M.R.O. 1—77,006—8-6-37.

(1) Number of pages 14

(2) Date of repair 9/9/38

(3) Initials of the Referencer
4

MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No.	503-04	Press ~~Mis.~~
Dated	30-6-	1890.

Not to be folded or roughly handled

28: JULY 1890, No. 5, REVENUE.

REVENUE DEPARTMENT.

To

THE RIGHT HONORABLE THE SECRETARY OF STATE FOR INDIA.

MY LORD,

In accordance with your Lordship's despatch of the 13th March last, we have the honor to forward the accompanying copy of our Proceedings, No. 503, Revenue, dated 30th June 1890, which embody a report from Mr. Lawson, Government Botanist and Director of Government Cinchona Plantations, on the process employed in the manufacture of sulphate of quinine. We invite your Lordship's attention to the last paragraph of Mr. Lawson's report, and request that Mr. Wood may be asked for suggestions upon the point therein raised.

Miscellaneous.

We have the honor to be,
My Lord,
Your Lordship's most obedient, humble servants,

(Signed) CONNEMARA.
(„) C. G. ARBUTHNOT.
(„) J. H. GARSTIN.
(„) J. GROSE.

OOTACAMUND,
28th July 1890.

Exd. P. L. Pereira.

15 Copies.

FORT SAINT GEORGE.

REVENUE (1890) DEPARTMENT.

(Copy.)

LETTER to the Right Honorable the Secretary of State for India.
Dated 28 July,
No. 5 of 1890.

Forwarding copy of the Proceedings of this Government embodying a report from Mr. Lawson on the process employed in the manufacture of sulphate of quinine and requesting that Mr. Wood may be asked for suggestions upon certain points raised.

5

REVENUE DEPARTMENT.

From

C. A. GALTON, ESQ., M.A., C.S.,
SECRETARY TO THE GOVERNMENT OF FORT ST. GEORGE,

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
REVENUE AND AGRICULTURAL DEPARTMENT.

Dated Ootacamund, the 30th June 1890.

SIR,

I am directed to forward, for the information of the Government of India, a copy of the Proceedings of this Government, noted in the margin, which embody a report from Mr. Lawson, Government Botanist and Director of Government Cinchona Plantations, on the process employed in the manufacture of sulphate of quinine.

Miscellaneous.
G.O., 30th June 1890, No. 503.

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

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

Exd. P. L. Pereira.

35 Copies

1890.

REVENUE AND AGRICULTURAL DEPARTMENT.

From the Government of Fort St. George.

Issued

Recd.

Encl.

Letter, 30th June 1890, No. 504.

JUNE.

Forwarding, for information, a copy of the Proceedings of this Government embodying a report from Mr. Lawson on the process employed in the manufacture of sulphate of quinine at Naduvatam.

9

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—again the following G.O., dated 25th April 1890, No. 2502, Mis., Revenue:—

Read—the following Despatch from the Right Honorable Lord CROSS, Her Majesty's Secretary of State for India, to His Excellency the Right Honorable the Governor in Council, Fort St. George, dated India Office, London, 13th March 1890, No. 2, Revenue:—

The samples of sulphate of quinine referred to in your letter of the 26th November last, No. 20, Revenue, were duly submitted, as asked by your Lordship, to Dr. de Vriz and to Mr. C. Wood, for analysis, and copies of their reports are forwarded herewith.

2. The results of the analyses, which show that the samples only contained from 1·4 to 2·2 per cent. of sulphate of cinchonidine, are so highly satisfactory that I should be glad of full information as to the process by which these samples were prepared.

ENCLOSURES.

From Dr. J. E. DE VRIZ, C.I.E., to the Under Secretary of State for India, dated The Hague, 4th February 1890, No. R. and S. 160—90.

In reply to your letter of 20th January, R. and S. 1886, I have the honor to report the following:—

The sulphate of quinine manufactured on the Government Cinchona plantations at Naduvatam, contained in the two bottles sent to me, proved, after careful investigation, to be quite identical. The physical character is different from that of commercial sulphate of quinine, which is more woolly and lighter. Although this lightness is generally appreciated in the trade, my numerous investigations of all the different brands of sulphate of quinine in the market have convinced me that this preference given to light woolly sulphate of quinine is nothing but a prejudice, for I have proved, by experiment, that the *lightest* of all the brands of sulphate of quinine on the London market, viz., the brand called "Pelletier's quinine" or "des 3 cachets" contains not less than 11 per cent. of sulphate of cinchonidine. Therefore I consider the somewhat different physical character of the Naduvatam samples of not the least importance, and would I not have mentioned it if I had not been requested in your letter to report on the physical character.

The chemical character, however, is of the highest importance and therefore I feel a great satisfaction that my careful qualitative and quantitative analysis of both the samples yielded the following excellent results:—

The qualitative analysis performed by my chromate test proved the presence of an exceptionally small quantity of cinchonidine, which was much smaller than that found by me with the same test in all the different brands of sulphate of quinine found on the London market.

Considering that this exceptionally small amount of cinchonidine contained in both the samples made the accurate quantitative determination of it of great importance, I transformed both the samples into tartrates and requested my friend Professor Oudemans to apply on them his celebrated very accurate optical test for ascertaining the quantity of cinchonidine contained in them. The result of his careful investigation was—

(1) that both the samples contain the same quantity of cinchonidine and are therefore identical;
(2) that this quantity is equivalent to 1·4 per cent. of sulphate of cinchonidine contained in each of the mentioned samples of sulphate of quinine.

Considering that the British Pharmacopœia requires "sulphate of quinine should not contain much more than 5 per cent. of sulphates of other alkaloids," it is clear that the sulphate of quinine manufactured at Naduvatam is not only satisfactory to the requisition of the British Pharmacopœia, but is even much purer than any commercial sulphate of quinine.

From C. H. WOOD, Esq., to the Under Secretary of State for India, dated 46, Loraine Road, Holloway, London N., 23rd January 1890.

In reply to your letter R. and S. 1886, dated 20th January 1890, I have the honor to report to you that, in accordance with your request, I have examined the two samples of sulphate of quinine manufactured at Naduvatam with the following results :—

Both samples were well crystallised in small light crystals fairly uniform in size, which dissolved quickly and completely in dilute acid forming colorless solutions. On analysis they yielded me—

Water of crystallisation	14·2	13·7
Anhydrous cinchonidine sulphate	1·6	2·2
Do. quinine sulphate	84·2	84·1
	100·0	100·0

Crystallised quinine sulphate, when freshly prepared, contains 15 per cent. of water, but by exposure to the air it gradually loses a portion of this water. Hence the sulphate very frequently contains somewhat less than the full amount.

The proportion of cinchonidine present in these samples is notably small. The British Pharmacopœia, which is the official authority for defining the quality of drugs for use in medicine in this country, states that "Quinine sulphate should not contain much more than 5 per cent. of sulphates of other cinchona alkaloids." It will be seen from this that these samples are of a high degree of purity ; and, in other respects, they possess all the characters of good sulphate of quinine.

Practically all the quinine of commerce contains cinchonidine ; the proportion, in some cases, being as much as 10 or 12 per cent., and, even in good quinine, ranging generally from 3 to 6 per cent. This arises from the difficulty of effecting the complete separation of cinchonidine in the processes of manufacture ; and as its presence in moderate amount in no way detracts from the medicinal activity of the quinine, the occurrence of about 5 per cent. is considered unobjectionable. To this extent it is permitted by the requirements of the British Pharmacopœia.

When quinine is prepared exclusively from good calisaya or officinalis bark (containing much quinine with but a small proportion of cinchonidine) it is quite practicable to obtain the quinine of the quality of these samples. But in its manufacture from other barks such as *succirubra* and certain hybrids in which the amount of cinchonidine is often very large, it may be more difficult to maintain such a high degree of purity. I venture to offer these remarks because I assume that these samples have been obtained from bark suitable to the purpose ; but if the production of quinine on the Government plantations in India should extend to the working up of all the bark grown, it may not prove economically advisable to aim at quite so high a standard of excellence as these samples would tend to establish.

Order—dated 25th April 1890, No. 2502, Mis., Revenue.

Communicated to the Government Botanist and Director of Government Cinchona Plantations.

2. Mr. Lawson is requested to submit, for transmission to the Secretary of State, a detailed report giving full information as to the process by which the samples were prepared.

3. It is observed that several indents for quinine have been received from the officers addressed under G.O., No. 7331, dated 15th November 1889, and the Government desires to impress on Mr. Lawson the importance of avoiding failure to supply the required quantities.

(True Extract.)

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

To the Government Botanist and Director of Government Cinchona Plantations.

READ—again G.O., dated 3rd June 1890, No. 3386, Mis., Revenue.

ABSTRACT.—Forwarding to the Government of India copies of the reports by Dr. deVriz and Mr. C. Wood on the samples of sulphate of quinine manufactured on the Government Cinchona Plantations at Naduvatam and stating that a copy of the report asked for by the Secretary of State on the process by which the samples were prepared will be forwarded as soon as it is received.

READ—again G.O., dated 4th June 1890, No. 3399, Mis., Revenue.

ABSTRACT.—Considering that the report submitted by Mr. Lawson does not deal with the subject in sufficient detail and requesting him to submit a full report on the process by which the samples of the sulphate of quinine recently forwarded to the Secretary of State were prepared.

READ—also the following letter from M. A. LAWSON, Esq., Government Botanist and Director of Government Cinchona Plantations, Nilgiris, to the Secretary to Government, Revenue Department, dated Ootacamund, 17th June 1890, No. 13 :—

With reference to G.O., No. 3399, dated the 4th June 1890, Revenue, I have the honor to send you a detailed account of the manufacture of quinine in the factory at Naduvatam.

The bark used is a mixture of branch, stem and root of *Cinchona officinalis*, or brown bark. The bark is ground up by a disintegrator, and the powder passed through a scalper which has a mesh of 64 strands to the inch. The bark contains 4 per cent. of quinine.

2. Two hundred pounds of the powder are put into a cylindrical vat, the dimensions of which are 6 feet deep by 3 feet in diameter. To this powder is added 100 gallons of water and 14 lb. of solid caustic soda. After the powder has been well mixed with this alkaline solution, 120 gallons of parafin and fusil oil are poured into the vat. These oils are in the proportion of four parts of parafin and one of fusil oil ; or 96 gallons of parafin and 24 gallons of fusil oil. The whole is then stirred by means of paddles, which are arranged on a central spindle, after the fashion of a screw, so as to raise the heavier water and mix it completely with the lighter oils. The operation of stirring is carried on for three hours, and the mixture is then allowed to stand over night. In the morning the oils, which have separated from the water, are removed by means of a tap, which is placed at the junction of the water and the oil. This oil is then carried to the agitating casks, and to it is added water acidulated with sulphuric acid. The oils are washed with this, by means of paddles, for about ten minutes, and then allowed to settle, when the acidulated water is drawn off by means of a tap placed at the bottom of the cask. Some fresh water, not acidulated, is again added to the oils, and the washing is again repeated a second and third time. All the water, which has been used to wash the oils, is then removed to a separator ; that is, a tall conical tub, with a tap at the bottom. The water, which always contains a quantity of oil and other impurities, is allowed to stand for half an hour, or other convenient period, and then run off through the tap. By this means the acid water, which contains all the alkaloids, is obtained in a much purer state than when taken direct from the agitating cask. The acid liquor is then filtered through charcoal and removed to other tubs, where it is stored till a sufficient amount has been accumulated to fill the steam pans. The oil, which has been washed by the acid water, is then put back into the vat, and again stirred up with the bark, after which it is allowed to settle for another night, when it is drawn off, and treated in the same manner as has been described above. The acid water containing the alkaloids is removed to the steam pans, each of which has a capacity of 50 gallons. Into each pan 40 gallons of the acid water is poured and heated up to boiling point, when a handful of charcoal is thrown in and the water neutralized by means of caustic soda. After the water has been allowed to boil (water boils at Naduvatam at 94° cent.) for a quarter of an hour, or so, it is filtered into cooling pans, when

the greater part of the sulphate of quinine is crystallised out, but *it* also contains 16·5 per cent. of cinchonidine, while all the other alkaloids remain in the solution. The crystals the next day are filtered from the liquor, and as much of the liquor as possible is squeezed out by a screw press. The crystals are then removed to the hot room and there thoroughly dried. These are called *crude* crystals. To the liquor which remains behind, caustic soda is added in a sufficiency, to precipitate the other alkaloids, and these are removed for future treatment, when any quinine which they may contain is afterwards extracted.

3. The above-mentioned crude crystals, when thoroughly dried, are powdered up and passed through a fine sieve, after which they are boiled in pure water, in the proportion of 10 pounds to 50 gallons. The solution, after being boiled for about quarter of an hour, with some charcoal, is passed twice through double filters into the cooling pans, where the sulphate of quinine crystallises out, and contains about 4 per cent. of cinchonidine.

4. When the manufacture was first started here, the crystals of sulphate of quinine were not sufficiently colorless after the second crystallisation, and had therefore to be crystallised a third time, and this was the cause of the small quantity of cinchonidine which was found in the samples sent to the Secretary of State.

5. I do not know that there is anything more which I can add that would be of interest; but I should be much obliged if ever there should be any information available on the following point it may be communicated to me:—

Mr. Wood has pointed out the difficulty which exists in getting rid of the cinchonidine in the red, or hybrid bark, but upon these I have not yet worked, except upon a very small scale, by way of experimenting. Can Mr. Wood suggest any variation in the process above described, by which, upon the second crystallisation, the sulphate of quinine can be extracted from these barks, so that it shall contain under 6 per cent. of cinchonidine and yet entail a small loss of the quinine itself.

ORDER—dated 30th June 1890, No. 503, Revenue.

Miscellaneous.

Mr. Lawson's report on the process employed in the manufacture of sulphate of quinine, which is contained in the last of the papers read above, will be communicated to the Right Honorable the Secretary of State, with reference to His Lordship's despatch, No. 2, Revenue, dated 13th March 1890. A copy will also be forwarded to the Government of India in compliance with the request contained in its letter No. 343—73-2A., dated 19th May 1890. Information will be asked for on the point raised in the last paragraph of Mr. Lawson's letter.

(True Extract.)

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

To the Government Botanist.
„ the Editors' Table.

Exd. P. L. Pereira.

80 Copies.

Original 6

Fam. 23-1-1890 No. 7

29-10-07

2-11-07

7-1-10

Govt. of {1890} Madras.

REVENUE.

Issued

Recd. Encl.

G.O., 30th June 1890, No. 503.-4

JUNE.

Sulphate of Quinine.

Ordering that Mr. Lawson's report on the process employed in the manufacture of — be communicated to the Right Honorable the Secretary of State for India.

15/

It is advised to send reminder despatches had better wait a month is too near. Then take orders - send up again on Sept-1-91.

Rem
1 July 91.

Reminded 1st Sept 1891

NOTE FOR THE UNDER SECRETARY.

Q. O. 583 & 30-6-90

Submitted for the orders of the Under Secretary. How Secy of State has not replied to the request of this Govt that the suggestions of Mr Wood on the manufacture of Sulphate of Quinine may be obtained. Cinchona

Bottle sent on
Year - i.s. 1 Oct
June 30 - Sir R. Rawlinson
Rec. 1/7
Ack.
Not seen Mr/12 in time

17

NOTE FOR THE SECRETARY.

Please see the despatch under G.O. 503. dd. 30. June 90. The S. of S. has not yet stated whether Mr. Wood can suggest any method for getting rid of cinchonidine in working up the red barks.

Is a reminder to be sent to the S of S.?

Rec
1. Sept. 91.

I don't think it is necessary to press his Lordship to reply to this. He knows we are waiting & he knows the importance. CL
2/9

Call o'clock to
Rec

No 13 19

Director's Office 13.

Ootacamund 17 June 1890

From

M. A. Lawson Esq^r

Government Botanist & Director of

Government Cinchona Plantns.

Nilgiris.

To

The Secretary to Government

Revenue Department

Ootacamund

Sir

With reference to G. O. No 3399 dated the 4 June 1890 - Revenue - I have the honor to send you, a detailed account of the manufacture of quinine in the factory at Nedivattam:—

1. The bark used is a mixture of branch, stem, and root of Cinchona officinalis, or brown bark. The bark is ground up by a disintegrator, and the powder passed through a Scalper, which has a mesh of 64 strands to the inch. The bark contains four percent of quinine.

2. Two hundred pounds of the powder are put into a cylindrical vat, the dimensions of which are 6 feet deep, by 3 feet in diameter. To this powder is added one hundred gallons of water and 14 lbs of Solid caustic Soda. After the powder has been well mixed with this alkaline solution, 120 gallons of paraffin and fusel oil are poured into the vat. These oils are in the proportion of four parts of paraffin and one of fusel oil; or 96 gallons of paraffin and 24 gallons

of

of fusel oil. The whole is then stirred by means of paddles, which are arranged on a central spindle, after the fashion of a screw, so as to raise the heavier water and mix it completely with the lighter oils. The operation of stirring is carried on for three hours, and the mixture is then allowed to stand over night. On the morning the oils, which have separated from the water, are removed by means of a tap, which is placed at the junction of the water and the oil. The oil is then carried to the agitating casks, and to it is added water acidulated with sulphuric acid. The oils are washed with this, by means of paddles, for about ten minutes, and then allowed to settle, when the acidulated water is drawn off by means of a tap placed at the bottom of the cask. Some fresh water, not acidulated, is again added to the oils, and the washing is again repeated a second & third time, till the water, which has been used to wash the oils, is then removed to a separater, that is a tall conical tub, with a tap at the bottom. The water, which always contains a quantity of oil and other impurities is allowed to stand, for half an hour, or other convenient period, and then run off through the tap. By this means, the acid water, which contains all the alkaloids, is obtained in a much purer

purer state, than when taken direct from the agitating cask. The acid liquor is then filtered through charcoal and removed to other tubs, where it is stored, till a sufficient amount has been accumulated to fill the steam pans. The oil which has been washed by the acid water is then put back into the vat, and again stirred up with the bark, after which it is allowed to settle for another night, when it is drawn off, and treated in the same manner as has been described above. The acid water containing the alkaloids is removed to the steam pans, each of which has a capacity of fifty gallons. Into each pan, forty gallons of the acid water is poured and heated up to boiling point, when a handful of charcoal is thrown in and the water neutralized by means of caustic soda. After the water has been allowed to boil (water boils at Nedumkanam at 94° cent.) for a quarter of an hour, or so, it is filtered into cooling pans, when the greater part of the sulphate of quinine is crystallized out, but it also contains 16.5 per cent of cinchonidine while all the other alkaloids remain in the solution. The crystals are the next day filtered from the liquor, and as much of

of the liquor, as possible, is squeezed out by a screw press. The crystals are then removed to the hot room and there thoroughly dried. These are called crude crystals.— To the liquor, which remains behind caustic soda is added in a sufficiency to precipitate the other alkaloids, and these are removed for future treatment; when any quinine, which they may contain is afterwards extracted.

3. The above mentioned crude crystals, when thoroughly dried are powdered up, and passed through a fine sieve, after which, they are boiled in pure water, in the proportion of ten pounds to fifty gallons. The solution, after being boiled for about quarter of an hour, with some charcoal, is passed twice through double filters, into the cooling pans, where the sulphate of quinine crystallizes out, and contains about four per cent of Cinchonidine—

4. When the manufacture was first started here, the crystals of sulphate of quinine were not sufficiently colourless after the second crystallizations, and had therefore to be crystallized a third time, and this was the cause of the small quantity

quantity of Cinchonidine which was found in the samples sent to the Secretary of State.

5. I do not know that there is any thing more which I can add that would be of interest; but I should be much obliged if ever there should be any information available on the following point it may be communicated to me:-

Mr. Wood has pointed out the difficulty which exists in getting rid of the Cinchonidine in the Red, or hybred barks; but upon these I have not yet worked, except upon a very small scale, by way of experimenting. Can Mr. Wood suggest any variation in the process above described, by which, upon the second crystallization, the Sulphate of quinine can be extracted from these barks, so that it shall contain under six per cent of Cinchonidine, and yet entail a small loss of the quinine itself?

I have the honor to be
Sir
Your most obdt. Servant
N. A. Lawson
Government Bahamas &
Director

2502 / 2524-90 ; 3399 / 4-6-90

Revenue Department

REVENUE {1890.} CINCHONA.

No 4347

From

M. A. LAWSON, Esq.,

Government Botanist and Director of

Government Cinchona Plantations,

Nilgiris,

To The Secretary to Government

Revenue Department

Ootacamund

No. 13

Dated 17th
Despd. 17th } June 1890.
Recd. 18th

GOVERNMENT OF MADRAS
REVENUE DEPARTMENT
STAMPED 90

Sulphate of Quinine —

Furnishes a detailed account of the process of Manufacture of — at the Quinine Factory at Naduvattam —

W. 20.6.90
Dr
12.6.90

Dr 23/6
Dr 3.7.

17

Revenue Department.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read again Go. 2502 dt. 25 April 90.
also Go.s 3399 & 3386 dt. 4th & 5th June 90.
Read Cno. 4347/90.

Print in full - omit
Go 2502 - in full -
Go.s 3386 & 3399.
in abstract.

Order of 30 June 1890, no: 503.

Mr Lawson's report on the process employed in the manufacture of Sulphate of Quinine, which is contained in the papers read above, will be communicated to the R.-Stn. the S. of S., with reference to His Lordship's despatch no. 2. Rev: dt. 13. March. 90. a copy will also be forwarded to the G.o.I. in compliance with the request contained in the letter no. 343/73-2 - A. dt. 15. May. 90.

Rev
21.6.90.
No 5 of 190
To the R.-Stn. S. of S. 24/6
dt/28. July 190

My Lord

In accordance with your Lordship's despatch of the 13th March last, we have the honor to forward the accompanying copy of

Dup: sent to G.o.I. with G.o. 3399 dt. 30.6.90 & Rev. letter no. 343/73-2 dt. 30.7.90.

Information will be asked for on the point raised in the last para. of Mr. L's letter.

To the Govt Botanist.
" E.T.
9/7/90

Note
May this report be placed on the Editor's Table?

Rev C
Dr Wicksteed
11/7/90

Approved

6/11

Our proceedings no - 503 Rec.
dd - 30 June 1870. Which enclosed
a report from Mr Dawson,
Govt Botanist and Dirr of Govt
Cinchona Plantations, on the
process employed in the
manufacture of sulphate
of quinine - to which I beg
Lordship's attention to the last para
of Mr Dawson's report, and request
he suggestions upon the point there

No 504
30 Dec 6 qr
Dec to the Govt -

Rec. & Agric. Dept.

Sir

I have am directed
to forward for the information
of the Govt. a copy of the pro
of this govt, noted in the
margin, which enclosed
a report from Mr Dawson,
Govt Botanist and Dirr of Govt
Cinchona Plantations, on
the process employed in the
sulphate of
manufacture of Quinine.

Rec
Cdr
21/6
3/7

Ex 21/6
Ans 3/7

Manufacture of
Quinine.

- that Mr Woodward may be asked
in Ceylon -

Rec
21. 6.

The Hon. Mr Jardine. C.S.I.
The Hon. Mr. Stokes. C.S.I.
&c. &c. &c.

The Governor -

C.O. 30 June 1870, no: 503.

Draft order and
despatch to the Govt

Printed
Mr [illegible]
30 Dec 1870.