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MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No. 1149 Press / Mis.

Dated 19-10-1872.

Not to be folded or roughly handled

No. 163. Read the following letter from the Commissioner of the Nilgiris, to the Chief Secretary to Government, Ootacamund, dated Ootacamund, 10th October 1872, No. 62 :—

With reference to Government Order, Revenue Department, dated 6th February 1872, No. 241, in which the Government desire to be furnished with a copy of the detailed report, when finished, of the Superintendent, Cinchona Plantations, on the condition of the Cinchona Plantation at Peermede in the State of Travancore, I have the honour to submit herewith Mr. McIvor's views on the subject.

2. It appears that canker pervades the Cinchona on the Travancore ghauts. The disease commences with a small black spot which spreads, in general, horizontally until the tree is ringed. The bark at this point shrinks and the tree above the ring perishes.

3. A conspicuous feature in the disease is that cankered trees lose their alkaloids. Mr. McIvor supposes that the leaves absorb the alkaloids and do not return them owing to the circulation in the tree being impeded by the disease.

4. I beg to submit the specimens which accompanied Mr. McIvor's report.

Enclosure No. 1.

From Mr. W. G. McIVOR, Superintendent, Government Cinchona Plantations, to the Commissioner of the Nilgiris, dated Ootacamund, 12th September 1872, No. 58.

With reference to my letter No. 135, dated 22nd January last, reporting the state of the canker in the Cinchona plantations of the Travancore Government at Peermede, I have the honour to inform you that I have now made an examination of the diseased portions of the plants which I brought from there. I have also carefully inspected the various Cinchona plantations on the Nilgiris with the view of ascertaining how far any of them are affected with this malady, and taken such measures as seemed to me best to ascertain the cause of the disease. As is usually the case with diseases which affect vegetation the true cause of this malady seems involved in much obscurity.

2. On the Bengal plantations in British Sikkim the disorder, or at least much of its fatal effects, seems to be caused by damp or bad drainage. The disease is there most frequent and most fatal in damp valleys. In such places acres together of fine plants have entirely died out. On the dry and well drained positions in those plantations the disease also occurs but not so frequently nor is it so fatal in its effects except among the varieties of *C. Officinalis* there, which have all been seriously injured or destroyed both in dry and damp situations.

3. At Peermede in Travancore the disease affects the plants to a very serious extent in all localities and exposures. Here, in fact, the moisture during the rains seems to be much in excess of the requirements of the Cinchona plant.

4. On the Nilgiris there are many Cinchona plantations without a trace of this disease. In others it is entirely confined to badly drained and damp localities and to neglected estates. On one plantation only has this malady made its appearance in both damp and well drained positions, but this is on a plantation of *C. Officinalis*, the cultivation of which has been neglected for several years. On the Government plantations there are very few cankered plants, and these are confined to damp localities and retentive soils. In the early stages of our operations it was observed that plants did not succeed on such land, and in future extensions such places were not

5. When the trees have attained sufficient size to cover the ground with their foliage, the feeding roots come more up to the surface. Among such trees the disease is seldom found and where the disease previously existed this condition seems to retard its progress.

6. Plants affected with canker may be distinguished at a considerable distance by their yellow tinge and sparse foliage. When examined more closely the bark of the stems or roots is generally found to be cracked, swollen, and disorganized. The disease generally first attacks the stem of the plant at only a few inches above the ground, but occasionally it appears at the same time in various parts of the stem and branches. It is first indicated by a small black spot of decay on the bark, which ultimately penetrates into the wood. Branches when seriously affected drop off. In the early stage of the disease, and before the bark becomes cracked or disorganized on the surface, the cells are found to be enlarged and split. The sap, which in a healthy plant is almost colourless and limpid, is found in the diseased parts to be thick, turbid, and of a yellow colour, and when exposed to the air oxidizes much more rapidly than healthy sap. The diseased spot, which at first is not larger than the head of a pin, spreads perpendicularly or horizontally in its progress, destroying both the bark and the wood. The thick turbid fluid or sap appears to be produced by a fermentation in the cells, which split and become disorganized. Decay follows, entirely destroying the bark affected and penetrating the wood. Ultimately the decayed bark becomes quite dried up and then contracts. The sap then ceases to circulate in the parts affected, while the deposit of wood still goes on above. This produces a swollen or gouty protuberance above the part suffering from disease. In time the bark and the surface of the wood around the stem both decay when the whole of the plant above the diseased part necessarily dies. The roots, however, have generally sufficient vigour left to throw out fresh shoots. In time these fresh shoots, unless again attacked with the same disease, replaces the plant which has been destroyed.

7. The roots of the plants are also frequently affected by this disease. The points and roots lets are then found to be dead, while here and there on other parts of the roots portions of dead bark occur. Here, however, the decay appears to be much slower in penetrating the wood. The decayed bark on the roots has been frequently found to flake off, and a new layer of fresh bark has been found underneath. In some instances the roots of diseased plants have been found to be quite healthy. In others the roots have been diseased while the bark of the stem and branches are free from the disorder.

8. When the bark becomes decayed it is found to contain numerous filaments of a minute fungus (mycelium). This fungus is generally limited to the decayed cells, but occasionally it is found to penetrate into the living tissue of the bark and wood. The Dutch in Java appear to have considered this fungus to be the cause of the disease. But so far as our observations extend, I am impressed that the fungus is not the cause, but the consequence of the disease, and is produced by the decay of the bark. The fungus seems to me to be generated in the bark after it decays. It appears as if the fungus, obtaining its nourishment from the decayed bark, consequently spreads and gains sufficient strength to send its filaments into the growing tissue, but only apparently where the cells of the bark have been to a certain extent previously disorganized by the disease.

9. In order to illustrate more perfectly how the disease affects the plants, I enclose six specimens of the stems and bark. In specimen No. 1 between AA is the spot where the canker first made its appearance. The bark here has become dead and dried up on the growing tree. This bark contains no alkaloids; these having in some mysterious manner become dissipated during the progress of decay. At and between the letters BB the disease is shown in active progress. The bark and cells here are in a forward state of disorganization. The liber of the wood also is to a certain extent affected. At C the disease is present, but its effects are only beginning to show themselves.

10. As above noted it is found that the alkaloids entirely disappear from cankered barks which dry and die on the tree while in a growing state. This is a most curious fact, and all the more interesting as it is not limited to diseased bark, and seems not to be caused by the disease. When a tree in perfect health is destroyed by a ring of its bark being artificially removed from the stem a few inches above the ground, and the circulation thereby impeded, the tree gradually dies.

this case also the alkaloids gradually disappear in exactly the same way as in a tree which dies om canker. This very interesting fact I have only casually observed, but not yet investigated so carefully as the case merits. I have, however, examined the bark of several trees containing between 5 and 6 per cent. of alkaloids, before being affected with disease. I found that so soon as the plant began to decay, whether from disease or from being artificially ringed, the alkaloids began to disappear, or rather in the first instance they became more or less uncrystallizable. As decay advanced to an extent sufficient to retard circulation the bark became covered with warts, as in the specimens marked No. 2 D. At this stage the alkaloids are to a great extent uncrystallizable, and are less in quantity. In the specimen of bark marked No. 3 E, the disease has advanced a stage further, the alkaloids being now almost uncrystallizable, and much less in quantity. But it is only when the bark has become quite dead on the living stem that all trace of the alkaloids are lost. This is the more curious as mere dead bark does not part with its alkaloids by being kept for any length of time or apparently in any climate. The cause, therefore, of the dissipation of the alkaloids must apparently be looked for in the fact that the living leaves of the plant draw the whole of the alkaloids from the dying bark. The disorganization of the cells, whether from disease or from the incipient death caused by ringing seem to admit of none of the akaloids being returned from the leaves to the bark. The above conclusion is partly confirmed by the fact that if a tree is felled and the bark is allowed to dry on the felled stem, the whole of its alkaloids are retained in it, and may be preserved in this state for any length of time.

No. 164. ORDER THEREON, 19th October 1872, No. 1,449.

Miscellaneous.

ORDERED to be communicated to the Agri-Horticultural Society and to the Government Quinologist.

2. It is assumed that Mr. McIvor has forwarded a copy of his report to the Resident at Travancore.

(True Extract.)

(Signed) W. HUDLESTON,
Secretary to Government.

To the Agri-Horticultural Society.
,, the Government Quinologist.
,, the Commissioner of the Nilgiris.

Exd. F. R. Bantleman.

Gobt. of {1872} Madras.

REVENUE.

To

THE AGRI-HORTICULTURAL SOCIETY,

&c., &c., &c.

Dated October 19th.

Read. *Encl.*

G. O., 19th October 1872, No. 1,449.

OCTOBER.

Nos. 163-164.

Cinchona Plantations at Peermede in Travancore.— Mr. McIvor's report on their condition ordered to be communicated to the Agricultural Society and to the Government Quinologist.

No. 3296
Revenue 1872. Klesh
No. 62
Date— 10 October 1872
Rec'd 11th

Commissioner's Office,
Ootacamund.

To Hon'ble
The Chief Secretary
to Government
Ootacamund

Enclosures. 2*
Cinchonas

* Env: containing 3 Packets +

SUBJECT.

Submitting Mr Mc Ivor's Report on the conditions of the Cinchona plantations at Permeedemes & Travancore & Wynaad

With order
No 1449 - 19th Oct 1872

No 162

Which accompanies Mr Mc Ivor's report.
Should the Lower Bdo
See
Govt Sec'y to Govt Mad
C. C. Cotton
(Commissioner)

No. 1449.

Bd 2 Lr com
& the Agri Hort. Soc. &
the Govt Quinologist.

It is assumed
that Mr Mc Ivor has forw
a copy of his Report to
Resident at Travancore

I. D. L.

19 Oct 72

1. To the Agri Horticultural Society 24 Oct 72
1. " Govt Quinologist
3. " Commr Nilgiris