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MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No. 2969	Press
242-243	Mis.
Dated	13-12-1867.

Not to be folded or roughly handled

2969
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*Proceedings of the Madras Government, Revenue Department,
13th December 1867.*

Read the following Endorsement of the Assistant Secretary to the Government of Bengal, dated Fort William, 27th November 1867, No. 4,268:—

No. 242. Read the following letter from the Assistant Secretary to the Government of Bengal, (Revenue,) to the Accountant General, Bengal, dated Fort William, 27th November 1867, No. 4,267.

* No. 2,572, dated 31st ultimo. In forwarding the accompanying copy of a letter,* and of its enclosures, from the Secretary to the Government of Fort St. George, I am directed by the Lieutenant-Governor to request that you will be so good as to issue the necessary instructions for the adjustment of the further charge of Rupees (611) six hundred and eleven, incurred on account of the Boat-builder, Maistry, and the boats' crews sent to Pooree per Ship "Scindian" and Brig "Vencataswarloo."

Copy forwarded to the Secretary to the Government of Fort St. George for information, with reference to his letter above quoted.

(Signed) T. JONES,
Asst. Secy. to the Govt. of Bengal.

No. 243. ORDER THEREON, 13th December 1867, No. 2,969.

Miscellaneous.

Communicated to the Accountant General and to the Superintendent of Marine.

(True Extract.)

(Signed) W. HUDLESTON,
Secretary to Government.

To the Accountant General.
„ the Superintendent of Marine.

Exd. T: O'Connor.

FROM THE ASST. SECRETARY TO THE GOVT. OF BENGAL,
TO THE ACCOUNTANT-GENERAL, BENGAL.

Fort William, the 27th November 1867.

Revenue.

SIR,

IN forwarding the accompanying copy of a letter,* and of its enclosures, from the Secretary to the Government of Fort St. George, I am directed by the Lieutenant-Governor to request that you will be so good as to issue the necessary instructions for the adjustment of the further charge of Rupees (611) six hundred and eleven, incurred on account of the Boat-builder, Maistry, and the boats' crews sent to Pooree per Ship "Scindian" and Brig "Vencataswarloo."

I have the honor to be,

SIR,

Your most obedient Servant,

THOMAS JONES,

Asst. Secretary to the Govt. of Bengal.

No. 4268.

COPY forwarded to the Secretary to the Government of Fort St. George for information, with reference to his letter above quoted.

FORT WILLIAM,

The 27th November 1867.

T. B. L.

Asst. Secretary to the Govt. of Bengal.

*Comm'd to the Acct. Gen.
to the Supt of Marine-
13th Decemr/67*

*Copy to the Acct. Gen. of Marine-
Copy to the Supt of Marine-
Copy to the Supt of Marine-
Copy to the Supt of Marine-*

Rev. 1867. No. 3368.
No of Govt. of Bengal.

From
Asst. Secy. to the
Govt. of Bengal.

Dated 27th Nov.
Received 1st Decemr.
1867 -

No. 4268.

In forwarding for
information copy of letter
to Accountant General
Bengal, regarding the
adjustment of the further
charge incurred in account
of Boat-builder, &c. sent
to Poore by Madras Govt.

With Order.

No. 2969-16 Decr.

No. 242-243

MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No. 2968

Press
~~Mis.~~

240.241

Dated 13 — 12 — 1867.

Not to be folded or roughly handled

*Proceedings of the Madras Government, Revenue Department,
13th December 1867.*

No. 240. Read the following letter from J. BROUGHTON, Esq., Quinologist to Government, to the Secretary to Government, Revenue Department, Fort St. George, dated Ootacamund, 28th November 1867 :—

1. I have the honor of forwarding a Report on the utilization of the Chinchona barks of the Government plantations.

2. In connection with this subject, I am desirous of ascertaining the capability of this part of India of furnishing materials for the manufacture of the febrifuge preparations mentioned in my Report. It appears highly desirable that the natural products occurring in the districts surrounding these hills should be utilized as far as possible in this manufacture, and that, for this purpose, their comparative technical value and cost should be investigated.

3. The most important of these materials are, Lime, Soda, Pearlash, Magnesia, Animal charcoal, Acid, Alcohol, and their possible substitutes. Among the latter class may probably be found some of the more abundant vegetable products of the Western Coast.

4. I therefore request that Government will be pleased to allow me to visit, on duty, localities in Coimbatore, Mysore, Malabar, and Salem, in order that I may have an opportunity of obtaining practical information on these subjects.

5. Should the Government see fit to grant this, I also beg that I may be accredited to those Government Officers in the above-named districts, who may be able to afford me information and assistance concerning the objects of my journey. I am already greatly indebted to the kindness of Mr. Grant, Collector of Coimbatore, who has provided me with specimens of some important products of the district in his charge. I should also be greatly assisted if Government would be pleased to supply me, henceforward, with copies of papers concerning natural products which might be susceptible of possible chemical applications.

6. If Government should dissent from the proposals advocated in my Report and in this letter, I beg that I may be honored with definite instructions respecting the course they desire me to follow.

REPORT.

1. Among the instructions that I had the honor of receiving from the Home Government,* I am directed to institute investigations for the purpose of enabling Her Majesty's Government to arrive at a decision with respect to the best and cheapest means of preparing the Chinchona febrifuge for use among the laboring classes of India. I am also required to consider the questions connected with the manufacture of the febrifuge for the use of Hospitals and Troops in India.

Reasons for early trial of bark preparations.

2. It may now, I would submit, be considered as proved that the Chinchona barks of the Government plantations of these hills contain, in at least an

* Proceedings Madras Government, Revenue Department, No. 248, December 14th, 1866.

equal amount, all the active medicinal principles of the American barks. The utilization in the most economical and effective manner of these extensive plantations, is now the important question to be solved. I believe that this question cannot be too soon attacked. There is now a large number of trees of *C. Succirubra* in a perfectly fit state for furnishing, without injury to the plantations, all the necessary materials that can be required for the manufacture of medicinal preparation for trial, even on a considerable scale. The number of such trees is constantly increasing. By the time that Government has arrived at a decision as to the best method of dealing with their bark, a very large amount will be ready for practical use. I may also observe, that the early cropping of some portion of the bark would afford a suitable trial of the practical working of the system of mossaing.

The medicinal preparations should be made in India.

3. It appears almost self-evident that, at any rate, the greater part of the cheap febrifuge required for use in this country must necessarily be here prepared. The preparation of the bark for transit, the exportation of so bulky a material, the importation of the alkaloids, are (as has already been observed by Mr. C. R. Markham*) items of such considerable expense, that it can only be on the failure of every attempt to manufacture in this country that such a course should be adopted. Failure, however, I consider as quite improbable.

Conditions to be fulfilled to obtain the greatest advantage.

4. But it is to be observed that, in order to reduce the total amount of labor entailed by such manufacture and its consequent expense, to a minimum, it will be necessary to depend principally on this country for the supply of the requisite materials, and to dispense as far as is expedient with those whose cost of importation would diminish the gain of manufacture on the spot. The preparation of Chinchona bark that is adopted for extensive medical use in this country must, therefore, combine as far as possible the qualities of thorough medicinal efficacy, readiness, and precision of administration, and practicability of manufacture with indigenous materials. In fulfilment of the instructions referred to in paragraph 1, I shall subsequently have the honor of proposing preparations which, while fulfilling in their respective degrees, the two latter conditions, will most probably be found to possess the first.

An advantage of manufacturing on the spot.

5. The advantage of manufacturing on the spot where the bark grows, is increased by another circumstance. The barks part with their alkaloids more readily when fresh. The usual labor of drying, and subsequently powdering the bark, preparatory to manufacture, is thus rendered unnecessary, while the time and labor required to obtain the alkaloids in a state of solution is reduced.

Manufacture simplified by recent medical experiments.

6. The object I have the honor of discussing is also facilitated by the great addition to our knowledge of the medicinal effects of the several alkaloids, recently contributed in the Report of the Chinchona Commission.* From the evidence adduced in this report, corro-

* Government Return 1866, page 218.

borated by the report of the similar Commission in the Bombay Presidency, I believe I am justified in assuming that the four alkaloids occurring in our barks are nearly equal in febrifuge power. Hence, in the manufacture of the alkaloids it will not be necessary, for ordinary purposes, in this country to separate the quinine from the chinchonine, chinchonidine, and quinidine, with which it is associated. Thus an operation of considerable labor will be avoided, while a much larger amount of product will be available for medical use.

Difficulties.

7. Though my own experience in India is limited, and extends over a short period, I have not, I trust, lost sight of the difficulties of detail which must be met and combated before a manufacture of Chinchona alkaloids can be successfully carried out in this country. They are such as would be incident to the initial establishment of any new branch of industry. It is for this reason that I would

Proposed plan of proceeding.

recommend that any manufacture that the Government may eventually see fit to undertake, should at first be on a small scale, and tentative in its nature. It should be extended only when the expediency of extension has been shewn by definite results. Its growth might thus be simultaneous with the demand exercised by the gradually increasing yield of the plantations. An extensive chemical manufactory on a European plan would, I think, be anomalous in India, and would not improbably prove a partial failure. But I learn that a manufacture of a somewhat comparable nature (inasmuch as it consists in the separation of a proximate vegetable principle in a colorless crystalline state) is now successfully being worked in this country, though once considered almost impracticable out of Europe. I allude to the manufacture of refined sugar from the cane and palm.

Classification of proposed bark preparations.

8. The medicinal substances that will be under various conditions most suitably manufactured from Chinchona bark are of three kinds: first, crystalline salts of the alkaloids; second, the free alkaloids themselves in an uncombined state; third, extracts of the fresh barks for local use. The ordinary pharmacopœia tinctures, &c., of Chinchona can of course be made from Indian as well as from Peruvian barks, and need not be considered here.

Sulphates of the Chinchona Alkaloids.

9. Among the many preparations of Chinchona alkaloids that have been adopted since their discovery, the crystallized sulphates have obtained the most extended use. Their special merit consists in the fact that while they are comparatively easy to prepare, their crystalline form ensures, within certain limits, both purity and uniformity of composition, and hence *cæteris paribus*, constancy of medicinal effect. Many other crystalline salts have at various times been proposed, which possess special advantages, but on the whole (with the exception of hydrochlorate of chinchonine) have not been advantageously re-placed in general practice. The proved efficacy of sulphate of quinine, and its long continued use, induce me to believe that it must, to a certain extent, be always employed in medicine, even should other preparations supersede its now almost universal use. It appears,

* *Proceedings Madras Government, Revenue Department, No. 302, March 19th, 1867.*

however, to be very probable that should the sulphates of the alkaloids be ever extensively manufactured in this country, that the sulphates of the mixed alkaloids, as they occur in the bark, would be found most expedient to prepare. The sulphate of quinine would be thus mixed with the sulphates of chinchonidine and quinidine. I have the honor to forward a specimen (No. 1) of such a salt which, with the exception of the sulphuric acid it contains, has been exclusively prepared from indigenous materials. Its efficacy follows as a direct inference from the results obtained by the Chinchona Commission.

Amorphous Alkaloid.

10. A preparation that I would now recommend for the consideration of Government, as offering considerable advantages, is that of the alkaloid precipitated from solution in an amorphous state. During the last five months I have spent much time in endeavouring to find a process which would yield the alkaloids in a state of sufficient purity by simple means. The specimen (No. 2) which I have the honor of forwarding, is prepared by a method which an ordinary Apothecary would have little difficulty in learning to follow. It is comparatively inexpensive, and it could, I believe, be adapted to the means of all the smaller Government plantations, and would thus enable them to become centres of supply of the febrifuge for the district in which they are situated. The preparation would be most conveniently administered in the same dose, and in precisely the same manner as sulphate of quinine, namely, by dissolving in dilute acid. It may also possibly be found to possess some advantages of its own (see Appendix, paragraph 7).

Proposal of a plan of proceeding.

11. Should the Government see fit to entertain such a proposition, I would suggest that some medical experiments be made with this substance, which I will supply, at first in small quantities; if it prove successful, I would then, with the sanction of Government, extend the manufacture, and, as opportunity offers, include that of crystalline sulphates. By such a mode of proceeding will, I believe, the subject of the utilization of the plantations be most conveniently placed on a practical basis.

Ready preparation from Chinchona bark.

12. The best form in which the febrifuge can be prepared on the spot for use by the owners of a few trees, has also occupied my attention. This will almost necessarily be a liquid preparation. At the suggestion of the Principal Inspector General Medical Department, some trials will be made on this subject by Mr. Wade, the gentleman in charge of the Dispensary at Goodalore, in Wynaad, to whom I will supply the necessary material.

13. I shall shortly have the honor of communicating a report on some other results to which my work has been directed. The above being connected only with a special part of my duties, I have thus, to avoid delay, taken the liberty of making it a separate communication.

OOTACAMUND,
27th November 1867.

(Signed) J. BROUGHTON,
Quinologist to Government.

APPENDIX.

1. I here take the opportunity of suggesting some circumstances connected with the chemical history of the barks and alkaloids, which appear to me to corroborate, in an interesting manner, the results arrived at by the Chinchona Medical Commission.

2. Mr. Howard has already pointed out the fact that the famous cure of the Countess of Chinchon was effected by a bark whose main febrifuge constituent was chinchonidine.*

3. Quinine was discovered in 1820, from whence its use in medicine commenced. Chinchonidine was discovered by Winckler in 1845. Quinidine was first identified by Van Heijningen in 1849. The two latter alkaloids were, however, very generally compounded with each other, and called by the common name of quinidine. It was not till Pasteur, in 1853, clearly distinguished the two alkaloids, and ascertained their true composition, that our knowledge of these important substances attained precision.

4. The consideration of these facts leads to the conclusion that, at least for thirty years, much of the commercial sulphate of quinine employed in medicine would inevitably, from the method employed in its manufacture, be largely mixed with the sulphates of quinidine and chinchonidine, without their presence being suspected, and would occasionally consist entirely of the latter salts. The test now generally employed to ascertain the purity of sulphate of quinine did not come into use till the year 1854. Hence, during the period that quinine gained its reputation as being the first of febrifuge medicines, it was constantly liable to large admixture with its associated alkaloids. Had the latter not possessed similar medicinal properties, the high reputation which now attaches to quinine must necessarily have been greatly modified.

5. Pereira (*Materia Medica*, Ed. 1857, vol. 3, pp 132, 133) bears from his own practice unequivocal testimony to the efficacy both of chinchonine and the then called quinidine. He also quotes the opinion of many authorities in support of this fact.

6. The chemical constitution, and properties of the four several alkaloids of chinchona, singularly resemble each other. Quinidine and quinine are identical in composition, and unite with acids in precisely the same proportions. The same is the case with chinchonine and chinchonidine, and they differ but slightly from the former pair in composition. The similarity in their therapeutic action is thus in harmony with their other properties. Among the very numerous alkaloids of opium, where a far greater divergence in composition and properties occurs, the physiological action of the various numbers differs widely from each other, as has lately been well shown by the experiments of Claude Bernard.

7. I observe in the interesting report of one of the members of the Chinchona† Commission, it is stated that the administration of chinchonidine has a tendency to produce nausea and vomiting. This has been also found by some earlier observers to have been the case with chinchonine. The taste of the salts of these two alkaloids, though greatly resembling that of quinine, has in addition a disagreeable after-taste, which becomes on a second dose particularly sickening. It appears probable that should the effect alluded to by Mr. Chipperfield be a frequent consequence of the exhibition of chinchonidine, it may be ascribed to this cause. I would suggest that it could be remedied by administering the chinchonidine not in the state of solution, but in the form of the free alkaloid, either as dry powder, or diffused through water. The alkaloid being but very slightly soluble has but little taste. As it would probably be desirable to make a few experiments on this subject with patients on whom the sulphate produces vomiting, I beg permission to forward some chinchonidine, nearly pure, which has been prepared from our Red Bark.

8. I here also take the opportunity of mentioning a circumstance, which might, unless corrected for, modify in some degree the results obtained in a strict quantitative comparison of the therapeutic effects of the sulphates of the respective alkaloids. These sulphates, when crystallizing from solution, combine with different amounts of water. Thus, unless it should so

* Government Return 1866, p. 135, and *Nueva Quinologia* of Pavon, sub. voc. Chuarguara.
† *Proceedings of the Madras Government*, No. 302, March 19th, 1867, Appendix III.

happen that the precaution has already been taken of drying the sulphates at a steam heat, (which would destroy the beauty of the crystals,) they will thus contain variable quantities of water, and as a consequence the same doses may really contain somewhat different proportions of true alkaloid, which is of course the curative substance.

Thus the normal crystalline sulphates contain of water as follows:—

Sulphate of Quinine	contains	14.9	per cent of water.
Do. Quinidine	do.	12.8	do. do.
Do. Chinchonine	do.	4.7	do. do.
Do. Chinchonidine	do.	16.9	do. do.

Commercial samples, even if quite pure, may contain variable amounts of water within the above limits. Whether this circumstance obtains to a sufficient extent to affect the present experiments of the Chinchona Commission, I am not competent to say.

(Signed) J. BROUGHTON.

No. 241.

ORDER THEREON, 13th December 1867, No. 2,968.

Miscellaneous.

1. The Government have perused with much interest Mr. Broughton's Report on the utilization of the Chinchona barks of the Government plantations, and fully approve his proposal that he shall proceed into the districts adjoining the Hills in order to investigate their capabilities for furnishing the requisite materials for the manufacture of febrifuge preparations. The Collectors of Coimbatore, Malabar, and Salem will be instructed to afford him every assistance in his researches, and the Government will request the Commissioner of Mysore to ensure him all due facilities in the Mysore territories, when the pursuit of his investigations may take him into that country. The importance of the object in view can scarcely be overrated.

2. The Government will be prepared to place the services of a competent Interpreter at Mr. Broughton's disposal to accompany him on his tour, and request him to communicate with the Collector of Coimbatore in view to the selection of a properly qualified person for the duty, unless Mr. Broughton can himself name any one whom he would prefer to employ. The Inspector General, Indian Medical Department, will instruct all Officers of his department in the districts named, that the Government rely on their co-operating with Mr. Broughton to the best of their ability, in any way consistent with the discharge of their regular duties, which may seem calculated to promote success in the attainment of the object in view.

3. The Government would recommend to Mr. Broughton's attention some inquiry into the native remedies for fever, and into the medicinal properties of the barks of indigenous trees and other vegetable products of the country.

4. His request to be furnished with copies of papers concerning natural products susceptible of possible chemical application, will be attended to as opportunity may offer.

5. The specimens of the sulphate of mixed alkaloids and of the amorphous alkaloid, mentioned in paragraphs 9 and 10 of the Report, will be forwarded to the Inspector General, Indian Medical Department, with reference to paragraph 11, for his remarks, and for such trial as, in communication with his colleagues in the

Chinchona Commission, he may consider most suitable to test the efficacy of the preparations.

6. The Government authorize Mr. Broughton to draw a travelling allowance of Rupees 7 a day while absent from his head-quarters, on the duty which he has volunteered to undertake. He will report what camp equipage he will require, which the Government will provide. They will await with interest his report of the results of his inquiries.

(True Extract.)

(Signed) W. HUDLESTON,

Secretary to Government.

To J. Broughton, Esq.
,, the Revenue Board.
,, the Inspector General, Indian Medical Department, with specimens.
,, the President of the Chinchona Commission.
,, the Collector of Coimbatore.
,, the do. of Salem.
,, the do. of Malabar.
,, the Accountant General.

Exd. S. T. Augustin.

4. I therefore request that Government will be pleased to allow me to visit on duty, localities in Coimbatore, Mysore, Malabar and Salem, in order that I may have an opportunity of obtaining practical information on these subjects.

5. Should the Government see fit to grant this, I also beg that I may be accredited to those Government Officers in the above-named districts who may be able to afford me information and assistance concerning the objects of my journey. I am already greatly indebted to the kindness of Mr. Grant, Collector of Coimbatore who has provided me with specimens of some important products of the district in his charge. I should also be greatly assisted if Government would be pleased to supply me with herewith and with copies of papers concerning natural products which might be susceptible of possible chemical applications.

6. If Government should dissent from the proposals advocated in my reports, and in this letter; I beg that I may be honored with definite instructions respecting the course they desire me to follow.

I have the honor to be

Sir

Your most obedient servant

John Bevington

Geologist to Government

Cotacoreund Nov. 28. 1864

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I think
this is our
desiderata
D.H.

high be
attention
as opportunity
not

Revel DEPARTMENT.

No. 3279

From

Mr. J. Broughton
Quinologist to Government.

Dated 28th November 1867.

FOR ORDERS.

If Mr Broughton's proposal in para
4 be adopted, he will be removed for a
considerable period, from the scene of his more
important labors, and I doubt whether his
inexperience of India enables him to con-
sider the real difficulties of his movement
he proposes himself to make in form before
himself, and then to return. Well it will be
well to ask him, whether by another com-
missioner of these districts, he cannot
procure all the information he requires? If he
states that he cannot, we may then consider
the propriety of sanctioning his roving expeditions.
The measure suggested in para 11 of

Reported to England
By 1847 from No. 8 of 1868

Received 1867. 10/10/67
By 1847 from No. 8 of 1868

Quinologist

Mr. J. Broughton

Quinologist to Govt

Colonial

Dated 28th Nov.

Received 29th Nov.

To 1847 from No. 8 of 1868

By 1847 from No. 8 of 1868

No. 2968. 13th Dec.

Forwarding of letters

in the collection of the

Colonial Bank of India

No. 240

Ms. 240

the enclosure to Mr. Broughton. I think he can do better. I. G. Med. Dept. as a punishment of his crew. It will be a punishment to let Mr. Wade of good practice on the fence structure. I believe that with a new medicine with the probable efficacy has been recognized by the Superior.

5 New by. W.D.H.

I should be disposed to allow Mr. Broughton to visit the districts named in his letter. He is an American in the first place and with the aid of the other who will readily cooperate in his, if instructed by force to it, he will have no difficulty in getting a result.

the proposed article in the 27th page of Mr. Broughton's report was to report to the Government.

by A.

I have read the report forwarded by Mr. Broughton with great interest and I think that his proposal to visit the neighboring districts with the view of capturing their resources for the purposes specified should be acceded to at once by Gov. and that he should be recommended in every possible way to the good offices of the Revenue authorities. I consider it desirable that a competent interpreter

Ms 240

should stand at the disposal
of Mr Broughton whose great
estimate intelligence will in doubt
lead him to communicate largely
with the natives on questions congenial
to his duties.

I would also recommend his attention
some enquiry into the native
remedies for fever and into the
medicinal qualities of the Barks of ~~native~~
indigenous trees and other vegetable
products of the country. N.P.

Dec 17 1876

W-2968

R.D.

81

Pro. of the Madras Govt

Under date the 13th Decemr 1876

Read the following
letter from Mr J Broughton
Quinologist & Govt

Forwarding report on the
utilization of the Cinchona barks
of the Govt plantations.

N.C. 28th Nov 1876

The Govt have
perused with much
interest Mr Broughton's
report on the utilisation
of the Cinchona barks
of the Govt plantations
and fully approve his
proposal that he shall
proceed into the Districts
adjoining the Hills in
order to investigate their
capabilities for furnish-
ing the requisite mate-
rials for the manufac-
ture of febrifuge pre-

parations

preparations. The Col^ls.
of Coimbatore - Malabar
and Salem will be in-
structed to afford him
every assistance in his
researches - and the Gov^t
will request the Comm^r.
of Mysore to ensure
him all due facilities
in the Mysore territories -
when the pursuit of
his investigations may
take him into that coun-
try. The importance of
the object in view can
scarcely be overrated.

The Gov^t will
be prepared to place
the services of a com-
petent interpreter at
Mr. Broughton's dis-
posal to accompany
him on his tour - and
request him to com-
municate with the
Col^ls.

Col^ls. of Coimbatore
in view to the selection
of a properly qualified
person for the duty -
unless Mr. Broughton
can himself name any
one whom he would
prefer to employ - The
Insp^t. Gen^l. Indian
Med^l. Dept^t. will in-
struct all officers
of his department
in the Districts
named that the Gov^t
rely on their co-oper-
ating with Mr. Broughton
to the best of their a-
bility in any way con-
sistent with the dis-
charge of their regu-
lar duties which may
seem calculated to
promote success in
the attainment of
the object in view.

The

The Govt. would recommend to Mr. Broughton's attention some enquiry into the native remedies for fever and into the medicinal properties of the barks of indigenous trees & other vegetable products of the country.

His request to be furnished with copies of papers concerning natural products susceptible of possible chemical application will be attended to as opportunity may offer.

The specimens of the sulphate of mixed alkalis and of the amorphous alkali mentioned in paras. 9 and 10 of the report will be forwarded

to the Inspr. Genl. Indian Med. Dept. with ref^{ce} to para 11 for his remarks and for such trial as, in communication with his colleagues in the Pinchona Commission, he may consider most suitable to test the efficacy of the preparations. —

The Govt. authorize Mr. Broughton to draw a travelling allowance of Rs. 5 a day while absent from his H^q quarters on the duty which he has volunteered to undertake. They will await with interest his report of the results of his enquiries.

accompanied
L^t Govt. Secy

He will report that camp
equipage & with requisites
of the Govt. will provide.

Copy to Mr. Broughton by Despatch

1. — Sulphate of mixed alkalis
2. — Sulphate of mixed alkalis
3. — Sulphate of mixed alkalis
4. — Sulphate of mixed alkalis
5. — Sulphate of mixed alkalis
6. — Sulphate of mixed alkalis

W. H. Hall

Reported to England
of 1874 & 1875 1876 1877 1878 1879

Revised 1879 1880

Report for 1879

1879

Report for 1879

1879

1879

1879

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