

case mentioned in Mr. Todd's paper, in his Oregon case where the disease, if it proved to be, held over for three years, is quite possible. Empty honey-tins of imported honey may also spread the disease.

(A long and interesting discussion on the above lines proceeded for some time, in which all the members joined. In the evening session the discussion again began regarding the possibility of introducing foul-brood, with the result that a resolution was moved and passed relating to the issue. This resolution will be seen on page 74.)

Mr. Taylor: While we are on the subject of bee-diseases, I would like to bring up the question of the possibility of the germs of fire-blight (*Bacillus amylovorus*) "carrying over" in hives during winter. I may say that at a recent meeting at Kelowna a discussion on the above subject was begun and it caused quite a stir. The growers thought that the disease was spread from the hives to the trees in the spring, and if this was so it meant another way of combating the disease which during the last year has been very destructive to our orchards in the Okanagan. I told the meeting in Kelowna that I would bring the matter to the attention of the entomologists in session in January to determine what was known in the matter. Can any one offer any suggestions?

Mr. Lyne: I would like to remark that there is an excuse for the growers in their supposition that there is a possibility of carrying over the disease in wax or honey in bee-hives. It is well known, of course, that the bees are the active agents in the spring for spreading blossom-infection; consequently it may be so as they suggest. I am not prepared to say. The question may prove to me a scientific problem which may be of use.

Mr. Taylor: I may say that I asked Mr. Brittain when he was with us in the Okanagan, and the question was new to him. I placed my bees at his disposal, but he had no time. At any time I should be glad to place my bees at the disposal of any who would care to work out the problem.

Mr. Robinson: I have no data on this point, neither have I heard the question asked before. I can offer no suggestions on the point beyond the fact that, if this disease you mention can be carried over in bee-hives during winter, the same treatment as D. A. Jones some thirty years ago applied to foul-brood colonies may be applicable. In this case germs are carried over and all attempts at disinfection were useless. The starvation cure, however, proved successful. This consisted of shaking the bees into new hives and starving them. When some dropped it was supposed the germs or spores of the disease were killed. The bees were then returned to their quarters.

Mr. Taylor: In view of the disconnected knowledge on this point I believe some kind of investigation would be in place. I will therefore place the following resolution before you. (This resolution will be found on page 73.)

Mr. Day: We will now adjourn for lunch, meeting here at 2 p.m. this afternoon.

THE TENT-CATERPILLAR.

BY TOM WILSON.

The species of tent-caterpillar that we have with us in the Lower Fraser Valley is probably that known as *Malacosoma crosa*, which we are informed is only a variety species from *M. disstria*. Its appearance in the valley is periodical. It is subject to years of ups and downs in the matter of prevalence. The same occurs with a great many insects, and this periodical occurrence of insect-life, in abnormal numbers or otherwise, is, of course, influenced by natural causes, climate, fungus, bacterial diseases, or insect parasites being the main causes.

The study of the real and actual causes under strictly local conditions and relative to this species of tent-caterpillar has not up till now been proceeded with, and I do not propose dealing with these issues in this paper. Suffice it to say that the tent-caterpillar, a familiar insect to all of the farmers in the valley, varies in

its centres of infestation one year following another. One year it will be very troublesome on the Delta, and another year at Agassiz, and so on. It is therefore with the purpose of detailing the centres of infestation, such as I have notes on, each succeeding year, to demonstrate the trend and the migrations of these insects, that is the main reason for this paper.

In 1896 the caterpillars were very prevalent in the Lower Fraser Valley from Agassiz down to the mouth of the Fraser Valley; that is, the entire valley was severely troubled by the presence of these insects.

In 1897 the caterpillars were again present throughout the valley, with a slight increase in numbers in the Chilliwack District and a lessening or easing off through the Delta.

In 1898 Chilliwack, Langley, and Surrey were the centres of infestation, while there was a lessening in abundance on the north shore of the Fraser and a practical disappearance on the immediate coast.

In 1899 only a few caterpillars were observed in the valley this year, which indicated that some disease coupled with its own insect parasites had been active during the fall of 1898. This remarkable disappearance of the insect in injurious numbers is worthy of note, for this condition of almost freedom continued until 1907, a period of nearly ten years. I do not wish to advance any theories on these happenings, as they are beyond my ken, but I merely wish to record the dates and the years when these caterpillars were troublesome to the farmer. The points or centres of infestation already mentioned were severe infestations, the caterpillars causing serious injury to the foliage of orchard as well as to ornamental or forest trees.

In 1908 the caterpillars appeared again during the summer, evidently from eggs laid the previous fall. They evidently had come up from the State of Washington from the south, as they were very destructive from the International Boundary-line through the Delta, Surrey, and Langley Districts. They appeared in slight numbers in the Chilliwack and Agassiz Districts and only lightly on the north shore of the Fraser. This 1908 infestation was severe and covered a great deal of territory, and when it is considered that in the year previous (1907) there was a practical freedom, with the exception of a slight infestation somewhat heavier than elsewhere in that year about Maple Ridge on the north shore of the river and at Langley on the south, it seems the more remarkable.

In 1909 the infestation had increased to a great extent, about the same territory as in 1908 being still the worst infested. It may be practically said that the infestation was doubled at each point as compared with the year previous.

In 1910 the moths had evidently flown up the river towards Lytton, for during this summer a few caterpillars were observed at this point. Hope, Ruby Creek, Agassiz, Chilliwack, Harrison River, and Dewdney were evidently the centres of infestation, while there was also a continuance, but possibly to a lesser degree, in the Langley, Surrey, and Boundary Districts. It was apparent the infestation was moving eastward.

In 1911 only a few caterpillars remained at Chilliwack and Surrey. I have no notes on the country east up the river, but judging from the migration route it would appear possible that the Lytton District was the centre of infestation.

In 1912 only a few remained up the river, while the Fraser Valley was fairly free.

In 1913 there were no caterpillars in the Lower Fraser Valley, but the country about the Pemberton Meadows and as far up the Fraser River Valley as Quesnel were very severely infested. An account of this infestation I have included in another part of this bulletin under the heading of "Insects for the Year."

This present winter (1914) I have been on the search for egg-masses, but I have been forced to consider that we are not likely to be again visited by the caterpillars this coming season. If there is such a thing as recurring seasons, and any definite rule on which Mother Nature works, it may be possible that we will not again be troubled by a serious outbreak, such as the ones I have mentioned, for possibly ten

years. It will be very interesting to see when and from where the next infestation comes, but in the meantime I will not dare to set my brains to work to offer suggestions as to the controlling influences in the universe, to predict when the next outbreak occurs.

So far as Vancouver Island is concerned, my notes extend back only as far as 1908, in which year the caterpillars were very numerous and destructive in the neighbourhood of Victoria and up the line of the Esquimalt and Nanaimo Railway to all points where there was a preponderance of crab-apple trees.

In 1909 it was again very prevalent about the same points and through as far as Alberni.

In 1910 there was a distinct lessening of the attack at all the above points on the Island. I have notes to show that a great deal of parasitism took place this summer, which must have been very effective, for in 1911 they had practically disappeared, and thus far have not appeared again.

Here again, as on the Mainland, it is gratifying to note the scarcity of egg-masses in most of the districts which have been subject to the heaviest attacks in the past, both in orchard and forest.

PRELIMINARY NOTE ON THE WORK OF *ERIOPHYES* SP. UPON APPLES, APRICOTS, AND PLUMS.

BY W. H. BRITAIN, B.S.A., PROVINCIAL ENTOMOLOGIST.

The first specimen of the work of this mite to come under my notice on some young apples was sent in by Mr. Chas. Holt, of Balfour, B.C., on July 3rd, 1912. Since that time I have had samples sent in from all parts of the Kootenay and Okanagan Districts. The correspondent nearly invariably stated that the trouble attacked the same trees year after year and did not seem to spread rapidly through the orchard. Nearly always it was confined to a few varieties—Wealthy, Duchess, and Yellow Transparent.

Affected fruit has a peculiar spotted or blotched appearance. The injury varies from slight elevations or blisters upon the skin, of about 1 m.m. diameter, to large, slightly raised blotches, which may involve one-quarter to three-quarters of the surface of the fruit, the cells below the surface being also affected to some extent. The raised patches vary considerably in colour, some appearing dark green or water-soaked; others dark red or reddish-brown; and others, again, a dark yellowish-brown. The smaller blisters are in most cases red or reddish. In some cases the blotches are not raised at all.

Where the injury is very severe the fruit may be dwarfed or stunted. The death of the cells and underlying tissues sometimes results in the formation of brown sunken spots or even cracks upon the fruit. The fruit may reach its normal size, but more often it drops prematurely.

Where the mites are active a clear, slightly yellowish fluid will sometimes be detected oozing through the skin. Later the fluid may become cloudy, or whitish in colour. On examining this exudate and the tissue beneath, the adults and eggs of the mites were found in abundance. The exudate was first noticed on July 10th; and hundreds of samples of such fruit were examined at intervals throughout the season, the mites being present in each instance.

On August 15th a number of apricots were sent in from Naramata, covered with reddish and brownish-yellow unraised blotches. Examination revealed the presence of the mites and their eggs. Similar specimens obtained from different parts of the Okanagan, obtained at the packing-house of the Vernon Fruit Union, showed the apricots to be affected by the mites.

On August 19th Mr. Wm. Middleton, Jr., sent in a box of plums from Penticton. These plums were covered with raised russet spots and beads of a clear fluid. From these specimens were also obtained mites and their eggs.