the greater quantity of bark will be produced by cutting them down now, because the disease is rapidly destroying the plants. My impression is, that there are 100,000 Plants of the age above-mentioned which will die before the end of this year.

20. What do you consider the best means of drying the bark for export?—My limited experience leads me to suppose that the bark would be best dried as rapidly as possible in the sun.

I dried some bark in an oven, and some in the sun, taken from the same tree and of the same quality, which I sent to Mr. Howard, who found about a third more crystallizable alkaloid in the former than in the latter. I learn from Mr. Broughton that exposing the bark to too high a temperature renders the alkaloids uncrystallizable.

23. Should Government wish to extend the plantation, what species of cinchona will grow best?—It does not seem to be established which species will be the most profitable to grow. The red-bark plant is the most luxuriant, both here and on the Nilgherries.

25. What are the merits of the adjoining plantation of the Darjeeling Cinchona Association at Pomong, as compared with those of the Government Plantation?—The Pomong Plantation appears to be in as good a condition as the Government Plantation.

26. We learn that a large proportion of the trees of the Pomong Plantation were cut down last year; do you think that the plantations are thereby rendered less valuable?—The plantations may be benefited by the cutting down, as all, or nearly all, the stumps appear to have been cankered. These stools are now throwing fine vigorous shoots which promise to be free of canker for two or three years at least. If the canker is allowed to advance too far before the trees are cut down, they do not throw strong shoots from the stumps, and many of them die altogether.

30. Do you consider the canker to be spreading in the plantation?—The canker appears to me to be rapidly spreading. It is met with in all stages of development on the plants. Many plants which are now sickly must have been healthy three months ago. It appears to me that, when the roots penetrate the cold sub-soil, canker makes its appearance, and the tree subsequently makes no healthy growth.

30*. Can you give more fully your reasons for believing that the canker is now spreading in the plantations?—I judge from the fact that the young trees are healthy; that the trees of from four to seven years' growth must

have been healthy in the early stages of growth from the fact that, where the sub-soil is near the surface, the canker sets in and destroys plants long before those on a deeper surface soil are affected; from the fact that the roots in the lower sub-soil are decayed at their points, while the roots in the upper soil are still fresh and vigorous.

30*. You have stated that, during the first two or years, the plants are healthy, and grow vigorously; do you not consider it possible that the canker in the older plants may be due to the fact of over-propagation in the first instance?—It appears to me that the canker arises from the roots entering the cold sub-soil.

31. Can you suggest any remedy for the state of canker?—It is difficult to apply a remedy to canker, because the cause generally lies in the soil. Deep cultivation, large pits filled in with surface soil, and deep draining might have a good effect, but would not in any way tend to make the cultivation profitable. This canker also exists in Java, and in the plant in the natural forests of South America, where seedlings which germinate in low, damp places generally die out in the third or fourth year.

31*. Do you consider that what you have said respecting *C. Succirubra* applies to *C. Calisaya* also?—In every respect, so far as I can judge from so small a number of plants.

APPENDIX A, No. 2.

Re-examination of Mr. McIVOR immediately after the Commission had been accompanied by him through the plantation.—(Taken 4th March 1871).

You stated in your reply to question 17 *supra*, that your impression was that 100,000 plants of from four to six years' growth would die before the end of this year; what do you mean by a plant of four years' growth?—I meant a plant that had entered on its fourth season of growth.

Are we to understand from what you have said that you consider the soil and climate of British Sikkim to be unsuited to the growth of *C. Succirubra* and *C. Calisaya*?—It is rather difficult for me to say. My impression is that a better soil would have produced better and finer plants. As for the climate, I have no knowledge of it. Sikkim is, however, beyond the Tropic, and I believe that in South America cinchona is not found without the Tropics; but I consider this is no reason that the plants may not do well, provided the sub-soil is open and dry.

APPENDIX A, No. 3.

Examination of Mr. GAMMIE, who has been in charge of the Government Cinchona Plantations as Head Gardener since January 1866.—(Taken 28th February 1871).

1. ARE you of opinion the *cinchona succirubra* can be grown to any extent in British Sikkim?—I am of opinion that it can be grown to any extent.

2. Are the plants of *cinchona succirubra* likely to attain the size of forest trees?—Yes.

3. Can they be grown at little cost?—Yes.

4. Can they be grown with a certainty of future revenue?—I reserve my opinion on this point.

5. Why do you reserve your opinion on this point?—Because I am doubtful of the bark retaining its present price.

6. Why do you conclude that they can be grown to any extent and at little cost?—Because labor is cheap, and the land is easily cleared, and plants are produced cheaply.

7. Do you think that disease exists among the *C. Succirubra* plants; and if so, to what extent? Yes, disease exists in some part of the plantations, and not in others.
8. What is the disease?—Canker.
9. Have not a number of plants already died?—No, not one in a thousand has died yet of canker; but plants have died out in considerable quantities from bad drainage.
10. There is a marked difference in the growth of the trees; to what do you ascribe this?—To difference in soil.
11. You are aware, I suppose, that natives dig for yams in these parts, leaving large holes open; have many trees been planted in such holes filled up with good earth, and do you think that this may account for the difference alluded to? Natives have dug for yams, but this occasions no difference in the plants. The yam-pits are rare; there are frequently ten acres without a yam-pit.
12. What depth are the yam-pits?—From two to five feet.
13. The vertical growth of the trees is great during the first three years; is this rate of growth as in the second and third subsequently maintained?—Yes; trees of five years' growth have grown as well in the fourth and fifth year as in the second and third.
14. What is the cause of the canker in the plant?—I attribute it to hard propagation so that the stock got weakened. It may be partly due to cold soil, so that the plants got weakened.
15. What do you mean by a cold soil?—A soil that retains the moisture.
16. Do you consider cold soil exceptional, or is it general over the plantation? I consider it exceptional.
17. May a rapid increase in the supply of bark be looked for from existing plants?—Yes.
18. How many plants were planted out by the end of 1866?—31,387.
19. Within what period do you expect the cankered plants to die?—They will not die. If a tree be affected with canker, and the top be cut away, it will shoot out again and become a forest tree.
20. What do you consider the best means of drying the bark for export?—The only way I have done it is to dry it in the air, and then finish over charcoal.
21. What is the cost of drying and packing 1,000 lb?—About Rs. 50.
22. Would packing in gunny bags be cheaper than in boxes?—I do not know the price of gunny bags.
23. Should Government wish to extend the plantations, what species of cinchona will grow best?—*Cinchona succirubra*; it is the hardiest plant, and will grow any where. *C. Calisaya* requires its site selected.
24. Do you know the adjoining plantation of the Darjeeling Cinchona Association at Pomong?—Yes.
25. What are the merits of that plantation as compared with those of the Government plantations?—Equal, as they stand.
26. We learn that a large proportion of the trees of the Pomong plantation were cut down last year; do you think that the plantations are thereby rendered less valuable?—Yes; for the present.
27. Do you think it would be advisable to cut the Government plantations more severely than heretofore?—At the end of four years every plant not likely to make a good tree should be cut down.
28. What do you mean by a plant that is not likely to make a good tree?—Every tree which is cankered, or hide-bound, or stunted, or wants a leader.
29. Do you consider a cankered tree and a hide-bound tree in different stages of the same disease?—No.

30. Do you consider the canker to be spreading in the plantation?—Certainly not. It is diminishing, because we have got a healthier stock.
31. Can you suggest any remedy for the state of canker?—Cut them down.
32. Would cutting down all the cankered trees leave enough standing to form a forest?—Over nine-tenths of the plantation, it would.
33. Do you consider the canker a consequence of planting in wet places?—No.
34. Do you consider *Cinchona Calisaya* to be more liable to disease than *Cinchona Succirubra*?—I have not sufficient experience.
35. From the experience you have had, do you consider the plants of *Cinchona Calisaya* promising?—Yes; in well selected places.
36. What are the conditions which you consider necessary for the growth of *Cinchona Calisaya*?—An altitude not exceeding 3,000 feet, a moist and shady situation, and good soil.
37. You have stated that the Pomong plantation has been rendered less valuable for the present: do you consider that it will become more valuable hereafter; and if so, why?—Yes: because I believe the shoots from the stools of the plants that have been cut down will make better trees than the original plants would have done.

APPENDIX A, No. 4.

Re-examination of MR. GAMMIE.—(Taken 6th March 1871.)

38. You were present when Mr. McIvor pointed out to the Commission the existence of canker both in the young and in older plants of *C. Succirubra* and explained his views concerning it; has your opinion regarding the permanence of the plantation been thereby modified?—No; my opinion is the same as before, because in the earlier planting of 1864 and 1866 the disease—if it is to be called a disease—was much worse than it is now.

APPENDIX A, No. 5.

Examination of MR. KENNEDY, who has been 2nd Gardener on the Government Cinchona Plantation since February 1867.—(Taken 2nd March 1871.)

1. Are you of opinion that *Cinchona Succirubra* can be grown to any extent in British Sikkim?—Yes; I think so.
2. Are the plants of *Cinchona Succirubra* likely to attain the size of forest trees?—Yes.
3. Can they be grown at little cost?—Yes.
4. Can they be grown with a certainty of future revenue?—I think they ought to give a good revenue.
6. Why do you conclude that they can be grown to any extent and at little cost?—Because the other slopes in the neighbourhood are as good as those at Rishap, and when the plants grow up they will require comparatively little labour.
7. Do you think that disease exists among the *cinchona succirubra* plants; and if so, to what extent?—Yes, some of them are diseased; about one-eighth.
8. What is the disease?—Canker.
9. Have not a number of plants already died?—Yes, about 4 per cent. of the first hundred acres I planted have already died. They have not all died of canker. Some have died of damp sub-soil.

10. There is a marked difference in the growth of trees; to what do you ascribe this?—To difference in soil.

11. You are aware, I suppose, that Natives dig for yams in these parts, leaving large holes open; have many trees been planted in such holes filled up with good earth; and do you think that this may account for the difference alluded to?—I know that the Natives have dug for yams. I have only seen one cinchona plant put in a yam hole.

13. The vertical growth of the trees is great during the first three years; is this rate of growth subsequently maintained?—Yes.

14. What is the cause of the canker in the plant?—Hard propagation may have something to do with it.

14*. Do you not consider it possible that a wet sub-soil might induce canker in a healthy seedling?—It might, but such a sub-soil would never grow a healthy plant, though it might not cause canker.

16. Do you consider cold soil exceptional, or is it general over the plantation? I consider it exceptional.

17. May a rapid increase in the supply of bark be looked for from existing plants?—I do not think any increase in the supply must be expected next year. The year after that it will be very considerable. I do not see why it should not continue to increase afterwards.

17*. Why will not the yield of bark be increased next year?—Because there was no such large amount planted in 1868, and a number of vacancies occurred which were not filled up immediately.

19. Within what period do you expect the cankered plants to die?—I cannot say that I have ever seen them die of canker only in good soil. Canker plants will die above the canker, but will spring up again from the roots, and this second growth may become a tree.

20. What do you consider the best means of drying the bark for export?—In the sun, or else under sheds so arranged that the air may pass freely through. It will then get perfectly dry in the months of October, November, February, March and April.

23. Should Government wish to extend the plantations, what species of cinchona will grow best?—*Cinchona Succirubra*, because it is more easily propagated than *C. Calisaya*; but when once planted out, I do not think *C. Calisaya* will be more troublesome.

24. Do you know the adjoining plantation of the Darjeeling Cinchona Association at Pomong?—Yes.

25. What are the merits of that plantation as compared with those of the Government plantation?—There is little difference between them.

26. We learn that a large proportion of the trees of the Pomong Plantation were cut down last year; do you think that the plantations were thereby rendered less valuable?—No; I think they were benefited, for a number of the trees cut down were cankered, and the shoots springing from the stools are quite healthy.

27. Do you think it would be advisable to cut the Government plantations more severely than heretofore?—No; I would only cut cankered trees. There is no need to cut healthy trees.

29. Do you consider a cankered tree and a hide-bound tree in different stages of the same disease?—No.

29*. Are you acquainted with the plan of slitting up the bark of a hide-bound tree?—Yes; I approve of it.

30. Do you consider the canker to be spreading on the plantation?—It is not decreasing, at any rate.

30*. Are we to conclude therefore that it is increasing?—No; I think it is about the same.

In the first year that I was here, I do not think that I observed canker at all in the plantation. The second year it made its appearance, and the third year it got worse. The fourth year it has not increased.

31. Can you suggest any remedy for the state of canker?—No.

32. Would cutting down all the cankered trees leave enough standing to form a forest?—Yes; I think so.

33. Do you consider the canker a consequence of planting in wet places?—No.

34. Do you consider *Cinchona Calisaya* to be more liable to disease than *C. Succirubra*?—No.

35. From the experience you have had, do you consider the plants of *Cinchona Calisaya* promising?—Yes.

36. What are the conditions which you consider necessary for the growth of *C. Calisaya*?—The same as for the growth of *C. Succirubra*.

42. Of the plants of 1866 planting, how many have died?—There were about 25,000 standing of previous years' planting when I came here in 1867; of these about 2,500 have died. About half of the trees have been cut. They have died out in patches.

You say there were about 25,000 trees in permanent plantation when you first came here in 1867, of which about half have been cut, and about 2,500 are dead. Some 10,000 plants will remain, of these what percentage do you expect will die in the course of the next three years?—About 3 per cent.

APPENDIX A, No. 6.

Examination of MR. JAFFREY, the 3rd Gardener, who has been in the Government Cinchona Plantations since 1862.—(Taken 2nd March 1871.)

1. ARE you of opinion that *Cinchona Succirubra* can be grown to any extent in British Sikkim?—Certainly.

2. Are the plants of *Cinchona Succirubra* likely to attain the size of forest trees?—I believe they can be grown into forest trees.

3. Can they be grown at little cost?—I cannot speak as to cost.

4. Can they be grown with a certainty of future revenue?—I think it ought to yield a large revenue.

7. Do you think that disease exists among the *Cinchona Succirubra* plants; and if so, to what extent?—Yes, they are diseased to a considerable extent. The disease does not exceed 20 per cent.

8. What is the disease?—Canker.

9. Have not a number of plants already died?—Very few.

10. There is a marked difference in the growth of the trees; to what do you ascribe this?—To portions of land that have not been so severely cultivated by squatters. The bamboo jungle has never been cultivated, and on this the trees are luxuriant.

11. You are aware, I suppose, that natives dig for yams in these parts, leaving large holes open; have many trees been planted in such holes filled up with good earth, and do you think that this may account for the difference alluded to?—No; it has nothing whatever to do with it.

13. The vertical growth of the trees is great during the first three years; is this rate of growth subsequently maintained?—Very nearly.

14. What is the cause of the canker in the plant?—Moisture, I believe, and bad ventilation.

14.* You had charge of the plants at Lebong in 1863 before any were planted out from the nursery, the canker then appeared; to what do you attribute this?—To moisture and over-propagation.

14.** Do you not consider it possible that wet sub-soil might induce canker in a healthy seedling?—Yes.

16. Do you consider cold soil exceptional, or is it general over the plantation?—It is exceptional.

17. May a rapid increase in the supply of bark be looked for from existing plants?—Yes.

19. Within what period do you expect the cankered plants to die?—They must be cut to the ground, and then they will live. If a branch only is cankered, the branch only need be cut.

20. What do you consider the best means of drying the bark for export?—I cannot give an opinion.

23. Should Government wish to extend the plantations, what species of cinchona will grow best?—*Cinchona Succirubra* and *C. Calisaya*. What *C. pitayensis* will be, I do not know.

24. Do you know the adjoining plantation of the Darjeeling Cinchona Association at Pomong?—Yes.

25. What are the merits of that plantation as compared with those of the Government plantations?—Nearly equal; the Government plantations being the better in general appearance. This is to be attributed to aspect.

26. We learn that a large proportion of the trees of the Pomong Plantation were cut down last year; do you think that the plantations are thereby rendered less valuable?—No, I do not: the growth is rapid from the stools and superior to the original growth.

27. Do you think it would be advisable to cut the Government plantations more severely than heretofore?—Yes.

29. Do you consider a cankered tree and a hide-bound tree in different stages of the same disease?—They are decidedly different diseases.

30. Do you consider the canker to be spreading in the plantations?—I consider it to be diminishing. Formerly we had it everywhere, both in the nursery stock and in the cuttings.

30.* You stated that in your opinion canker was caused by moisture and bad ventilation; these causes remain in operation now as before; to what then do you attribute the diminution of the canker?—To a change in the manner of propagation by treating the young cuttings in a more hardy manner, and not under glass.

34. Do you consider *Cinchona Calisaya* to be more liable to disease than *C. Succirubra*?—No; it is less liable, being a less soft plant than *C. Succirubra*.

35. From the experience you have had, do you consider the plants of *Cinchona Calisaya* promising?—Yes.

35.* Are the plants of *Cinchona Calisaya* likely to die?—A few exceptional plants may die.

39. Supposing that you were to take a plant indigenous to the soil and propagate it by seedlings and cuttings, and plant it six by six over the Rungbee valley, would you expect it to be more uniform than *C. Succirubra*?—No.

44. Of the older plants now growing on Rungbee, what proportion do you expect may die from canker and other causes within the next three years?—I do not believe that any except a few tops will die.

APPENDIX A, No. 7.

Examination of Mr. BIERMANN who came as a gardener to the Rungbee Plantation in the spring of 1865, then had charge of the Government Cinchona Plantations in the Khasi Hills from February 1867 to August 1870, and since then has been re-transferred to Rungbee in charge of the manufactory.—(Taken 3rd March 1871).

1. Are you of opinion that *Cinchona Succirubra* can be grown to any extent in British Sikkim?—Yes.

2. Are the plants of *Cinchona Succirubra* likely to attain the size of forest trees?—Yes.

3. Can they be grown at little cost?—I prefer to say nothing about the cost.

4. Can they be grown with a certainty of future revenue?—The revenue will depend upon circumstances.

7. Do you think that disease exists among the *Cinchona Succirubra* plants; and if so, to what extent?—Yes; some plants are diseased. I cannot state what proportion, because I have not lately been working in the plantations.

9. Have not a number of plants already died?—Yes; I have no idea of the number.

10. There is a marked difference in the growth of the trees; to what do you ascribe this?—To the nature of the ground.

11. You are aware, I suppose, that the natives dig for yams in these parts, leaving large holes open; have many trees been planted in such holes filled up with good earth, and do you think that this may account for the difference alluded to?—Yes; such yam holes are dug, and an exceptional cinchona tree may be affected; but one may walk a mile over the ground not planted and not see a yam hole.

13. The vertical growth of the trees is great during the first three years; is this rate of growth subsequently maintained?—The rate of growth may diminish; the subsequent rate of growth may be a little less than during the first three years.

14. What is the cause of canker in the plant?—Excess of moisture both in atmosphere and in the soil.

16. Do you consider cold soil exceptional, or is it general over the plantation?—It depends on the slope of the ground and the nature of the soil.

17. May a rapid increase in the supply of bark be looked for from existing plants?—Yes; because the growth is good, and in the older trees the bark increases in thickness.

19. Within what period do you expect the cankered plants to die?—If badly affected they may die quickly; if not so, they may recover. I have seen cankered plants take on healthy bark.

23. Should Government wish to extend the plantations, what species of cinchona will grow best?—*C. Succirubra*, without doubt, because it is a rapidly growing tree. I have, however, not had much experience of *C. Calisaya*.

24. Do you know the adjoining plantation of the Darjeeling Cinchona Association at Pomong?—Yes.

25. What are the merits of the plantation as compared with those of the Government plantations?—Just equal. I can perceive no difference.

26. We learn that a large proportion of the trees of the Pomong Plantation were cut down last year; do you think that the plantations are thereby rendered less valuable?—It cannot much make difference, since from what I have seen in those places where the trees have been cut, there are enough left to cover the ground within a short time.

27. Do you think it would be advisable to cut the Government plantations more severely than heretofore?—No; the present cutting is now sufficient.

29. Do you consider a cankered tree and a hide-bound stages of the same disease?—No; I think they are different not think the disease seen in the cinchona trees is the same as canker in Europe, but I am not sure on this point.

30. Do you consider the canker to be spreading in the pl I do not. I consider it to be diminishing.

In 1865 about 380 plants had been planted out in perma and I was told that these were all unhealthy when put out year. After the rains sixty died at one time and more died sh some recovered. If this rate of death had continued, 75 pe plants would now be missing, whereas I have now examined 236 alive.

If the canker had been equally fatal in succeeding yea of the plantation as it was in 1865, the plantations would sho the vacancies had been filled up.

31. Can you suggest any remedy for the state of canke would cut cankered trees down below the cankered spots, and planting where there is no natural drainage.

Of the older plants now in the plantations, few, if any, will is drainage; where there is no drainage, more will die.

31.* Do you consider the natural drainage of the plant or bad, speaking generally?—Good, as a whole.

39. Supposing that you were to take a plant indigenou propagate it by seedlings and cuttings, and plant it six by six o valley, would you expect it to be more uniform than *C. Succ* should not.

APPENDIX A, No. 8.

Examination of Mr. SPICER, the 4th Gardener on the Government Cinchon has been continuously employed there since July 1865.—(Taken 3rd M

ARE you of opinion that *Cinchona Succirubra* can be grow in British Sikkim?—Yes.

2. Can the plants of *Cinchona Succirubra* be grown at lit and at a very much less cost than heretofore.

7. Do you think that disease exists among the *Cinc* plants; and if so, to what extent?—Yes; there is one or two cankered; about 2 or 3 per cent.

9. Have not a number of plants already died?—One o there have died, but there are few vacancies.

10. There is a marked difference in the growth of the tr you attribute this?—To difference of soil.

11. You are aware, I suppose, that natives dig for yam leaving large holes open; have many trees been planted in s up with good earth, and do you think that this may account f alluded to?—There are lots of yam holes, but this does not a difference in the growth of the trees.

13. The vertical growth of the trees is great during the f is this rate of growth subsequently maintained?—Yes.

14. What is the cause of the canker in the plant?—Har soil.

16. Do you consider the harsh soil exceptional, or is it plantation?—It is not general.

17. May a rapid increase in the supply of bark be looked for from exist- ing plants?—Yes; certainly.

30. Do you consider the canker to be spreading in the plantation?—No.

30*. Must a plant which is cankered die?—Some die, some live.

APPENDIX A, No. 9.

Examination of Mr. MUNRO, who has been in charge of the Cinchona Plantations of the Dar- jeeling Association at Pomong, as Head Gardener since December 1863; had fifteen years' experience as a Gardener and Forester in Europe, and was trained three and-a-half years in the Edinburgh Botanic Garden.—(Taken 6th March 1871.)

ARE you of opinion that *cinchona succirubra* can be grown to any extent in British Sikkim?—Yes; decidedly.

2. Are the plants of *cinchona succirubra* likely to attain the size of forest trees?—I expect them to grow to the height of 30 feet at least. I do not see why they should not grow as high as in their native land, when we grow them from seedlings: but my present plantation of 5,00,000 have been raised by cuttings from ninety-two plants, and we hardly expect forest trees raised by cuttings to grow to a large size. By the rapid propagation at first here practised, the constitution of the plants was weakened.

3. Can they be grown at little cost?—Yes, they can be grown at very little cost. We merely make a hole in the ground and stick a plant in.

4. Can they be grown with a certainty of future revenue?—At present prices it can be grown to a profit.

7. Do you think that disease exists among the *c. succirubra* plants; and if so, to what extent?—There is no disease whatever except canker, which is hardly worth calling a disease.

In former years' planting it was heavy, say 5 per cent. or more in the 1866 planting; in later years' planting, it is much lighter, say 1 per cent. in the 1869 planting.

9. Have not a number of plants already died?—I cannot say that any nave died of canker only; some may have been broken across by canker very low down, but generally they have thrown fresh healthy shoots from the root.

10. There is a marked difference in the growth of the trees; to what do you attribute this?—To some plants being stronger in constitution than others when planted, and to some plants getting into better soil than others.

11. You are aware, I suppose, that natives dig for yams in these parts, leaving large holes open; have many trees been planted in such holes filled up with good earth, and do you think this may account for the difference alluded to?—Yes, there are yam holes, but we do not fill them up, nor do we plant in them.

If a plant got into a yam hole filled up with good earth, it would very probably grow well; but not one plant in a hundred can be so situated.

13. The vertical growth of the trees is great during the first three years; is this rate of growth subsequently maintained?—As far as I have seen, the rate of growth is maintained.

14. What is the cause of the canker in the plant?—Hard propagation; the canker is helped on if the plant gets into poor soil or into a place where the water stagnates. Numbers of plants die out from wet soil, but this has nothing to do with canker, from which such plants may be quite free.

16. Do you consider the wet soil to be exceptional, or is it general in the Rungbee valley?—A wet subsoil is exceptional, the drainage is in general good.

17. May a rapid increase in the supply of bark be looked for from existing plants?—Yes; most decidedly.

19. Within what period do you expect the cankered plants to die?—I do not expect the cankered plants to die. I cut them over and generally obtain healthy shoots.

20. What do you consider the best means of drying the bark for export?—We are drying our bark under sheds and finishing over charcoal.

21. What is the cost of drying and packing 1,000lb?—Roughly Rs. 26; that is, exclusively of taking the bark off the trees, which costs nearly as much more. (A note subsequently given the Secretary by Mr. Munro.)

22. Would packing in gunny bags be cheaper than packing in boxes?—I do not know the price of gunny, but I should think it would be cheaper.

23. Should it be wished to extend the plantations, which species of cinchona will grow best?—*C. succirubra*. I have very little experience of *c. calisaya*; but so far as I have seen it in the Government plantations, *c. calisaya* may do as well as *c. succirubra*.

29. Do you consider a cankered tree and a hide-bound tree in different stages of the same disease?—No.

31. Can you suggest any remedy for the state of canker?—Cut them down and get young shoots from the stools.

34. Do you consider *cinchona calisaya* to be more liable to disease than *cinchona succirubra*?—No; so far as I have seen, I have little experience of *c. calisaya*.

39. Supposing that you were to take a plant indigenous to the soil and propagate it by seedlings and cuttings, and plant it six by six over the Rungbee valley, would you expect it to be more uniform than *c. succirubra*?—No, you have only to look in the jungle, and you will see that any trees, as the *chelonis*, will grow in one class of situation and avoid another, as the soft places.

40. Do you see a difference between your plants from cuttings and those from seeds in growth and healthy appearance?—No.

41. You have stated you have canker: is it among the plants raised from cuttings only, or is it also among those raised from seed?—Among both.

I raised two years ago a large quantity of plants from Ceylon seed, these are now nearly free from canker.

Our own seedlings were mostly raised from seed of cankered trees, and they also exhibit canker, but the seedlings which I am now raising from seed of sound trees I expect to exhibit little canker. From the state of cuttings which I have received from Ceylon, I infer that in Ceylon they were propagating much less severely than we do.

We received our first cuttings from the Nilgherries, and these were extensively affected with canker.

APPENDIX

Examination of Mr. SCOTT, Curator of the Calcutta Botanic Garden.—(Taken 17th March 1871).

You have been educated as a horticulturist, where?—At the Botanic Gardens, Edinburgh, under Dr. Balfour and Mr. McNab.

You have, we understand, conducted many important and delicate investigations in vegetable physiology: can you particularize any of these?—My investigations have principally been in structural anatomical investigations of the higher cryptogams.

I have also carried out a number of biological experiments for Mr. Darwin: my papers describing the detailed results of these are printed partly in the publications of the Linnæan Society of London, partly in those of the Edinburgh Botanic Society.

When were you put in charge of the cinchona plants at Rungbee?—In January 1865.

How long did you retain charge?—Till May 1865.

Was there any disease at that time among the cinchona plants?—Yes; I observed a disease in the bark. It was not very prevalent, but I occasionally observed it. It was exhibited not only in the plantation, but also in the pot-culture, and in the nursery beds.

What was the nature of that disease?—It first presented itself as a discoloration of the bark and a softening of the cellular tissue; a communication of it inwards, discoloring the wood opposite, ensued.

So far as the process extended, the tissues and the wood had their vitality completely destroyed.

Did you examine closely the diseased plants?—Very closely, and the items most particularly.

What conclusions did you come to concerning the cause of this disease?—The cause appeared to me to lie in the atmosphere rather than in the soil. I noticed that the disease broke out especially after several days' continued rain, and seemed to me caused by a saturated state of the atmosphere inducing suppressed transpiration and a local decomposition of the sap. Then follows a transfusion of the diseased juices into the adjoining parts of the wood. The disease is intensified by a moist state of the soil, but in my opinion does not originally proceed from the soil.

Have you visited the Sikkim cinchona plantations since 1865?—It was in 1866 and again in 1868 for three weeks or a month on each occasion.

You may have heard that doubts have been raised whether *cinchona succirubra* will grow into a forest in Sikkim; are you able to offer any opinion on this point?—So far as I have had opportunity of observation, I see no reason to doubt that it will. I think the disease will gradually disappear as the plantation gets thinned.

10. There is a marked difference in the growth of the trees; to what do you ascribe this?—To the circumstances of the soil.

16. Do you consider cold soil exceptional, or is it general over the plantation?—Exceptional.

29. Do you consider a cankered tree and a hide-bound tree in different stages of the same disease?—Certainly not.

29.* Is there more than one form of disease among the cinchona plants?—The above is the only form of disease that I observed as sufficiently common to merit attention.

31. Can you suggest any remedy for the state of canker?—I do not consider the disease which I have been describing to be canker at all. Canker arises from a wet subsoil, and may be cured by removing the cause.

Canker proceeds from the root; the disease in the cinchona plant proceeds from the eaves. The early stage of the disease in the cinchona plants in no wise resembles canker. It first appears as a minute patch on the bark, as if a drop of nitric acid had been placed on the plant at that point.

Do you consider that a cinchona tree diseased as above described must die?—When the disease extends circularly round the stem, the portion above the diseased ring must die, not the portion below; when the disease spreads longitudinally, the plant may heal up.

34. Do you consider *cinchona calisaya* to be more liable to disease than *cinchona succirubra*?—So far as my experience goes, *cinchona succirubra* is the more liable to disease; but there was very little *c. calisaya* at Rungbee when I last visited there.

39. Supposing that you were to take a plant indigenous to the soil, and propagate it by seedlings and cuttings, and plant it six by six over the Rungbee valley, would you expect it to be more uniform than *c. succirubra*? I do not think that any plant would stand uniformly over such a place. Some of the ground planted in 1868 were mere marsh.

It has been suggested that the disease in the *cinchona* plant has been induced by over-propagation; do you at all admit this view?—Severe propagation will weaken the stock, but the cuttings even from weakened stock plants, if placed under favorable circumstances, will be as vigorous as the direct progeny of seeds.

In taking cuttings, would you willingly propagate from a cankered stock plant?—As readily as from a healthy plant, provided I could find a healthy shoot to make a cutting of. I took on this disease as entirely a local affection.

APPENDIX A, No. 11.

Examination of MR. MANN, Assistant Conservator in the Bengal Forest Department.—(Taken 25th March 1871.)

WERE you educated as a gardener?—I was educated as a gardener in Brunswick, and subsequently in many places—all over the Continent of Europe, indeed.

Did you come out to India to take charge of the *cinchona* plantations; and at what date?—I came out in April 1864, and I went up to Sikkim. The *cinchona* plants were then mainly at Lebong, whither they had been removed from Sinchul. When I arrived, Rungyroong was the nursery. Rungbee was totally uncleared, and during that summer we made a commencement of clearing and planting at Rungbee.

How long did you retain charge of the *cinchona*?—Until Mr. Gammie came out, in 1866. I remained in British Sikkim as a forest officer up to November 1868, and during such time frequently had opportunities of visiting the *cinchona* plantation.

Was there any disease among the *cinchona* plants in 1864?—Yes.

What was the nature of that disease?—A disease in the bark, and it formed furrows in the bark up and down the stem; not round patches. The disease I should hardly call canker; it is a stoppage of the sap only. The disease in the bark of *cinchona* I have frequently seen to heal up.

Did you examine closely the diseased plants?—At that time frequently.

What conclusions did you come to concerning the cause of this disease?—Pressure of propagation, the exceeding artificial rapidity with which the plants were multiplied. More particularly I attribute the disease to the treatment under propagation. We forced the young plants in frames very hard and planted them out suddenly.

You may have heard that doubts have been raised whether *cinchona succirubra* will grow into a forest in Sikkim; are you able to offer any opinion on this point?—Forest is a vague term: they seem to be forest now. If by forest is understood trees of 30 to 40 feet, I think they will quite grow up to that.

10. There is a marked difference in the growth of the trees; to what do you attribute this?—The same difference is always observed in plantations on a large scale as in our forest operations. In gardens sufficient attention may be paid to each plant, but in planting large areas, the coolies cannot be superintended in planting each plant; one young plant may have the earth torn from the root or allowed to drop before planting, and it may never overtake its neighbours.

No care could make up for deficiency in soil: that will show itself very rapidly. Aspect and elevation, too, tells very remarkably on *cinchona*.

16. Do you consider cold soil exceptional, or is it general over the plantation?—It is not general, but it is more common in Rishap than in Rungbee.

29.* Is there more than one form of disease among the *cinchona* plants?—No; only one. I never observed the disease to spread circularly round the stem.

39. Supposing that you were to take a plant indigenous to the soil and propagate it by seedlings and cuttings, and plant it six by six over the Rungbee valley, would you expect it to be more uniform than *c. succirubra*?—No, or very slightly so; but some plants have a very wide range in nature,—are universal plants.

In taking cuttings, would you willingly propagate from a diseased stock plant?—If I could get a good cutting from an unsound plant, I imagine it might produce a sound tree; but I should decidedly select my cuttings from the soundest plants.

You planted out, we understand, with your own hands the plants that were planted out in 1864; how many were then planted out?—It may be seen exactly in the records.

Do you recollect the state of those plants when planted?—Ten per cent. perhaps were old, exhausted stock plants from the Neilgherries, 90 per cent. were healthy cuttings of our own propagation.

Did many of those plants die in the first two years?—Not very many, I think; but I believe it is not improbable that the whole of the exhausted plants died.

When I last visited the Sikkim Plantation in 1868, it was my opinion, as was then Dr. J. Anderson's, that the condition of the plantations had generally improved. I am positive that the percentage of diseased plants had greatly diminished. We had then got very much stronger stock plants.

I do not at all believe that the disease is caused by external conditions.

APPENDIX B.

Statement of Expenditure in collecting, carrying, and manufacturing one thousand pounds of *Succirubra* Twig Bark (wet).

	Rs.	As.	P.
40 women collecting bark, at 3 annas 1 pie per working day	...	7	11 4
Carriage of bark, at 4 annas per maund	...	3	2 0
Coolie labor for boiling, pressing, precipitating, and filtering	...	3	8 0
Lime	...	0	12 0
Drying and grinding precipitate	...	0	8 8
Working cone, and charcoal for ditto	...	1	4 0
Recovering alcohol	...	0	8 0
Loss of alcohol	...	1	4 0
Filters, gum, bladder, &c., and drying and pounding the alkaloids	...	0	12 0
Total	...	19	6 0

To the above amount required to be added cost of 7½lbs. sulphuric acid, 2lb. hydrochloric acid, interest on cost of machinery, and European superintendence.

Average yield of alkaloids from 1,000lbs. of wet bark ... 15oz.

RUNGBEE;
The 6th March 1871.

J. GAMMIE.

APPENDIX C.

Report of some numerical results obtained from examination of the condition of the "*C. Succirubra*" plantations by Mr. C. B. CLARKE, in March 1871, under instructions of Dr. CAMPBELL BROWN, President of the Cinchona Commission.

THE following numeral results were obtained by following a single line of plants across the plantation, examining every tree. Patches of 1864 and 1866 planting were examined for reasons given in the notes; and in 1867 plantation, two lines were taken in order to get a larger number of plants within the breadth of the plantation.

2. This examination confirmed my opinion that the tabulation of results of no practicable number of trees would furnish sound grounds for generalization concerning the whole,—though the figures are for other purposes by no means without value. I selected good pieces of plantation in running the lines through the 1870 planting and line B through 1868 planting, but the other lines pass mostly through inferior parts of the plantation. Very different numerical results would have followed a different choice of lines for examination.

3. The trees are planted, where the ground permits, six feet by six; holes at these distances, called *tullies*, are prepared. If the ground, from stoniness or wetness, is exceedingly unfavorable, no *tullies* are prepared in this part of the line: and where a *tully* has been prepared, no plant is put if a large stone is found close to the surface of the soil, or the *tully* otherwise appears very unpromising. After the first year the vacancies in the lines are filled up. No further filling up is done, because it is assumed, if two plants die out in the same *tully*, that it is probably not a favorable one, and at six feet apart a moderate percentage of vacancies does no harm.

Hence it is impossible to estimate, except by guess, the percentage of vacancies in the existing plantation. Where a vacancy in bad ground occurs in the line, we can often not ascertain how many *tullies* were originally dug; and where sufficient marks remain to assure us about this, we are not certain how many ever had trees planted in them.

4. The fourth column shows the percentage of trees standing now sound, *i. e.*, which do not show any rotten places in the bark, however small.

In this column are included trees which have lost their leaders. Such trees may have lost their leaders by circular bark disease, hail, borers, wind, or various accidents; but if the tree showed no unhealthy bark, I could not generally venture to guess what might have been the cause of the loss of the leader.

In this column also are included very many trees exhibiting long scars where the bark has been affected and longitudinal strips of it have died; but where the bark on the edges of such marks is now quite sound, and the whole plant vigorous, and, in our opinion, likely to make a good tree, I was in great difficulty how to tabulate these cases, which are very numerous in the older plantations.

5. The Rungbee valley is a gigantic stony landslip. The surface is covered in places with a very irregular thickness of vegetable earth; it may vary from six inches to several feet in thickness within a short distance. The soil below this is gritty and poor, filled with stones of every size, but in no place that I examined did I find clay below the vegetable earth. The *cinchona succirubra* trees exhibit the best growth where the vegetable soil is deepest; they become stunted and may never make trees where there is no vegetable soil at all: they die out where there occurs stagnant water at their roots. These very simple remarks are all that I can offer regarding the

effect of soil, concerning which I received particular instructions to make observation.

YEAR OF PLANTING.	Tullies examined.	Trees standing.	Percentage of trees standing now sound.	Average height of trees standing.	Approximate elevation of the trees above the sea in feet.
				Ft. In.	
1864	156	68	67	13 0	2,500
1865	...	None planted.			
1866	144	118	81	12 0	2,500
1867	499	437	76	8 0	2,200—1,500
1868(a)	327	273	71	3 6	3,000—2,400
1868(b)	133	112	83	6 4	2,300—1,900
1869	287	230	85	2 8	2,800—2,300
1870	100	90	97	3 0	2,400

Note on the figures above for 1864.

IN 1864 only one patch of 380 plants was planted out. No line of any length could be run through it, and the northern portion was selected for examination.

Of the 156 *tullies* examined, 53 contained the living stools of trees lately cut in the process of thinning. The ground remains well covered.

Of the 68 standing trees, 57 show distinct signs that they have at some period or other of their lives suffered from bark disease, and the other 11 have been nearly all cut down, at least once, which leads me to a strong suspicion that they have also been unhealthy at some time. These 1864 trees might be statistically returned 100 per cent. diseased if our theory of "canker" be adopted, but their produce in bark has been satisfactory, and many of them are now very fine trees: in my opinion, likely to stand. It does not appear that any tree has ever died of bark disease, but several have been broken across at various heights from the ground by circular bark disease, and others would never make fine trees unless cut near the ground, and they shall then throw a healthy shoot. The soil on which this patch stands is exceptionally good, as is also the drainage.

Note on the figures above for 1866.

IN selecting the trees of 1866 for examination, there were four very different pieces of plantation to choose from, *viz.*,—(1) the Teesta plantation; (2) the Rishap corner; (3) Kennedy's ridge; and (4) the Rungbee patch.

Of these the last was selected because—(1) the Teesta plantation was known to be remarkably clean stemmed; (2) the Rishap corner has been judged by Mr. McIvor to be the finest Rungbee plantation; (3) Kennedy's ridge was planted late in 1866, and so many of the plants died, that it was largely replanted in 1867; moreover, it has been lately very heavily thinned.

In this case (as in the 1864 planting) no long line could be taken, and a patch was examined; it chanced that the piece selected comprised a corner of old bamboo jungle which was exceptionally good.

Of the 144 *tullies* examined, 17 contained the living stools of trees cut in December 1870 for bark in the course of thinning; the trees thinned out were doubtless the worst.

Of the 118 trees now standing, 44 at least have at some time or other suffered from bark disease; of these, 22 are reckoned above as "now sound."

Many of the trees (as also of the 1864 trees examined) have been heavily barked, *i. e.*, strips three feet long have been taken off for half the circumference of the stem. The bark appears invariably to have grown again; but we must suppose the growth of the trees to have been checked by this process.

Note on the figures above for 1867.

The strongest portions of the 1867 planting have been thinned; the lines examined were selected so as to pass through parts (autumn planted) of 1867 plantation, which have not been thinned.

The soil here is in turn swamp, rock, and slopes covered with good vegetable mould, giving the plantations the patchy aspect which characterizes lower Rishap. The upper 100 and lower 100 trees in these lines would have given totally different results; the upper 100 would show but 60 per cent. with stems now sound, the lower 100 would show 83 per cent. with clean stems.

In this respect, however, this one line gives correctly the character of the whole plantation in lower Rishap, as I know from other observations.

Note on the figures above for 1868.

The line (A) selected for examination commenced at the point near Spicer's Hut, where Mr. McIvor pointed out his views to the cinchona commission. It no doubt passes through the worst portion of the 1868 plantation, and indeed through the least successful part of the whole Rungbee plantations.

On running this line across the whole breadth of the 1868 planting from this point, the frequency of occurrence of diseased bark does not appear very high, but the number of stunted shrubby plants is very great; the average height of the upper 167 plants being but 2 feet 10 inches. These trees were, as I understand, planted carefully and well, but the ground here is almost entirely wanting in a cover of vegetable soil.

The line (B) was selected (for contrast) in the good portion of the 1868 plantation. Of the trees marked as not having clean stems, only a very small percentage were, in my opinion, affected with any unhealthiness likely to prove serious.

The percentage of clean stemmed trees in (A) and (B) does not appear very different, and gives no idea of the really different character of the planting, which, however, is faithfully represented by the average heights of the trees.

Note on the figures above for 1869.

The line selected passes through the whole breadth of the 1869 planting, and the upper end of the line passes through some of the least successful plantation.

As in the case of line (A) in the 1868 planting, the recorded percentage of clean stems does not distinctly bring out the state of the plantation, but the difference in height shows distinctly enough how inferior the growth at the higher level is to that at the lower.

Note on the figures above for 1870.

I selected here a good part of the plantation for examination.

The vacancies recorded occur chiefly in a swamp where the trees in all the adjacent lines are dead.

These fine young trees were raised by cuttings from old stock plants.

I regret the length to which these notes extend, but I fear that, even with this copiousness of remark, the statistics given may be misleading, giving in some respects too good, in others too bad, an impression if generalized from.

C. B. CLARKE.

APPENDIX E.

As the committee is unable to arrive at a unanimous decision as to the process best adapted for the extraction of the alkaloids in a tolerably pure state, Mr. Broughton's opinions on the subject differing so essentially from mine, I am obliged to submit my views to Government in a distinct report.

In order to place the matter before them in as clear a light as possible, and to render a comparison of the two processes more easy, I will first briefly describe that adopted by Mr. Broughton in all its stages, and afterwards that which I am led to think will be most suitable under present circumstances. Mr. Broughton's process includes the following operations, numbered in the order in which I have put them down:

I. The fresh bark is boiled for several hours in a copper boiler with water containing a certain amount of sulphuric acid; the bark is then squeezed in a powerful press, and the operation repeated two or three times with fresh water and acid.

II. The acid decoction, containing the cinchona alkaloids in solution, mixed up with a number of impurities extracted by boiling, is allowed to cool.

III. Milk of lime is added in excess to the liquid. This causes the precipitation of the alkaloids together with a quantity of impurities extracted from the bark by boiling.

IV. After some time this precipitate is thrown into bags and allowed to drain.

V. The precipitate is dried.

VI. The precipitate is reduced to a coarse powder between ordinary grindstones.

VII. The precipitate is now put into a copper vessel, which is fitted to another of the same metal containing alcohol acidified with sulphuric acid. This alcohol is then heated, and by an ingenious contrivance the hot vapour of it is made to permeate the precipitate over and over again until the latter is supposed to be exhausted of all its alkaloid. This operation takes a considerable time, at least forty-eight hours being required for the exhaustion of 50lb. precipitate.

VIII. The copper retort containing the alkaloids dissolved in the acidified alcohol is connected with the worm of a still and the alcohol recovered, leaving behind in the retort the alkaloid, of the consistence and colour of treacle or tar, owing to the admixture of a considerable quantity of coloring matter and resin, &c., &c., which was washed out of the precipitate along with the alkaloids by the alcohol in operation VII.

IX. This dark acid mass is now thrown into a bucket of cold water, the effect being to precipitate a quantity of impurities (very variable), and to leave the alkaloids and the remainder of the impurities dissolved in the water.

X. The precipitated impurities having been removed, caustic soda or potash is now added to this acid solution of the alkaloids, so as nearly to neutralize all the free acid. (This requires some dexterity: if carried too far, there will be a considerable loss of alkaloid; if not far enough, the preparation will ultimately have a bad colour.) The object of this is to precipitate a further quantity of colouring matter, &c., whilst the bulk of the alkaloids remains in solution.

XI. Filter the above, and to the filtrate add soda or potash in excess, which will precipitate the alkaloids.

XII. Allow the precipitate to drain in bags.

XIII. Dry the precipitate, which is Mr. Broughton's so-called *amorphous quinine*.—*Vide* sample A.

N. B.—In addition to all these details, a considerable amount of alcohol adheres to the exhausted precipitate. This has to be washed out with water and recovered by distillation.

Dr. Simpson's Process.

I SHOULD premise, before entering on its details, that it was suggested to me by Professor DeVrij, whilst I was studying the chemistry of the cinchona barks in his laboratory, as a process likely to prove very suitable for the extraction of the alkaloids from the fresh bark at Darjeeling. I have named it my process merely in contradistinction to that of Mr. Broughton. The principles are novel in neither, whilst some of the practical details are so in both.

I advocate it in preference to Mr. Broughton's process, because I think it much simpler in its details, and because it produces a safer product. I judge from Mr. Clarke's working of the process, as I have not seen any specimen of that prepared in Madras.

* Mr. Broughton has called my attention to the fact that I have omitted to state that the bark must be crushed.

I. Infuse* the bark in cold dilute acid for at least twenty-four hours: squeeze in a powerful press, and repeat the operation three times.

II. To the acid infusion which contains the alkaloids and some impurities (but infinitely less of the latter than extracted by boiling) add potash or soda in such quantity as nearly to neutralize the acid; this has the effect of throwing down a quantity of colouring matter and other impurities, the bulk of the alkaloids remaining in solution.

III. Filter the above, and to the clear filtered solution add soda or potash in excess, and the alkaloids are precipitated.

IV. Dry the precipitate, which is the *cinchona alkaloids* by Dr. Simpson's process.—*Vide* sample B.

A casual glance at the above would naturally lead any one (even a chemist unacquainted with the cinchona alkaloids) to the conclusion that the last described process is infinitely the better of the two, always supposing the products to be equal in value.

I should be sorry, however, that any such conclusion should be hastily formed. Mr. Broughton has had great experience in working with fresh bark, and I have had, speaking comparatively, none. He assures me that he has tried my process, though, he admits, not with all the conditions fulfilled, and that he has settled on his own as the most suitable one.

The only real objection that can be raised to this process is *loss of alkaloid* or a greater amount of acid (and consequently more alkali) required to extract by cold infusion the same amount of alkaloid that can be obtained by *boiling* with a lesser quantity. I am of opinion, however, from some experiments I have made bearing on this very point, that both loss of alkaloid and any great additional expenditure of acid may be obviated in practice by using certain precautions in the details of the process. At the same time I wish it to be clearly understood that I do not uphold this process to the exclusion of Mr. Broughton's or any other; but on account of its great comparative simplicity, and the fact that the apparatus necessary to carry it out, even on a large scale, can be purchased on the spot at a nominal cost, I strongly recommend the Government to give it a fair trial in competent hands.

The questions to be determined by the experiment would be—

1st whether the process yielded less alkaloid than is obtained by Mr. Broughton's from a similar sample of bark.

2nd if less, how much less; and whether or not the loss in alkaloid is not more than compensated for by the cheapness of process and requisite machinery. If after a sufficient trial the loss should still prove serious, I should

either modify or abandon the process; if not, I think there can be no doubt as to its being the better one of the two.

There are, in my opinion, defects of a much more serious nature in the process advocated by Mr. Broughton,—one of them at least being of a grave nature. First of all, there is the chance of an explosion; the process as performed at Rungbee being left a good deal in the hands of Native coolies, and the retorts containing the alcohol being treated with naked fire.

Next, there is the constant liability of Government being cheated in the matter of alcohol, a beverage of which hill coolies are particularly fond; and last, though not by any means least, is the danger of the product being contaminated with copper if the operation be not conducted with care and skill. Indeed, I can hardly conceive its not being so contaminated during some stage of the process, and to remove this, contamination must, therefore, be considered as another stage or operation in Mr. Broughton's process.

This gentleman's chief objection to the cold infusion is the alleged loss of alkaloid, which, he says, is practically *nil* in his process.

Considering the nature of the substance which he has to exhaust with alcohol, *viz.*, a quantity of alkaloid wrapped up, so to speak, in a mass of sulphate of lime, which latter is *insoluble* in spirit, I have from the first doubted whether he *did* recover all the alkaloids; and in order to test the truth of my theory on the subject, I powdered *very minutely*, and subjected to prolonged boiling in alcohol, a small quantity of the precipitate which was thrown away as exhausted at Rungbee, and I think I shall be able shortly to show the Government that I was correct in my supposition. Here again, however, I must call attention to the fact that I got this precipitate at Rungbee, and it does not at all follow that I should succeed in obtaining similar results in Madras, where the operations are conducted under Mr. Broughton's own superintendence. The test laid down by him to show when the precipitate becomes exhausted was duly applied in this particular case before it was thrown away.

APPENDIX F.

Memorandum.

DR. SIMPSON having been good enough to allow me to read his attached report, I take this opportunity of mentioning a few facts connected with its subject.

2. My process was adopted after a thorough consideration of the whole subject, which includes Indian barks and indigenous manufacturing materials among its items. I have fully tried the process of infusion now recommended by Dr. Simpson, employing altogether about 2,000lb of red bark in the experiments. The conditions were nearly those laid down by Dr. Simpson, the only failure being that the bark was not *crushed* beforehand, but simply cut small. I found by suitable analysis that but two-thirds of the whole amount of alkaloid contained in the bark was extracted, and that the amount of acid that was requisite, even with the greatest economy, was more the four times as much as that necessary when boiling was applied. This acid being the only manufacturing material brought from Europe, it is exceedingly necessary that it should be employed with the greatest economy.

3. Furthermore, according to Dr. Simpson's verbal statements (*vide* proceedings of commission), it is quite necessary that before the bark be subjected to his process that it should be *crushed* by machinery. Indeed, if the bark were submitted whole to the acid water, scarcely any alkaloid would be extracted. It is this necessity which detracts greatly from the simplicity of the process; nor am I aware of any existing machine which will effectively perform this necessary work. The difficulty of cutting bark small is great; but the thorough

APPENDIX H;

Being a memorandum of Mr. C. B. CLARKE on Appendix G.

1. I DIFFER from the other members of the Commission merely on the details of the schedule in Appendix G which it is proposed to introduce.

The filling up that schedule involves, besides a record of well ascertainable facts, the numerical tabulation of several matters of opinion, concerning which no two gardeners now on the plantations agree; and it is, therefore, reported (in paragraph 12 of the report) that it is undesirable that the filling up of the schedule proposed in Appendix G should be entrusted to gardeners.

I believe, on the other hand, that the information really required may be safely obtained from the resident gardeners by adopting for the form of schedule an extension of the tables now in use.

I append a copy of the half-yearly report for 31st September 1870, in which the measurements of 75 trees are shown by tabular statement.

2. I should hardly have thought it necessary, on a point of detail, to have drawn up a minute in opposition to the other members of the Commission; but the carrying out of these measurements will devolve on the superintendent of the plantations, and I feel that I cannot recommend a plan to Government in carrying out which I see so much difficulty. To examine as detailedly as proposed 1,800 trees scattered on a wide plantation will be a work of time: it will be a considerable journey from the inspection bungalow to each row of trees to be examined. Practically, it will not be found worth while to attempt to proceed with the work during wet hours. What is really necessitated by the report (paragraph 12) is, that Government should depute an officer to journey to Rungbee, at regular intervals of six months or twelve months' stay there, and carry out these measurements, all which I believe unnecessary for attaining the proposed object.

Under the scheme in Appendix G, 1,800 trees require to be examined. I estimate that in two years' time 3,000 trees would require to be tabulated, as there will probably be a third species of cinchona cultivated.

3. Turning to the details of the schedule in Appendix G—

There will be a difficulty in determining the "number of plants" for the reasons shewn in my minute in Appendix C.

There will be a difficulty in returning the "number diseased," as no two gardeners coincide about disease, and no definition of disease is suggested. This difficulty is meant to be provided against by the next heading of "doubtful;" but the numbers obtained under this system of classification at six monthly intervals will be, in my opinion, of little value.

The cause of deaths is required to be ascertained in the next column. I expect the results obtained here will be of small value.

The tabulation of the plants left standing as healthy, diseased, doubtful, I do not expect to furnish valuable results; different men will estimate differently the plants. I do not say in any of these cases that an expression of opinion may not be valuable. I do not consider these points of opinion likely to be well represented by numerical tables.

On comparing Appendix C, my grounds for supposing it of no use to tabulate at two or three places the thickness of the vegetable soil will be at once inferred.

4. Speaking generally, I should be exceedingly sorry to attempt to fill up the schedule G for 100 plants on the plantation. I could not do it in a way that would be satisfactory to myself.

5. I suggest that a schedule of the annexed simple form be used:—

	Date of plating out.	Height on 1st April 1871.	Height on 1st October 1871.	Increase.	Decrease.	Remark on the condition of each plant.
		Ft. in.	Ft. in.	Inches.	Inches.	
1	1st March 1868	8 10	10 10	24		Sound.
2	...	8 0	4 0		48	Leader gone.
3	...	3 0	3 8	2		Is over a large stone.
4	...	6 4	...		76	Dead.
5	...	7 6	11 3	45		Now sound.
6	...	5 6	6 0	6		Sickly; in a swamp.
7	...	7 6	1 6		72	Cut down for unhealthiness, and has thrown a shoot.
8	6th March 1868	6 4	10 0	44		Sound.
9	...	9 6	2 0		90	Cut in the course of thinning, and has thrown a shoot.
10	...	5 6	7 3	21		Sound.
11	...	and so forth.				
12	...					

6. The rows selected for record will have a numbered stick at the base of each tree. When these have once been placed, it will, from the irregularity of the plantation, be utterly impossible to shift them to any other line.

All the facts required can then be left to the gardeners, for (as now) the superintendent without visiting the plantation at any particular month can test in a morning the whole six monthly record sufficiently.

7. The facts being thus ascertained, they should (as now) be printed *in extenso*; and it will be the duty of the superintendent to make such deductions and generalizations from them in his report as he thinks warranted. The average growth in height will be a most valuable deduction while the trees are small; but when the trees get any size, it is difficult to make. If the trees are thinned, the worst are cut down; so that by giving the average of the remainder an enormous growth appears: if the trees are not thinned, they are not given a fair chance of growth. [This difficulty applies now to the present measurement of *C. Calisaya*.]

8. The casualties that affect the trees are so varied, that I think a remark column is the only way of representing them.

So in the case of affections of the bark, which in some forms are very fatal to the whole of the branch above the affected part, it is a matter of opinion whether one of the more serious forms is a variety, or even a necessary consequence of another comparatively harmless form. But I do not think it is advisable to frame a schedule which shall introduce the tabulation of such matters, or with the object of refuting a particular theory regarding them. Provided a tree grows regularly several feet a year, I do not regard much such speculations; the tree will produce a satisfactory amount of bark, and, as a general rule, I do not fear trees dying which have been as yet growing well: if they meditate dying extensively, I expect them to stop growing first. The most serious forms of disease are those which cost a tree its leader, and the tabulation of heights only at once represents this sufficiently.

I therefore consider that after all tables showing growth contain essentially the information wanted, and without admixture of controvertible matter.

9. I quite agree in the concluding remarks of Dr. J. Campbell Brown's minute. I go further and question whether the record of a much smaller number of trees will not be as valuable as that of 1,800, which latter number affords poor ground for generalizing concerning 1,200,000 trees.

I think one row of 50 trees recorded in each year's plantation would answer the required purpose. It must be recollected that the preparation of these

statistics costs Government money; that lists of 50 for six years' plantation of *C. Succirubra* and three years' plantation of *C. Calisaya*, will occupy nine pages of printing, and that this number will rapidly increase. This will be exclusive of deductions, and may, I fear, be cumbrous. Indeed, in my original scheme, I proposed to examine lines of 25 only in each year's planting, but I substituted lines of 50 in trying to meet the views of the other members of the Commission.

10. The present Appendix II has been drawn up in extreme haste, in order not to delay the submission of the report.

Report on the cultivation of Cinchona at Darjeeling for the half-year ending 30th September 1870.

From C. B. CLARKE, ESQ., M.A., Officiating Superintendent, Botanic Garden, and in charge of Cinchona cultivation in Bengal, to the Officiating Secretary to the Government of Bengal, General Department,—(No. 226, dated Rungbee, Darjeeling, the 25th October 1870).

THE Government of Bengal having approved of the substitution of half-yearly for monthly reports of the cinchona plantations near Darjeeling, I beg leave to submit herewith the report for the six months ending 30th September 1870, which is intended to follow the report for the month of March 1870.

Report on the Cultivation of Cinchona at Darjeeling for the half-year ending 30th September 1870.

THE season has been unusually wet, the rain-fall having already (25th October) amounted at the inspection bungalow to 200 inches, whereas the total fall for the year averages 180 inches only. The health of the plantations of *C. Succirubra* and *C. Calisaya* has remained good, and their growth satisfactory, though somewhat less than that of the preceding year. But *C. Officinalis* has suffered more than during previous rainy seasons, and all hope must be abandoned that this species can be grown to an economic profit at Rungbee.

Taking the plantation called the 5th in the tabular report, which represents best the present centre of the plantations, it will appear that the average growth of the measured plants of *C. Calisaya* for the half-year has been 36 inches, and that of *C. Succirubra* 22 inches. The latter, from accidental circumstances in choice of the plants measured, is too low, and does not represent fairly the growth of plants of that age in that part of the plantation. The best plants of *C. Succirubra* and *C. Calisaya* have, within three years of planting out, surpassed 20 feet in height. No measurement is given of *C. Officinalis*. It may be said generally of the older plants, that some 40 per cent. perished during the last six months, and that those which survived did not grow. The number of plants of *C. Officinalis* has been by estimation reduced from 930,704 on 31st March 1870 to 440,000 on 30th September 1870; but it would be best, in any calculations regarding these plantations, to write off these 440,000 at once; for, though some of them may survive for years, there is no probability that any profitable result will ever be derived from them.

Throughout the *C. Officinalis* plantation below 4,500 feet level, *C. Succirubra* was planted in 1869, in order to utilize area kept clean at considerable expense. These young *C. Succirubra* promise exceedingly well.

The 164,615 plants of *C. Succirubra* planted out during the early part of the six months under report were required to fill up the 1,000 acres of that species as designed by Dr. T. Anderson. The 33,101 plants of *C. Officinalis* were put out at a higher level (5,000 feet) than before as an experiment.

By far the greater portion of the coolie-labor is spent in scouring the young plantations during the rains. In order to ensure a sufficient supply of labor at this period, it is necessary (as in the surrounding tea plantations) to maintain the coolies during the year, so that, during the cold weather, it has been difficult to devise sufficient employment for them. The cold weather is the best time for planting out; and in accordance with Dr. T. Anderson's advice, it is proposed, during the ensuing cold season, to employ them in planting out *c. succirubra* in a rough way, on some portions of the reserve which are at too high a level for *c. calisaya* to thrive upon; and it is for this purpose that a considerable quantity of *c. succirubra* seed has been raised, put down at 500,000 (including some stock raised by cuttings) in the accompanying tabular statement.

C. Calisaya has set its seed very favorably during the last two months. This seed should ripen in the course of next spring; and it is hoped that in future the quantity of seed produced will be sufficient to enable the extension of *c. calisaya* in any quantity that may be thought desirable.

The usual tabular statements are appended.

Table shewing the Temperature at the different Plantations for the half-year ending 30th September 1870.

Plantations.		Mean maximum.	Mean minimum.	Mean temperature.	Remarks.
April 1870	2nd plantation		54.40		
	4th ditto		53.92		
	Rishap ditto	84.80	61.30	73.05	
May "	2nd plantation		60.17		
	4th ditto		62.92		
	Rishap ditto	88.67	68.19	78.43	
June "	2nd plantation		61.78		
	4th ditto		66.17		
	Rishap ditto	84.16	69.80	76.98	
July "	2nd plantation		64.00		
	4th ditto		67.48		
	Rishap ditto	81.37	70.68	76.03	
Aug. "	2nd plantation	72.90	63.00	67.95	
	4th ditto	79.60	67.40	73.50	
	Rishap ditto	84.30	70.40	77.35	
Sept. "	2nd plantation	71.80	60.80	66.30	
	4th ditto	80.28	65.53	72.95	
	Rishap ditto	83.40	69.00	76.20	

Table shewing the Maximum and Minimum Growth for the half-year ending 30th September 1870.

NAMES OF SPECIES.	TEESTA.		RISHAP.	RUNGBEE.	
	First plantation.	Second plantation.	Third plantation.	Fourth plantation.	Fifth plantation.
<i>C. succirubra</i> ...	Not measured	Not measured	5 to 33 inches	21 to 32 inches	9 to 40 inches.
<i>C. micrantha</i> ...	Ditto ..	Ditto ...	18 to 28 "	28 to 37 "	24 to 44 "
<i>C. calisaya</i> ...	Ditto ...	Ditto ...	16 to 44 "	16 to 23 "	28 to 48 "

Table shewing the Number and Distribution of Cinchona Plants in the Government Plantations at Darjeeling on the 1st October 1870.

Names of species of Cinchona.	Number in permanent plantations.	Number of stock plants for propagation.	Number of seedlings or rooted cuttings in nursery beds for permanent plantations.	Number of rooted plants in cutting beds.	Number of cuttings made during the month.	Total number of plants, cuttings, and seedlings.
<i>C. succirubra</i> ...	1,219,715	20,000	120,000	260,000	120,000	1,739,715
<i>C. calisaya</i> ...	24,860	10,000	34,500	23,000	8,000	100,360
<i>C. micrantha</i> ...	29,667	None.	None.	None.	None.	29,667
<i>C. officinalis</i> and varieties ...	440,000	...	...	...	...	440,000
<i>C. pahudiana</i> ...	5,092	...	...	...	...	5,092
Total ...	1,719,334	30,000	154,500	283,000	128,000	2,314,834

RUNGBEE,
The 3rd October 1870.

J. GAMMIE,
Head Gardener in charge,
Cinchona Plantations, Darjeeling.

Table shewing the Growth of Cinchona in the Darjeeling Plantations during the six months ending 30th September 1870.

Names.	Numbers.	1st Plantation (Teesta), Altitude 900 feet.				2nd Plantation (Teesta), Altitude 450 feet.				3rd Plantation (Rishap), Altitude 2,000 feet.				4th Plantation (Rungbee), Altitude 3,332 feet.				5th Plantation (Rungbee), Altitude 2,556 feet.			
		Date of planting, 18	Height in inches on 1st	Height on 1st	Growth during	Date of planting, 18	Height in inches on 1st	Height on 1st	Growth during	Date of planting, 1867.	Height in inches on 1st January 1868.	Height on 1st April 1870.	Height on 1st October 1870.	Growth during the 6 months.	Date of planting, 1864.	Height in inches when planted.	Height on 1st April 1870.	Height on 1st October 1870.	Growth during the 6 months.		
C. Succirubra	1									29th March	30	145	172	27							
Ditto	2									"	37	129	161	32							
Ditto	3									"	24	146	179	33							
Ditto	4									"	37	158	166	8							
Ditto	5									"	30	158	182	24							
Ditto	6									"	27	105	133	28							
Ditto	7									"	30	152	176	24							
Ditto	8									"	29	135	146	11							
Ditto	9									"	25	114	119	5							
Ditto	10									"	17	129	157	28							
C. Micrantha	1									16th	19	137	162	25							
Ditto	2									"	44	141	168	27							
Ditto	3									"	46	149	169	20							
Ditto	4									"	55	157	175	18							
Ditto	5									"	25	136	180	44							
C. Calisaya	1									June	25	136	180	44							
Ditto	2									29th	16	137	165	28							
Ditto	3									"	15	136	164	28							
Ditto	4									"	16	126	142	16							
Ditto	5									"	22	124	146	17							
Ditto	6									"	24	138	162	24							
Ditto	7									"	23	138	169	31							
Ditto	8									"	19	130	159	29							
Ditto	9									"	21	129	156	27							
Ditto	10									"	21	138	168	30							

RUNGBEE;

The 3rd October 1870.

(Signed) C. B. CLARKE,
Supdt. Botanical Gardens,
and in charge of Cinchona Cultivation in Bengal.

From A. O. HUME, Esq., c. B. Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, to the Secretary to the Government of Bengal,—No. 18, dated Simla, the 29th June 1871.

I AM directed to acknowledge the receipt of your letter, addressed to the Government of India in the Home Department, No. 1309, dated the 8th ultimo, submitting the report of the Commission appointed to enquire into the cultivation of cinchona in British Sikkim and divers questions connected therewith.

2. I am desired, in reply, to state that the Governor General in Council entirely approves of the orders on the report already issued by the Lieutenant-Governor, and I am to request that the following remarks on the cultivation of the plant, the export of the bark to England, and the local manufacture of alkaloids, may receive His Honor's consideration.

3. As regards the first point, viz., the cultivation, it seems clearly proved that *c. officinalis* is unsuited to the soil and climate of the Government Plantations in Sikkim. It has been tried at various elevations without making any progress, and its extended cultivation would be unprofitable. His Excellency in Council, therefore, agrees in the recommendation of the Commission that its further propagation should cease. All the plants now standing should be cleared away, with the exception of those which it may be desired to retain for the supply of seeds, or for other sufficient reason. It seems advisable that vigorous efforts should be made to propagate *c. calisaya* and *c. pitayensis*, which species yield a larger quantity of crystallisable alkaloid than *c. succirubra*, and which have a greater marketable value in Europe. The officers in charge of the gardens should also be directed to exert themselves to obtain for trial any other species or varieties, the yield of which in alkaloids appears likely to be superior to that of *c. succirubra*. At the same time it is not intended that the further cultivation of this latter species should be interrupted. On the contrary, all healthy seedlings and cuttings now in stock should be planted out, and further supplies of plants should still continue to be raised from seed taken from sound and healthy trees. In connection with the subject of this paragraph, I am to invite the attention of the Lieutenant-Governor to paragraph 4 of the despatch* from the Secretary of State, copy of which is forwarded herewith.

4. His Excellency in Council is not disposed without further experiment and more careful enquiry to concur in the opinion expressed by Mr. McIvor regarding the destructive nature of the disease which has attacked some of the plants at Rungbee—a disease which is shown to have existed in the plants originally sent up from the Neilgherries as stock for the Sikkim Plantations. Disease doubtless exists, and, unless care is taken, the results may prove serious; but there appears to be no valid reason for apprehending anything like the general failure predicted by Mr. McIvor; nay more, the Governor General in Council hopes to hear that in the new plantations stocked from healthy seedling plants, the disease will occur more rarely, and there is reason to expect that even in the older plantations it is gradually disappearing; and that the opinion of the Commission, that the vast majority of the plants are likely to last at least seven or eight years, will prove to be well within the facts. In order, however, that one test may be applied to the different opinions expressed on this point—a test which will be peculiarly valuable as being founded on that portion of the plantation where the disease is likely to be most extensive and persistent—His Excellency in Council would be glad if His Honor the Lieutenant-Governor would be good enough to issue orders that, of the 140 trees which still remain untouched from among those planted out in 1864, none may be cut unless it should be found absolutely necessary to thin them; and that a half-yearly report may be submitted showing the progress and condition of these trees, whether disease is increasing among them or not, and any other particulars of interest regarding them.

5. The Governor General in Council concurs in the Lieutenant-Governor's decision regarding the export of bark. For some years to come the only possible method of keeping a check on expenditure, and of ascertaining the real commercial value of this experiment, will be to export annually a considerable proportion of the best bark produced, and sell it for the highest price it will fetch in the open market. I am to request further that His Honor will favor the Government of India with the earliest intimation of the financial results of the exportation now authorized in a statement exhibiting the estimated cost of production, the actual cost of picking, drying, and packing the bark, the cost of transport to Calcutta, freight, shipping, and landing charges, brokerage, and other charges in England, and *per contra*, the price realised.

6. In regard to the remaining point, local manufacture, His Excellency in Council would be glad to be informed of the results of the enquiries being made by His Honor for a skilled and competent person to undertake the execution of systematic experiments at Rungbee.

7. The Governor General in Council is desirous that these experiments may be proceeded with energetically, and that the process advocated by Dr. Simpson, as well as that of Mr. Broughton, may receive full and fair trial, and their respective merits be accurately weighed. Mr. Broughton's process, which is already in operation at Rungbee, should receive further trial under skilled supervision, and Mr. Gammie, the Head Gardener in charge, might be directed to prepare a considerable quantity of alcohol from hill maize, in order to ascertain what it costs when made on an extensive scale. In the trial of Dr. Simpson's and Mr. Broughton's process, a quantity of, say, 2,000lbs. of fresh bark might be carefully worked up under each system, and an accurate comparison of the cost and results in each case instituted.

9. As regards the supposed discouragement of private enterprise which the Darjeeling Cinchona Association seem to believe involved in any further extensions of the Government Plantations, I am desired to remark that in this as in similar cases of the introduction of exotic staples, the first step towards enlisting the active co-operation of private capitalists generally is to prove by actual operations on a large scale that their cultivation will really be remunerative. Until this has been done, no efforts that the Government may make to establish that cultivation thoroughly can, if rightly considered, be held to affect private enterprise injuriously.

10. Considered only in the light of this broad principle generally applicable to the cases of exotic staples, it is manifest that the time has not yet come for the Government to relax its exertions in the matter of cinchona cultivation. These very papers show that two of the most practised experts in cinchona are of opinion that the Sikkim Plantations are dying rapidly out, and will, in a few years, be altogether extinct. His Excellency concurs with the Commission in considering these gentlemen in error; but should their conjectures unhappily prove well-founded, the Government would probably select other sites and open out other plantations,—in a word, would persevere until cinchona cultivation was a success, and until it had secured for the fever-stricken millions of India the inestimable blessing of cheap quinine.

11. Unfortunately the field is too wide to be adequately occupied for many years to come either by Government or private individuals, or both, let both labour as they may. From the first Government has encouraged, and will always encourage, private plantations. Seeds and plants it freely gives, and throws open to inspection its own plantations, and does its utmost to make available to all the experience gained in the work by its own officers; but the Government feels that it could not, without the abnegation of a vitally important duty, leave solely to private enterprise the further prosecution of those measures necessary to secure to the people abundant and cheap supplies of the "only efficient specific for the most deadly of all Indian maladies."

14. I am finally desired to state that the Governor General in Council appreciates the satisfactory manner in which the President and Members of the Commission have discharged the important duty confided to them.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

ACCOUNT AND AUDIT OFFICES OF THE OUDH AND ROHILKHUND RAILWAY.

Extract paragraphs 1 to 5 and 16 of the Report by CAPTAIN A. J. FILGATE, R. E., Assistant Accountant General, Public Works Department, on the Account and Audit Offices of the Oudh and Rohilkhund Railway.

SINCE I last inspected the Account and Audit Offices of this Railway, a complete change has been made in the manner in which the audit is conducted. Instead of having an audit carried out by a staff appointed by the Company, with an Examiner under the Consulting Engineer to check his work on behalf of Government, about the commencement of last year, with the consent of the Secretary of State and the Board of Directors, the appointment of a joint Auditor nominated by Government to carry out a combined audit of the transactions of the Railway on behalf of Government and the shareholders was sanctioned. The original idea of starting a combined audit was put forward by General Beadle shortly after his return to India as Agent of the Company; and although the proposition was not favorably received at first, after due consideration it was fully accepted by the Government of India. I am now bound to state that the joint audit appears to be a complete success in every respect, and to work with little or no friction.

2. The trial that the combined system of audit has undergone during the first year of its existence is more than sufficient to test its qualities to the fullest extent; for the work of construction during the period named has been pushed on over some 550 miles of Railway as fast as circumstances would permit, and the Auditor has been in direct account with 31 disbursing officers scattered over this length. The fact that no complaints have been received against the system is alone a fair proof of its success; but the complete manner in which the audit has been conducted to the satisfaction of the officers of Government and the Company places the matter beyond doubt.

3. The main features of the system are, that the accounts of Disbursers are submitted direct to the Auditor, who exercises a complete check over the outlay and forwards to the Company's Account Office the necessary information on which to base the entries in the books, and that no payments are made without the certificate of the Auditor as to their correctness.

4. As an example of the present state of the accounts of Disbursers, I may mention that on the 27th March, when I examined the books, out of 31 Disbursers, 27 had sent in their accounts to the Head Office up to the 17th, and the accounts of 28 officers up to the 10th idem had been examined and passed by the Auditor. It would be a good thing if some of the older Companies could be got to work up to this state of punctuality.

5. It would be superfluous on my part to enter into a full description of the manner in which the details of the accounts and audit are carried out, as the procedure has been fully described in the circulars that have from time to time been issued on the subject during the past year; but I will simply remark that the rules laid down with the sanction of the Accountant General, Public Works Department, have been adhered to. I would, however, suggest that these circulars should be published in pamphlet form for convenience of reference, advantage being taken of the opportunity for correcting any points which experience may have shewn to require modification. The system of account and audit now in force is second to none on any Railway in India, and it would be a benefit to the Companies' officials, as well as those of other undertakings, to have the rules and forms in force recorded in a lasting form.

16. In concluding these remarks, I think it my duty to bring to the notice of Government the very satisfactory manner in which Mr. Macdonald has conducted the responsible duties entrusted to him. He was the first officer of Government to whom the novel process of conducting a joint audit on behalf of the two parties to a contract has been entrusted. The situation was one of no little difficulty and great responsibility, and it is very much to Mr. Macdonald's credit that he has met and overcome the difficulties in his path and earned the approval of the Government and Railway Officials. The great success of the system however must, I think, be due in no small degree to the hearty manner in which General Beadle has co-operated with the officers of Government in its introduction.

Extract paragraph 2 of Public Works Department Resolution No. 409 A. R., dated 28th June 1871.

2. The Governor General in Council is much pleased to learn that the new system of joint audit on behalf of the Government and the Railway Company has been conducted in such an efficient manner and has proved so successful.

GOVERNMENT OF INDIA.

LEGISLATIVE DEPARTMENT.

Abstract of the Proceedings of the Council of the Governor General of India, assembled for the purpose of making Laws and Regulations under the provisions of the Act of Parliament 24 & 25 Vic., Cap. 67.

The Council met at Simla on Tuesday, the 27th June 1871.

PRESENT:

His Excellency the Viceroy and Governor General of India, K. P.,
G. M. S. I., *presiding*.
His Honour the Lieutenant-Governor of the Panjáb.
His Excellency the Commander-in-Chief, G. C. B., G. C. S. I.
The Hon'ble John Strachey.
The Hon'ble Sir Richard Temple, K. C. S. I.
The Hon'ble J. Fitzjames Stephen, Q. C.
The Hon'ble B. H. Ellis.
Major-General the Hon'ble H. W. Norman, C. B.
The Hon'ble F. R. Cockerell.

PANJÁB REGULATIONS BILL.

The Hon'ble MR. STEPHEN moved for leave to introduce a Bill for declaring what laws are in force in the Panjáb. He said that the object of the Bill was to place the law of the Panjáb on a definite footing, which at present could not be said to be the case. Before 1861, it had been supposed that the Government of India had the same right to make laws for newly conquered provinces as Her Majesty had to make laws for Crown colonies, but doubt had subsequently been thrown on this opinion. In consequence of this doubt the 25th section of the Indian Councils' Act was passed, the effect of which was to confirm every "rule, law or regulation" previously made by the Governor General or the Lieutenant-Governor. The Government had since that Act proceeded on the supposition that it negatived by implication the existence of the power in question. When the Panjáb was annexed, however, the older opinion prevailed, and the Board of Administration to which the Government of the Province was entrusted, was accordingly intrusted by a despatch from the Government of India, with very wide discretionary powers for that purpose. Under those powers, as every one knew, the province was administered with exemplary vigour and perfect success. The Board of Administration naturally issued a large number of orders for the Government of the Province, and, amongst other things, directed their Officers and were themselves directed, to conform generally to the system of administration which prevailed at the time in the North-Western Provinces. The orders made by the Board, and afterwards by Lord Lawrence, first, as Chief Commissioner and then as Lieutenant-Governor, were in some cases confirmed as they stood; in other cases they were confirmed under qualifications; in others they formed the subject of a correspondence which led to no very definite result, but which was afterwards indirectly referred to, possibly in reference to other Provinces. In other cases Lord Lawrence had occasion to refer to particular regulations in force in the North-West. These references were usually made in very general terms, as was natural and inevitable under the circumstances, and without any thought on the part of Lord Lawrence, or apparently on the part

of the Government of India, that these references amounted to legislation. This state of things went on from 1849 to 1861, when the section of the Indian Councils' Act already referred to was passed. Its authors would appear to have known vaguely that a great mass of matter of the nature already described had practically the force of law in the Panjáb, though they did not know specifically what was its nature. Such as it was, however, it was all converted into law by the enactment in question, and to this day it formed an unknown and unexplored region with which it was simply impossible for any one to acquaint himself who had not access to the archives of the Panjáb Government, and the industry and time to master their contents. It was highly undesirable to allow an undefined mass of rules and regulations, about the legal validity of which no one could be sure, to constitute a portion of the law of the province. These rules and regulations owed their existence to the necessity under which the Government of India was placed of providing forthwith for the administration of a newly-conquered province. The measures for this purpose had to be taken at once, and there was no time for simplicity and brevity. Moreover, at the time the general law of India was such, that it was natural for the Government to shrink from extending it to such a province as the Panjáb. Great as were the merits of the Regulations, they were intricate in many parts and difficult to understand. An idea as to the condition of the criminal law might be gained from a perusal of Beaufort's Digest—a work of great merit which showed the existence before the Penal Code of a more intricate and troublesome state of the Criminal Law than existed even in England. The Government did not like to burthen the official staff with so cumbrous and perplexing a system, but having no better system to give them, it was reduced to the necessity of directing in substance that the Board of Administration should introduce and act upon it as far as they found it suitable. It was usually supposed that the Panjáb had been governed, as the phrase was, patriarchally without any law at all, and at the discretion of Lord Lawrence and his colleagues. It was impossible to make a greater mistake. Lord Lawrence and his colleagues no doubt possessed great powers. It was most fortunate for the Province that they did, and that they used them with corresponding vigour, but it was by no means true that they ruled without law. On the contrary, one of their very earliest measures was to provide themselves with codes of laws which, if not so complete as the Penal Code and the Codes of Procedure, were an immense improvement on the intricate system which prevailed elsewhere in India. The book called the Panjáb Civil Code was prepared as early as 1853, and many rules relating to Civil and Criminal Procedure were introduced somewhat later. So far, indeed, was it from being true that the great authority of Lord Lawrence could be quoted in favour of personal government as against government by law, that it would be much more like the truth to say that Lord Lawrence's administration of the Panjáb afforded the clearest proof that could be given, not only of the necessity of having laws to govern by, but of the superiority of simple and scientific laws over cumbrous ones. His attempts, however, to introduce such a system met with very partial success. No doubt the laws which he introduced were, from a merely legal point of view, defective in many particulars. It would have been a miracle if this had not been the case, but the collection of rules now published showed conclusively that no man could have recognized more explicitly the necessity of introducing into the Panjáb broad, simple, definite and tangible express laws, or could have made greater efforts to obtain them. As was before observed, there was produced in 1853 the first draft of what was subsequently published as the Panjáb Civil Code. This was an attempt, and an exceedingly able attempt, at codification, and anticipated corresponding attempts that had been made in other parts of India. This volume was sanctioned as a text-book, and some portions of it relating to procedure undoubtedly acquired the force of law. But the Government of India had shrunk from the task of laying down a definite code for the Panjáb, and had continued to sanction

or discuss the special orders and suggestions made from time to time by the Local Government. The consequence was that things had gone on till they had reached their present strange condition. One instance of the strange way in which laws had come into existence was the revenue system of the province. The original letter of the Government of India to the Board of Administration had directed the four short circulars, which regulated this subject in the North-Western Provinces, to be taken as the guide on revenue operations. The language of this letter was that of an ordinary despatch; but it had all acquired the force of law. The result was this: the four letters referred to were immediately afterwards embodied in the Directions to Settlement Officers—a beautifully lucid and simple set of instructions. These Directions referred to and relied upon the Regulations, and in this way the Revenue Regulations had come into force in the Panjáb; in fact, the law was introduced by a circular professedly issued under the law. This was one instance of the extraordinary confusion that had been produced; another was the Panjáb Civil Code. When leave to publish it as law was asked, the Government of India had distinctly refused, and directed that it should be published with the authority attaching to the circulars of the Sadr Court. However, its introduction into Oudh was subsequently recommended by the Governor General, and in his recommendation he observed, in passing, that it had been found very useful in the Panjáb. This had, somewhat strangely, in Mr. STEPHEN'S opinion, been regarded by the Privy Council as an admission on the part of Government that the volume had acquired the force of law in the Panjáb. The question as to how far this was the case had been much debated; and Mr. Barkley, to whose labours they were all much indebted, had, in the course of a very careful investigation, discovered a remark which appeared to be the most distinct recognition of the Panjáb Civil Code, on the part of Government that was ever made. But it laboured under the disadvantages of being equivocal, unknown to every one whom it concerned, and being obviously made without the least intention on the part of the person who made it to legislate. The remark was as follows:—The Lieutenant-Governor in reviewing the Judicial Commissioner's Administration Report for 1858, observed—'His Honor's assent is fully given to your remarks concerning the necessity and importance of exacting a strict adherence to the letter and spirit of the Panjáb Law and Procedure.'

The Council would probably agree with him in thinking that if a law was to be considered to have come into existence because the Lieutenant-Governor in the course of official correspondence, with no idea of legislation present to his mind, made an incidental remark, which was fished up years afterwards by an industrious official, any one who managed to know what the law was, must be uncommonly fortunate.

It was now proposed that this state of things should cease. Lists of the rules and circulars confirmed by the Indian Councils' Act had been called for by his (Mr. STEPHEN'S) predecessor from all parts of India concerned, and the result, so far as the Panjáb was concerned, was the present volume by Mr. Barkley, which contained all which that gentleman, after a very careful enquiry, considered to be law in the Panjáb. The question was now how to deal with it. Mr. Barkley had forwarded a memorandum which, he (Mr. STEPHEN) was happy to find coincided in all substantial particulars with one which had already been drawn up by himself. There would, he believed, be no difficulty in reducing the whole volume into an Act of perhaps fifty sections; and when this Act was passed, there would be an end of all non-regulation law. Two principles must, however, be kept in view in the framing of any such Act: in the first place, a large portion of the book could not be regarded as law in any sense of the word. It consisted of mere executive orders which Government was quite competent to enforce on its officials without legislation on the subject. As

to these orders, not only was it unnecessary that they should have the force of law, but it was highly inconvenient that there should be any doubt whether they had it or not, inasmuch as, if they had it, Government became bound by them and could not vary them at convenience. In the next place, there were a number of topics as to which it was highly desirable that the Local Government should have power to frame rules; such subjects were the existing track law, the slaughter of kine—a subject which, as recent experience unhappily proved, was eminently likely to provoke animosities between Mussulmans and Sikhs, and required, therefore, to be provided for by special rules. Then there were rules as to armed retainers and grazing rights. Now, if the portion of the book which consisted of alterations in the ordinary law were expressly enacted, if the portion which consisted of mere executive orders were put aside, and power were given to the Local Government to issue rules on the subjects just enumerated, he believed that the rules contained in the book might be safely repealed; and the result would be to get rid of that large mass of non-regulation law which, till now, it had been so difficult to ascertain or define. There would also have to be a section to declare what the law was according to which the Courts were to frame their decisions. It would follow the precedents set by the Bengal Regulations, and would refer to the Acts and Regulations in force in the Panjáb, to the Muhammadan and Hindú laws in the cases to which they respectively applied, and where no other law was available, to justice, equity and good conscience, which was in practice a less vague expression than it might appear to be. What would be done, accordingly, would practically amount to this: such portions of the Panjáb Civil Code as were not mere expositions of Muhammadan or Hindú law, would be re-enacted, except when it was considered unnecessary or undesirable. In some instances, the Panjáb Civil Code deviated considerably from the existing law, particularly in the case of pre-emption, the effect of custom, and insolvency. Upon the subject of the validity of the rules as to insolvency involving the administration of many lakhs of rupees, a difference of opinion existed, Mr. STEPHEN understood, between the Judges of the Chief Court. As to this controversy, it appeared that the best thing to do was to leave it undecided as regarded the past, to set up everything which had been done heretofore on the assumption of the Panjáb Civil Code having the force of law, and, for the future, to lay down in clear and intelligible language what the law was which the Courts were bound to administer.

His Honour the LIEUTENANT-GOVERNOR said that he did not intend offering any commentary on the statement that his hon'ble friend had just made, but he could not but express the satisfaction which he felt that this troublesome and intricate matter was now to be dealt with. There could be no doubt that the effect of the Indian Councils' Act had been to make a great many things law that could not be regarded as law without a great deal of inconvenience alike to the Government and the people, and he sincerely rejoiced that the matter had fallen into hands so competent as to deal with it in a wise and statesmanlike manner.

The Motion was put and agreed to.

EUROPEAN VAGRANCY ACT AMENDMENT BILL.

The Hon'ble Mr. STEPHEN also moved for leave to introduce a Bill to amend the European Vagrancy Act, 1869. He stated that the Government of Bengal had requested that the European Vagrancy Act should be amended with a view to meeting the case of persons coming from Australia in charge of horses, on engagements which terminated with the voyage, and immediately becoming chargeable as vagrants. In these cases it was impossible to enforce the Act, inasmuch as the persons "to serve whom" the vagrant had come to

this country, was the shipper of the horses in Australia. As this was an obvious evasion of the law, it was proposed, by the present Bill, to make the consignee in such cases liable for the expenses of the vagrant.

The Motion was put and agreed to.

The Council adjourned to Tuesday, the 4th July 1871.

H. S. CUNNINGHAM,

SIMLA;
The 27th June 1871. }

Offg. Secy. to the Council of the Governor
General for making Laws and Regulations.

Abstract of the Proceedings of the Council of the Governor General of India, assembled for the purpose of making Laws and Regulations under the provisions of the Act of Parliament 24 & 25 Vic., cap. 67.

The Council met at Simla on Tuesday, the 4th July 1871.

PRESENT:

His Excellency the Viceroy and Governor General of India, K. P.,
G. M. S. I., *presiding*.

His Honour the Lieutenant-Governor of the Panjáb.

His Excellency the Commander-in-Chief, G. C. B., G. C. S. I.

The Hon'ble John Strachey.

The Hon'ble Sir Richard Temple, K. C. S. I.

The Hon'ble J. Fitzjames Stephen, Q. C.

The Hon'ble B. H. Ellis.

Major-General the Hon'ble H. W. Norman, C. B.

The Hon'ble F. R. Cockerell.

ODDH REGULATIONS BILL.

The Hon'ble Mr. COCKERELL moved for leave to introduce a Bill for declaring what laws are in force in Oudh. He said, this measure was a part of the general scheme described at the last meeting of this Council, for removing all ambiguity as to the legal effect of section twenty-five of the Indian Councils' Act of 1861, in the determination of the law in force in the non-regulation territories.

After the exhaustive remarks of his hon'ble and learned friend (Mr. Stephen) on that occasion, it was hardly necessary for him to enter into any explanation of the need for legislation of this kind.

Although, in the case of Oudh, the subject was not so complicated as it had been shown to be in that of the Panjáb, by reason of the comparatively short period intervening between the annexation, or rather the re-occupation, of Oudh and the date of the Indian Councils' Act, and the consequently small number of orders to be dealt with, yet there also the advantage of a simple declaration of what must be deemed to constitute the law of the province would, he thought, be generally acknowledged.

The task of sifting the various orders of Government during that period and distinguishing between those properly having the force of law, and those of a purely executive character, was entrusted to a committee of officers of local

experience of which the present Judicial Commissioner was the President. The Committee's selection of orders having the force of law was described in their report to have been guided by an opinion of the Advocate General of Bengal expressed in a letter to the Government of India, dated the 13th September 1864, to the following effect:—

"I am fully of opinion that the rules, laws and regulations referred to in section twenty-five are as if passed for the regulation provinces since the 22nd April 1834, must have been passed by the Council of the Governor General in its legislative capacity. * *

"I think it is clear that the section must be read as applicable to such rules and regulations as were in the nature of laws affecting rights or imposing punishments, and that any rules or orders which in their nature were only rules for the guidance of a department or for the action of the executive, and which could be, and always have been, issued by the Government in its executive capacity merely, do not come within the section."

The result of the Committee's action on this principle was condensed in a volume of extremely moderate dimensions, as compared with that exhibited to the Council in connection with the similar Bill for the Panjáb. The collection of orders and rules which that volume contained commenced with the Government letter of the 4th February 1856, which laid down in the most comprehensive manner the rules which were to govern every department of the administration of the province at the time of its annexation to British India. Much of those rules had since been superseded by the introduction of the Codes; but some of considerable importance survived.

For example, the reference in somewhat loose and general terms to the Panjáb Civil Code contained in these orders had been held by the Privy Council to render obligatory the adoption of the principles of the Code as the basis of the administration of justice in Oudh. The extent to which these principles were to be applied, as also the degree of permanence intended to be given to their operation, must, he thought, be considered extremely doubtful; for in the letter of Government, to which he had referred, occurred the following passages:—

"But it will not escape your observation that, in the preparation of the rules under notice, much attention has been given to the *lex loci*, and that, specially in matters relating to inheritance, marriage, divorce and adultery, adoption, wills, legacies and partitions as well as in all commercial transactions, a due regard to local usage has been enjoined. It cannot of course be supposed that the *lex loci* or local custom in provinces differing so widely as the Panjáb and Oudh is in all or even in many respects identical, and it follows that those provisions of the rules, which rest on the *lex loci* in the Panjáb, cannot with any propriety, or without risk of injurious failure, be extended to the province of Oudh.

"While then the Governor General in Council directs your attention to this collection of principles of law as calculated to afford material assistance in the absence of any better or more appropriate treatise, he refrains from requiring the strict observance of them, until it can be ascertained how far they are applicable to the peculiarities of the province and the customs of its people. With this end in view, His Lordship in Council desires me to suggest that all the Commissioners and District Officers and the most experienced of the Assistants, should be required to study the principles of law in their daily application to the business brought before the Civil Courts, and after the lapse of a twelve-month or more, as may be hereafter determined, to report to the Judicial Commissioner the opinions which they may have formed to the applicability of the 'rules of law to the people of Oudh,' and to offer at the same time any remarks and suggestions which may have occurred to them."

Within a little more than a year after the promulgation of these directions, the whole province was reduced to a state of anarchy by the mutiny of 1857, and it appeared from the subsequent letter of Government, dated 6th October 1858, that no such report was made up to that date. From the absence of any reference to the matter in the Committee's report, it was to be inferred that no such investigation of the subject, as was contemplated by the orders of Government, had ever been made up to the present time.

It would clearly be necessary to restrict the operation of the principles contained in the Code to the extent to which they might be found to be consonant to the practice of the Oudh Courts during the last twelve years. This was the only question connected with the framing of the Bill, which he was

now asking leave to introduce, which presented any difficulty. The rest was very simple. There were certain rules of procedure in force in the Panjáb which were applied to Oudh by the orders of Government, dated 20th January 1859. There was a circular letter based upon an order of Government in regard to the record of rights of sub-proprietors and middle-men. The rules regarding such rights had been superseded for the most part by the enactment of Act XXVI of 1866. The only object in declaring them to have the force of law, was to give validity to past proceedings. There was also a rule as to the award of a fixed percentage to the finder of hidden treasure, and an order in regard to the employment of juries in the adjudication of civil cases in Lucknow.

Some doubt appeared to exist as to the law of limitation of suits now in force in Oudh, and appended to the Committee's report was a rather long correspondence on the subject ranging over several years and terminating with no satisfactory solution of the question at issue. The importance of that question was, however, very much diminished by the recent enactment of a new limitation law which would come into force in Oudh, as elsewhere, about two years' hence. All that had to be done now, therefore, was to declare what must be considered to have been, and to be, the law on this subject until the new Act came into operation, and to provide for the legal validity of past proceedings so far as they were affected by this question.

It was thought, moreover—but on this subject some doubt was felt—that the system of registration of deeds heretofore in operation in Oudh had not the force of law. Here, again, all future difficulty was avoided by the application of the new Registration Act. It would seem, however, in any case to be immaterial whether the force of law was or was not conceded to the present system of registration in Oudh, for that system not only made no registration obligatory, but apparently did not give any prescribed superiority to the registered over the unregistered document.

One useful result of this scheme for declaring the law in force in our more recently acquired territories would be the effacement of all distinction between the so-called "regulation" and "non-regulation provinces." That distinction was purely nominal, for it would be found that every regulation that was still operative in the older was practically in force in the more recently acquired provinces. Indeed, in one sense the latter would appear to be more overlaid with regulation law than the former, for apart from the fact of the Indian Councils' Act of 1861 having given the force of law to a mass of rules and orders promulgated by the Executive Government, he found from the volumes which described the regulations in force in the Panjáb and Oudh—and he confessed that the discovery was rather mortifying, as he had taken great interest in the work of consolidation and replacement of the regulations by modern enactments—that, for the purposes of these provinces, the 'spirit' of old regulations decently buried and put away in the repealing schedules of the consolidation Acts by which they had been superseded, was held to have survived their corporeal extinction.

The only places to which the term "non-regulation" could now aptly be applied, were those districts and hill tracts along our frontiers which had been expressly placed beyond the pale of the mass of our laws, whose degree of civilization and material progress were better suited to the patriarchal, than the legal, system of administration.

The Hon'ble MR. STEPHEN merely wished to add one word to what had fallen from his hon'ble friend. He entirely concurred in the observations with which he had closed his speech. He would be sorry that it should be supposed that the process at present going on with regard to the law of this country was calculated to render it more intricate or difficult. On the contrary, it was a process of simplification, and its result would be to render the law less technical

and obscure. At present, in provinces like Oudh and the Panjáb, there was considerable difficulty in ascertaining what the law was; and in Burma, as had been pointed in a striking pamphlet by Mr. Broughton, the present Administrator General, the condition of things was such that, supposing it to be the interest of a sufficiently skilful lawyer to go into the matter, difficulties might ensue which it would be really extremely difficult to meet except by express legislation. In fact, when rules and orders, such as are called for by the necessities of a newly conquered province, were suddenly invested with the fixity of law, it was certain that, before long, complications and embarrassments would ensue, for which legislation was the only cure. It was on this account that the present measure, and others of a kindred nature, had become a matter of necessity.

The Motion was put and agreed to.

GENERAL REGULATIONS AND ACTS (DEHRÁ DÚN) BILL.

The Hon'ble MR. COCKERELL also presented the Report of the Select Committee on the Bill to bring the Dehrá Dún within the operation of the General Regulations and Acts.

The Council adjourned to Tuesday, the 11th July 1871.

H. S. CUNNINGHAM,

SIMLA;
The 4th July 1871. }

Offg. Secy. to the Council of the Governor
General for making Laws and Regulations.

1091
From

Commissioner's Office,
Batacounda
13th December 1871

J. W. Brinkley Esquire
Commissioner

Y
Nailheries

The Secretary to Government
Revenue Department.
Fort Saint George

Sir
In accordance with the Under Sec-
retary's letter of the 27th October 1871 No
1865-A I draw Mr. W. W. Ivers attention
to the statement made by Mr. Moore at
page 982 of the Supplement to the
Gazette of India dated 8th July 1871 viz.

"We received our first (Cinchona)
Cuttings from the Nailheries and these
were extensively affected with canker"
and to the remark in para 4 of Mr. Secre-
tary's letter (page 1000 of Supplement)
to the effect that the canker which has
attacked the plants at Ranghoo is shown
to have existed in the plants originally
"sent up from the Nailheries as stock"
for the Sikhim Plantations.

2 As directed I forward Mr McLoore's remarks which are pertinent and to my mind conclusive.

The weight due to Mr Mooro's statement is not difficult to determine, with the aid of Mr McLoore's explanation that the Berjeeling Association unemployed any cuttings from the Kulcheries in Mr Mooro's time, and that Mr Mooro did not arrive at Bonouf until the Kulcherry Plants originally supplied had been nearly 2 years and the last supply fully 10 months in Bonouf.

It was not the object of the Cutchona Commission to discover whether the disease came from this or that District and therefore Mr Mooro's statement passed unchallenged, nor is it worth while now I apprehend to ask him to refresh his memory by the light of Mr McLoore's letter.

3 There remains Mr Sumner's Statement. I have read the Cutchona Commissioner's report and am at a loss to understand how Mr Sumner arrives at the conclusion that the disease "is shown to have existed" "in the plants originally sent up from the Kulcheries."

Mr Mooro's random assertion is the only

only evidence that the Kulcherry Plants were cankered. At this single unexamined statement made 7 or 8 years after the last supply of Kulcherry Plants to Bonouf by a witness who could not speak from his own experience, is accepted by Mr Sumner as conclusive and is made public with the authority of the Government of India in the face of Dr Anderson's testimony at the time, to the "vigorous growth and excellent condition" of the Kulcherry Plants imported by him.

* See Supplement to the Report of India Commissioner dated 20th June 1911 Page 923

4 Such a hasty statement is hardly creditable to a Department lately created in order that "Special attention might be devoted to many branches of administration" now unavoidably more or less neglected "or but imperfectly dealt with."

Shave the honor to be

Sir
Your Most Obedient Servant.

T. C. D.

W. S. S. S.
Commissioner.

No 115

7-12-71

Government Gardens
Ootacamund 6th December 1871

From,

W. G. M^{rs} Esq^r
Supt. Govt. Shimshona Plantations

To,

J. N. Brooks Esq^r
Commissioner of the Nilgherries
Ootacamund

Sir,

I have the honor to acknowledge your letter, No 61, of the 31st ultimo, calling my attention to Pages 982, and 1000 of the Supplement to the Gazette of India of 8th July 1871, in which is published the Report of the Bengal Shimshona Commission, and asking me for an explanation of the evidence given by Mr. Munro, viz^t, that, "we received our first cuttings from the Nilgherries, and these were extremely affected with canker", and to para 24 of the Proceedings of the Governor General in Council where the canker in the Shimshona plants in Sikkim is said to be "a disease which is shown to have existed in the plants originally sent up from the Nilgherries as stock for the Sikkim Plantations."

In reply I beg to state that, I am not aware of the facts on which the Government of India have come to the above conclusion, but if

27 Dec 71 11/12/71

Received to Esq^r No 115 1871

DO. 91
1871
No. 4003.
Date 13th December 1871
Received 18th

Commissioner's Office,
Ootacamund.

To, J. N. Brooks Esq^r
Commissioner of the Nilgherries
Ootacamund.
Enclosures, 11/5

SUBJECT.

Submitting Mr. Munro's letter containing remarks on the statement made by Mr. Munro viz^t that the 1st cuttings received from the Nilgherries were affected with canker.

27 Dec 71 11/12/71

No 115

if the original 204 plants of *Chinchona* selected by Dr. Anderson in December 1861, from our stock on the Nilgherries, and conveyed by that gentleman to Bengal, were really cankered plants, it is remarkable that there should have been no mention of this fact until 1871. The Reports by the gentlemen in charge of the Bengal plantations, describe the plants to be in the "highest health" and "growing most vigorously." It appears impossible that, responsible, scientific, and practical gentlemen should have continued for years to furnish such favorable reports on plants which were affected with disease from the first.

3 When viewed in connection with recorded facts many of the statements made before the *Chinchona* Commission appear contradictory and impossible. This is especially the case with reference to the evidence of Mr. Munro. It is therefore to be regretted, that that gentleman was not asked to explain the facts on which he made the statement above quoted. It is quite certain from a careful examination of the records that Mr. Munro never received any cuttings from the Nilgherries. In fact Mr. Munro did not arrive at Pomong until December 43, or when the original plants sent from the Nilgherries as stock for the Sikkim plantations had been nearly two years, and the last supply fully ten months in Bengal. Thus it was impossible for him to know whether such plants were healthy or otherwise when they left the Nilgherries.

4 At page 981 in reply to question Mr. Munro states, "but my present plantation of 50,000" (*C. succirubra*) "plants have been raised by cuttings from 92 plants." This is an error as I supplied a quantity of excellent seeds to the Proprietors of the Pomong Plantations, Mr. Lloyd and Colonel Angus. These seeds germinated freely and probably produced from 50,000 to 100,000 seedlings. The seeds were gathered from plants which never had an indication of disease and at the present moment are fine forest trees.

5 Another instance of the manner in which the evidence given before the *Chinchona* Commission is ill considered and likely to mislead occurs at page 98 where Mr. Mann in referring to the plants planted in Sikkim in 1864, says, "10 per cent were old exhausted" stock plants from the Nilgherries." Mr. Mann did not arrive in India till the 14th March 1864, or 1 year and 2 months after the last supply of Nilgherry plants arrived in Bengal.

6 It appears to be assumed that the Sikkim plantations were stocked with plants from the Nilgherries only. But the records show that the stock was obtained as follows:— Dr. Anderson raised in April and May 1861 in the Calcutta Botanic Gardens 120⁰ seedlings from seeds of *C. micrantha*, *C. succirubra*, and *C. Peruviana* obtained by Mr. Markham
a Report of Botanical Gardens Calcutta from April 1861 to April 1862, by T. Anderson Esq.

rkham from South America. Of *C. Pahudiana*
248 seedlings were raised in Calcutta in December 1861,
and the early part of January 1862 from Java seeds.
Two hundred and four plants reached Calcutta from the
Nilgherries in the 13th January 1862, and the second and
last supply of 350 plants from the Nilgherries² arrived
in Calcutta on the 30th January 1863. Of *C. officinalis*
11 plants were received from Ceylon on the 28th January
1863, and 1373 additional plants of *C. Pahudiana* from
Java seed had germinated on 1st April 1863. In March
1866 Dr. Anderson raised 3,100 seedlings^c of *C. officinalis*
from seeds received in January 1866 from Mr. Thwaites,
Ceylon, and 8000 seedlings^a from seeds received from the
same source in March 1866. During 1866-67, 38,500 seedlings,
and in 1867-68, 101,175 seedlings^e were raised in the
Sikkim plantations.

7 Thus the Sikkim plantations
received large supplies of seeds and plants from other
sources than the Nilgherries; the Nilgherries merely
furnishing the principal stock of *C. Calisaya* and *C.*
Speciosa. The Sikkim stock of *C. officinalis* was
raised principally from seeds from Ceylon, and it is
worthy of note that the entire stock of this species

^b Annual Report of Chinchora Cultivation in British Sikkim
dated 30th April 1863.

^c S. Anderson Esq. to Junior Secretary to Govt. of Bengal 1st May 1866.

^d Report of the Sikkim plantations from 1st April 1865 to 31st March
1866 by S. Anderson Esq.

^e Report on the Cultivation of Chinchora in Bengal for the year 1867-68

13
species has been so seriously affected with canker as to
cause the cultivation to be abandoned. The Sikkim
stock of *C. Pahudiana* raised solely from Java plants
and seeds has also been destroyed by Canker. The
Java variety of *C. Calisaya* (*C. Javiphiensis*) has been
affected by canker that only one plant existed in
Sikkim plantations at the date of my visit in Febua-
ry 1871 out of all the plants received of this variety. It is
thus a matter of record that disease in the Sikkim
plantations has not been confined to plants produced
from the Nilgherrie stock; disease in fact having
made even more serious inroads on the plants and
seedlings from South America, Ceylon, and Java.

The *C. Speciosa* and *C. Calisaya* the principal stocks
of which were supplied from the Nilgherries are the only
species which give a hope of successful culture in Sikkim.
It therefore may be fairly assumed that the stock
of these plants were at least as healthy as any procured
elsewhere.

8 I shall now notice what Dr. Anderson
states to have been the condition of our plants. That
gentleman visited the Nilgherries on the 17th December
1861, and that he was not favorably impressed
with any thing we had done is abundantly illustrated
in his Report to the Secretary to the Government of
India of 14th February 1862. In this report Dr. Anderson
condemns all the sites on the Nilgherries as unsuited
to

to the growth of *Chinchona*. He asserts that the plants require "dense shade" and that our attempt to grow a "shade loving tree" in such "unnatural places" as cleared gardens will end in "complete failure".

This depreciation also extends to our plants, as Dr. Anderson in the same report at para 8 states, "The season is now too far advanced for the dispatch of plants to Java, and the plants at the Neilgherries are not at all adapted for transmission to a distance, as plants artificially propagated, as they have been, cannot bear the risk of a long journey without a few months preparation. Of those I brought, the short journey from the Neilgherries to this, I lost nearly 10 per cent, while the plants from Java, which were seedlings, can hardly be said to have suffered at all". Again at para 6 Dr. Anderson referring to the Neilgherry plants, says, "These arrived in tolerable order considering the loose manner in which Mr. M^r from want of time was obliged to pack them. About 13 plants out of 204, the entire number received, have been seriously damaged, the remainder in the present genial climate of Calcutta, have quite recovered, and are as healthy as at Ootacamund". Again at para 20 Dr. Anderson states, that, "193 plants out of the 204 were 'growing most vigorously' in the Calcutta Botanical Gardens on 19th January 1862.

This

56
This reduces the loss to less than 5½ per cent. 25

9 The whole of the above gives a most erroneous impression, as the loss of the plants was neither owing to artificial propagation or to being carelessly packed, but was wholly caused by an accident which Dr. Anderson describes in his Report on the Botanical Gardens Calcutta from April 1861 to April 1862, in these words, "while I was at Ootacamund" "I procured 204 plants belonging to four other species of *Chinchona* besides those I obtained in Java. Several of these plants were destroyed between the foot of the Neilgherries, and the Railway Station by the upsetting of one of the carts on which the Wardian cases were carried".

10 The last batch of plants forwarded from the Neilgherries as stock for the Sikkim plantations were prepared by me in December 1862 and are thus mentioned by Dr. Anderson in his report on the Sikkim plantations from 1st April 1863 to 30th April 1863. "These plants were obtained from Madras on the 31st January 1863, and of the original number 350, obtained from Madras only 23 had been lost between Calcutta and Darjeeling during the two months that had intervened from the date of their arrival in Calcutta and their reaching Darjeeling". Dr. Anderson speaks of the same plants in his letter to Sir William Dunsen dated 9th March 1863 as follows:—"You will probably

"probably like to hear that the Chinchona plants
"supplied to me from Potacumund arrived here in
"excellent condition, they are still in the gardens and
"have grown much, most of them having made
"3 pairs of leaves since their arrival here. The
"weather is now getting too hot for all of them
"except *C. succinbra*."

11. On the Neilgherries we received on the
9th April 1861 in all 465 plants of *C. succinbra* from
South America, and these plants had been about
eight months on these hills at the time Dr. Anderson
selected the plants for Bengal. Dr. Anderson thus
describes our plants at the date of his visit, Decr/61.

"With the exception of a few plants recently planted
"in the open air Nurseries at Neddinutturn, all
"the Chinchona plants on the Neilgherries are
"growing in the Conservatories in the Government
"Gardens at Potacumund, where protected from the
"vicissitudes of the weather, and in a recently erected
"house even under the influence of artificial heat

"they are growing luxuriantly". Dr. Anderson
selected his 2nd plants from 3,500 which were
prepared to be sent to the Neddinutturn Nurseries,
and the whole of the remainder of these plants viz.
3,296 were subsequently planted on the 1st Denison
plantation and now form a fine Chinchona forest.
No disease has ever appeared among any of these
plants.

plants. (During this year we have taken the
bark from the stems of 1000 of these trees and they
have yielded upwards of three pounds of dry bark
each; the trees notwithstanding the removal of the
bark still continue to maintain their mental health
and vigour.

12. In conclusion I would desire to bring
prominently forward the following facts:—First. For many
years subsequent to the receipt of the Neilgherry plants,
Dr. Anderson and the other gentlemen in charge of the
plantations speak of them as in the "highest health"
and "growing most vigorously," &c. * Second, the

* From Thomas Anderson Esq. M. D. Officiating Superintendent
Royal Botanic Gardens, to W. Grey Esq. Secretary to the Govern-
ment of India, 11th February 1862.

20 "The plants are in very good health and
"*C. succinbra*, *C. calisaya*, and *C. Pahudiana* are growing
"most vigorously, and seeds *C. Pahudiana* are coming up
"daily!"—

First Annual Report on Chinchona cultivation in
British Sikkim from 1st April 1862 to 30th April 1863 by J.
Anderson Esq. M. D. Offg. Supt. of the Botanic Gardens
Calcutta.

"I am glad to be able to report that on my visiting the
"Chinchona nursery at Tebing in the end of May, I found
"all the plants in the highest health, and that the propagation
"of all the species except *C. Pahudiana*, was advancing rapidly."

Report on Chinchona cultivation at Darjeeling from
1st April 1863 to 15th July 1864, by J. Anderson Esq. M. D.
Supt. Botanic Gardens Calcutta.

"It is however deserving of notice as showing the great
"suitability of the climate of Darjeeling for the species *C. officinalis*
"that the plants have increased from 2000 to 2500 during the same period
"(var. *Pahudiana*). The rate of increase is now most satisfactory
"and the cuttings obtained monthly are large & healthy."

the plants and seedlings received from other places than the Neilgherries, are, if any thing, more extensively diseased than those raised from the Neilgherry stock.

From J. Anderson Esq. M. D. Supt. of the Botanic Gardens Calcutta to L. G. Bayley Esq. Junior Secy. to the Govt of Bengal, 13th Febry 1865.

"The condition of the plants is in the highest degree satisfactory, considering the removal of almost all from Lebong to Rungbee, a distance of about 20 miles."

Report on the cultivation of *Chinchona* at Darjeeling during the month of April 1865.

"The growth of the plants has everywhere been most satisfactory, and especially at the lowest plantations, the condition of the plants of all species could hardly be surpassed."

Report on the cultivation of *Chinchona* at Darjeeling, from the 1st April 1865, to 31st March 1866, by J. Anderson Esq. M. D. Supt. Royal Botanic Gardens Calcutta.

"I am glad to be able to report that the cultivation of *Chinchona* at Darjeeling has, during the past year, been attended with the greatest success."

"The stock plants of all the species are in the finest condition, and the 37,000 plants of *C. succumbens* and *offinialis* intended for the permanent plantations to be commenced in April, are strong and healthy."

Report on the cultivation of *Chinchona* in Bengal for the year 1867-68.

"The cultivation of *Chinchona* has been most successfully carried on during the year. The number of plants propagated has far exceeded the amount added to the *Chinchonas* during any previous year."

From R. B. Clarke Esq. M. A. Officiating Supt. Botanic Gardens, and in charge of *Chinchona* cultivation in Bengal, to the Secretary to the Government of Bengal (Botanic Gardens 27th May 1869)

"The growth made by the plants in the Runglee and Rishap plantations during the year has far exceeded that during the preceding year."

19
stock. Third, that Dr. Anderson selected his own (204) out of 3,500, the remaining 3,296 were planted out on the Neilgherries. No trace of disease has ever shown itself in these plants, and they are at the present time as fine trees, for their age, as any in the world. Fourth, the loss of the 11 plants mentioned by Dr. A. was owing to an accident, and not to artificial propagation or loose packing.

I have the honor to be
Sir,
Your most obedient servant

W. M. G. G.
Supt. Govt. *Chinchona* Plantations

7 Copies sent
to the 10 Jan 1872

Revenue Department.
11th Jan 1872

No. 73

To

THE SECRETARY TO THE GOVERNMENT OF INDIA.

Depart^t of Agriculture, &c.

Sir,

The Gov^t of Madras
when lately on the Neil-
giris made enquiry as
to the foundation for
the statement publish-
ed at pages 982 and 1000
of the Supplement to
the Gazette of India dated
8th July 1871, to the effect

201

N.B.

31st Dec 1871

12/11/5

Dec: 1003/71

To The Commissioner
Madras

Dated 5th December 1871
Recd. 7. 8. —

Enc: two (Gazette)

Submits herewith with
reference to the statement
made before the Bengal
Commissioner's Commission
that the Contingents from the
Nagpore were so severely
affected with cancer.

with canker, and I am
now directed to forward
copy of Mr. McJannet's reply
on the subject, and to
request that in justice
to him, the same publicity
may be given to his state-
ment as was given to
the unfavorable report above
alluded to, which this
Govt. consider is con-
-clusively shown to have
been unfounded in
fact and hastily ac-

No 143-144

Polypod of India
Canker in *Polypodium*
plants supplied
to Darg

Circulate

Des