

Proceedings of the Madras Government, Revenue Department,
14th January 1874.

No. 105. Read the following letter from V. M. Gorkum, Esq. for Britannic Majesty's Consul, Batavia, to the Secretary to the Government of India, dated Batavia, 22nd November 1873, No. 2,110.

In reply to your letter of 18th July last, No. 1203, respecting the manufacture of the Chinchona bark into quinine, I beg to inform you that I have received from the Director of the Government Chinchona Cultivation detailed information on the points sought for in your communication. I beg to hand you a copy of his letter in Dutch, of which I also enclose a translation, made by a professional Translator, costing Guilders 50, as per accompanying bill.

TRANSLATION.

From VAN GORKUM, Esq., Director of the Government Chinchona Culture in Java, to the Consul for Great Britain, Batavia, dated Bandoeng, 10th September 1873.

I WITH pleasure comply with your request of 1st instant, as far as lies in my power, reserving the pleasure of forwarding you further information as soon as it can be supplied from this.

On repeated proposals from here, and after due authorisation from the Home Government, Mr. J. C. Bernicot Moens was, by Resolution of the Indian Government of 22nd March 1873, No. 18, appointed Chemist for the Chinchona Cultivation in Java, with instructions—

(a).—To prepare the refuse of the Chinchona crops into alcaloids for the use of the medical service here, —

(b).—By regular logical analyses to assist gradually in the solution of innumerable physiological questions which rule the most profitable manner of exploring the Chinchona Plantations, and

(c).—To make himself acquainted with the management of the Government cultures, in order, when necessary, to be able to take the management of that also.

The Home Government, in giving its sanction to the appointment of a Chemist, made it an explicit understanding that the work of the Chemist, so far as it concerned the preparation of alcaloids, should simply prepare the initiatory of private industry. That the principal aim should not be the erection of a costly fabric of a permanent character, but remain solely "preparation of rough mixed alcaloids." This last recommendation was a result of the advice of Dr. DeVry at the Hague, who, being in constant communication with Dr. Howard of London, and other Quinologists in British India, had reported that in British India great success had been obtained in extracting rough mixed alcaloids from the fresh Chinchona bark, and that the medical men there were very willing to sacrifice the use of the more expensive pure *sulphas chinensis* to this mixture. I leave this verdict totally on the responsibility of Dr. DeVry. I do not believe that an earnest physician would ever give the preference in acute cases of fever to the rough mixed alcaloids, which have an unstable and uncertain composition, when he can avail himself of the acknowledged specific remedy, *sulphas chinensis*.

Mr. Moens entered upon his duties in May 1872, and has since been continually employed in analytic investigations of Chinchona barks, by which he has brought much to light. He has also in the meantime tried to prepare rough mixed alkaloids from the refuse of our Chinchona works. Mr. Moens followed in this preparation the method described below:—

The chinchona refuse, pounded to a powder, in which the analysis showed $1\frac{1}{2}$ —2½ per cent. of alkaloids, was boiled in large copper-boilers lined with lead, on an open fire three times with diluted acidum sulph. 3 kilograms of acid sulph. to 100 kilograms of bark. The mass was then pressed, and the liquids evaporated to a certain concentration in leaden pans, were precipitated by soda. The precipitate, after being well washed and dried, was boiled in alcohol for the pure extraction of the alkaloids.

The alcoholic solution was neutralised with acidum sulph. the alcohol distilled, and the remaining solution again precipitated by soda, and the precipitate washed and dried.

This whole operation gave such unfavourable results for this bark that the method had to be condemned, even if there had not been continual difficulties with defective boilers, etc.

After this a trial was made to displace the chinchona powder with diluted acid in large wooden vats, and to separate the alkaloids by adding lime water, and further treatment of the precipitate as above. This method proved more practical, but also gave little satisfaction, so that the experiments were measurably discontinued. The weight of alkaloid obtained each time was not in proportion to the real bulk of the bark experimented upon. Now, there is no doubt that a more perfect extraction could be effected from fresh bark, but the Government Chinchona Plantations in Java are situate so far in the interior, and so distant from each other, that to extract from fresh bark as many small laboratories would be necessary as there are Chinchona Plantations, viz., eight.

The Chemist has further his hands full of work; also because he has to examine samples of bark of all the lots exported for the European market.

As has already been observed, the preparation of alkaloids did not stand on the foreground on the appointment of a Chemist, nor did it rule the urgency of that appointment.

We have up to the present not been able to declare that there was any profit in local manipulation of chinchona refuse, and it is very doubtful whether we could work out good chinchona bark with profit, as it has up to the present commanded such high prices in Europe that, taking labour and expense of manipulating into account, we could not possibly produce more value in alkaloids.

Without an extensive and complete establishment, the fabrication of alkaloids will certainly remain costly and defective, and this is also the opinion of Dr. Jobst, the great quinine manufacturer at Stuttgart. French manufacturers also have formerly attempted without success, to prepare alkaloids in America at places producing Chinchona with profit. The use of the rough mixed alkaloids will always meet with difficulties on account of their uncertain composition, just because they are a mixture of theoretically dissimilarly acting alkaloids, and the preparation of pure sulphate quinine must remain unprofitable in primitive establishments.

I notify here most explicitly that the Netherlands Government began the cultivation of chinchona from a purely humane principle, and the question of production of good Chinchona bark is thus the main point, whilst that of a more or less profitable manipulation of the bark remains of perfectly subordinate importance.

The original object, viz., "securing the costly bark," has succeeded, and if manufacturers in Europe can work that bark better than we can here, it would be more rational to leave the manipulation to them. The export of the bark already promises an important move to trade, navigation, and factory industry.

These are circumstances well worthy of attention. It has always been the main object in Java, from the commencement that I entered upon the administration of the Chinchona Culture, in March 1861, to cultivate the Chinchona sorts which are rich in quinine; and our plantation consists mostly of *chinchona calisaya*, in which quinine is the chief alkaloid; whilst in British India the finest result of the culture up to the present is to be looked for in the plantations of *chinchona succirubra*, which, it is true, may be reputed very rich in alkaloids, but is comparatively poor in quinine. Rough mixed alkaloids will therefore be much more easily prepared in mass in British India than here, not only because the *chinchona succirubra* produces a large quantity of that article, but also because up to the present this bark is the least enquired after in the European market. The Java Chinchona barks are celebrated in Europe for their superior outward appearance, and altogether they have also been able to command higher prices. I do not know in how far that superior outward appearance may be dependent on the manner of harvesting, drying, and packing, but certain it is that their treatment is highly spoken of.

There are numerous other varieties amongst the *chinchona calisaya*, but we possess one with which we have become more acquainted, especially from the numerous analyses of Mr. Moens, and which produces a superior manufacturing bark. This sort produces regularly 5 to 10 per cent. pure quinine, which is also remarkable for its being easily and perfectly separated. In May 1873 a first trial was offered for sale at Amsterdam, and this lot of 260 kilograms fetched fully Guilders 2,500. A second trial of nearly 2,000 kilograms has now been exported, and Mr. Moens found in several samples the same wonderful quantity of quinine.

We need scarcely say that we will cultivate this *calisaya* exclusively in future, because our chief object remains the production of the bark producing the most quinine.

Dr. Broughton, the Chemical Reporter at Ootacamund (Madras), has an opportunity of becoming acquainted with the Java Chinchona barks.

In July 1873 we sent him from here 16 samples of various barks, and we still hope to receive for the same purpose a similar shipment from the English plantations.

Should the Managers of the Chinchona Culture in Peral, S. P. de, and Ceylon wish for seeds of our superior *calisaya*, I can get a good quantity nearly within a month, and shall be most happy to offer some through your kind assistance. In former years we frequently exchanged seeds; and for our *Succirubra* and *Officinalis*.

*Proceedings of the Madras Government, Revenue Department,
14th January 1874.*

Plantations I have exclusively to thank the loyal assistance received from Dr. Anderson (now deceased), Dr. Clark, Mr. Melvor, and Dr. Twaites (Ceylon).

We do not, however, cultivate *Nuccifera* on a large scale any longer, because it does not give any quinine-producing bark. Otherwise this *Chinchona* sort grows here as luxuriantly as it does in India.

Officinalis, which produces a good sort of manufacturing bark, we only plant on a limited scale, because this *Chinchona* sort remains tender and produces relatively little bark. The cultivation of the *calisaya* (the good sort) remains for the future for quinine manufacturers the only true and profitable one.

I trust I have realised your wishes by this information in substance. I shall be most happy to explain dubious points. I am further at your disposal at any time when I can loyally contribute towards the promotion of a common interest, as the cultivation of *Chinchona* may be called. May the cultivation be carried on in Java as well as in British India or elsewhere with due perseverance.

I subscribe myself, Sir, with the greatest distinction.

No. 641.

Agriculture and Horticulture Department of Agriculture, Revenue and Commerce, Calcutta, 20th December 1873.

Copy forwarded to the Government of Madras for information.

(By Order,)

(Signed) C. J. LYALL,

Under Secretary to the Government of India.

No. 106.

ORDER THEREON, 14th January 1874, No. 55.

Miscellaneous.

Communicated to the Government
Quinologist and to the Commissioner,
Nilgiris.

(True Extract.)

(Signed) D. F. CARMICHAEL,

Secretary to Government.

To the Government Quinologist,
the Commissioner, Nilgiris.

Ed. G. A. Turton.

No. 2116, dated Batavia, the 22nd November 1873.

From—W. McLEAX, Esq., *Her Britannic Majesty's Consul, Batavia.*

To—*The Secretary to the Government of India.*

In reply to your letter of 18th July last, No. 268, respecting the manufacture of the chinchona bark into quinine, I beg to inform you that I have received from the Director of the Government chinchona cultivation, detailed information on the points sought for in your communication. I beg to hand you a copy of his letter in Dutch, of which I also enclose a translation, made by a professional translator, costing Guilders 50, as per accompanying bill.

TRANSLATION.

Dated Bandoeng, the 10th September 1873.

From—VAN GORKUM, Esq., *Director of the Government Chinchona Culture in Java.*

To—*The Consul for Great Britain, Batavia.*

I with pleasure comply with your request of 1st instant, as far as lies in my power, reserving the pleasure of forwarding you further information as soon as it can be supplied from this.

On repeated proposals from here, and after due authorisation from the Home Government, Mr. J. C. Bernelet Moens was, by resolution of the Indian Government of 22nd March 1872, No. 18, appointed chemist for the chinchona cultivation in Java, with instructions—

(a).—To prepare the refuse of the chinchona crops into alkaloids for the use of the medical service here;

(b).—By regular logical analyses, to assist gradually in the solution of innumerable physiological questions which rule the most profitable manner of exploring the chinchona plantations; and

(c).—To make himself acquainted with the management of the Government cultures, in order, when necessary, to be able to take the management of that also.

The Home Government, in giving its sanction to the appointment of a chemist, made it an explicit understanding that the work of the chemist, so far as it concerned the preparation of alkaloids, should simply prepare the initiatory of private industry. That the principal aim should not be the erection of a costly fabric of a permanent character, but remain solely "preparation of rough mixed alkaloids." This last recommendation was a result of the advice of Dr. DeVry at the Hague, who, being in constant communication with Dr. Howard of London, and other Quinologists in British India, had reported that in British India great success had been obtained in extracting rough mixed alkaloids from the fresh chinchona bark, and that the medical men there were very willing to sacrifice the use of the more expensive pure sulphas chinicus to this mixture. I leave this verdict totally on the responsibility of Dr. DeVry. I do not believe that an earnest physician would ever give the preference in acute cases of fever to the rough mixed alkaloids, which have an unstable and uncertain composition, when he can avail himself of the acknowledged specific remedy, sulphas chinicus.

Mr. Moens entered upon his duties in May 1872, and has since been continually employed in analytic investigations of chinchona barks, by which he has brought much to light. He has also in the mean time tried to prepare rough mixed alkaloids from the refuse of our chinchona crops. Mr. Moens followed in this preparation the method described below.

The chinchona refuse pounded to a powder, in which the analysis showed 14–24 per cent. of alkaloids, was boiled in large copper-boilers lined with lead, on an open fire three times, with diluted acidum sulphur, 3 kilograms of acid sulph. to 100 kilograms of bark. The mass was then pressed, and the liquids evaporated to a certain concentration in leaden pans, were precipitated by soda. The precipitate, after being well washed and dried, was boiled in alcohol for the pure extraction of the alkaloids.

The alcoholic solution was neutralised with acidum sulphur, the alcohol distilled; and the remaining solution again precipitated by soda, and the precipitate washed and dried.

This whole operation gave such unfavorable results for this bark that the method had to be condemned, even if there had not been continual difficulties with defective boilers, &c.

After this a trial was made to displace the chinchona powder with diluted acid in large wooden vats, and to separate the alkaloids by adding lime water, and further treatment of the precipitate as above. This method proved more practical, but also gave little satisfaction, so that the experiments were meanwhile discontinued. The weight of alkaloid obtained each time was not in proportion to the real bulk of the bark experimented upon. Now, there is no doubt that a more perfect extraction could be effected from fresh bark, but the Government chinchona plantations in Java are situate so far in the interior, and so distant from each other, that to extract from fresh bark as many small laboratories would be necessary as there are chinchona plantations, namely eight.

The chemist has further his hands full of work; also because he has to examine samples of bark of all the lots exported for the European market.

As has already been observed, the preparation of alkaloids did not stand on the foreground on the appointment of a chemist, nor did it rule the urgency of that appointment.

We have up to the present not been able to declare that there was any profit in local manipulation of chinchona refuse, and it is very doubtful whether we could work out good chinchona bark with profit, as it has up to the present commanded such high prices in Europe that, taking labour and expense of manipulating into account, we could not possibly produce more value in alkaloids.

Without an extensive and complete establishment the fabrication of alkaloids will certainly remain costly and defective, and this is also the opinion of Dr. Jobst, the great quinine manufacturer at Stuttgart. French manufacturers also have formerly already tried without success, to prepare alkaloids in America at places producing chinchona with profit. The use of the rough mixed alkaloids will always meet with difficulties on account of their uncertain composition, just because they are a mixture of therapeutically dissimilarly acting alkaloids, and the preparation of pure sulphate quinine must remain unprofitable in primitive establishments.

I notify here most explicitly that the Netherlands Government began the cultivation of chinchonas from a purely humane principle, and the question of production of good chinchona bark is thus the main point, whilst that of a more or less profitable manipulation of the bark remains of perfectly subordinate importance.

The original object, namely, "securing the costly bark", has succeeded, and if manufacturers in Europe can work that bark better than we can here, it would be more rational to leave the manipulation to them. The export of the bark already promises an important move to trade, navigation, and factory industry.

These are circumstances well worthy of attention. It has always been the main object in Java, from the commencement that I entered upon the administration of the chinchona culture, in March 1854, to cultivate the chinchona sorts which are rich in quinine; and our plantation consists mostly of *chinchona calisaj-a*, in which quinine is the chief alkaloid; whilst in British India the finest result of the culture up to the present is to be looked for in the plantations of *chinchona succirubra*, which, it is true, may be reputed very rich in alkaloids, but is comparatively poor in quinine. Rough mixed alkaloids will therefore be much more easily prepared in mass in British India than here, not only because the *chinchona succirubra* produces a large quantity of that article, but also because up to the present this bark is the least enquired after in the European market. The Java chinchona barks are celebrated in Europe for their superior outward appearance, and altogether they have also been able to command higher prices. I do not know in how far that superior outward appearance may be dependent on the manner of harvesting, drying, and packing, but certain it is that their treatment is highly spoken of.

There are numerous other varieties amongst the *chinchona calisaj-a*, but we possess one with which we have become more acquainted, especially from the numerous analyses of Mr. Moens, and which produces a superior manufacturing bark. This sort produces regularly 5 to 10 percent pure quinine, which is also remarkable for its being easily and perfectly separated. In May 1873 a first trial was offered for sale at Amsterdam, and this lot of 280 kilograms fetched fully Guilders 2,500. A second trial of nearly 2,000 kilograms has now been exported, and Mr. Moens found in several samples the same wonderful quantity of quinine.

We need scarcely say that we will cultivate this *calisaj-a* exclusively in future, because our chief object remains the production of the bark producing the most quinine.

Dr. Broughton, the Chemical Reporter at Ootacamund (Madras), has an opportunity of becoming acquainted with the Java chinchona barks.

In July 1873 we sent him from here 16 samples of our several barks, and we still hope to receive for the same purpose a similar shipment from the English plantations.

Should the managers of the chinchona culture in Bengal, Madras, and Ceylon wish for seeds of our superior *calisaj-a*, I can get a good quantity ready within a month, and shall be most happy to offer some through your kind assistance. In former years we frequently exchanged seeds; and for our *succirubra* and *officinalis* plantations I have exclusively to thank the loyal assistance received from Dr. Anderson (now deceased), Dr. Clark, Mr. McIvor, and Dr. Twaites (Ceylon).

We do not, however, cultivate *succirubra* on a large scale any longer, because it does not give any quinine-producing bark. Otherwise this chinchona sort grows here as luxuriantly as it does rapidly.

officinalis, which produces a good sort of manufacturing bark, we only plant on a limited scale, because this chinchona sort remains tender and produces relatively little bark. The cultivation of the *calisaj-a* (the good sort) remains for the future for quinine manufacturers the only true and profitable one.

I trust I have realised your wishes by this information in substance. I shall be most happy to explain dubious points. I am further at your disposal at any time when I can loyally contribute towards the promotion of a common interest, as the cultivation of chinchona may be called. May the cultivation be carried on in Java as well as in British India or elsewhere with due perseverance.

I subscribe myself, Sir, with the greatest distinction,

1873.

GOVERNMENT OF INDIA.

DEPARTMENT OF AGRICULTURE,
REVENUE AND COMMERCE.

AGRICULTURE and HORTICULTURE.

FROM

THE BRITISH CONSUL, BATAVIA.

D. 22nd Nov. }
R. 12th Dec. } 1873.

No. 2110.
Enclosures.
Spare copies.

D. No. 466. }
L. No. 449. }

Progs. {
No.

SUBJECT.

FORWARDS letter from the Director of the Government
cinchona cultivation, Java, containing the information
requested in letter No. 268, dated 18th July last, respecting
the manufacture of the cinchona bark into quinine.