

THE BUD-MOTH (*Tmetocera ocellana*).

This pest, although as yet only reported from Kelowna, is probably more widespread in the valley, is of great economic importance, and care should be taken that it is not allowed to become a serious pest here.

BUD-WEEVILS (*Cercopus artemisæ* and *Minctus setulosus*).

Feeding on buds and opening leaves of apple-trees at Penticton.

THE FLAT-HEADED CHERRY-TREE BORER (*Dicræa divaricata*).

Only reported from Vernon, where two specimens were taken by Mr. W. H. Brittain in 1912.

THE PEACH-TREE BORER (*Sanninoidea crotiosa*).

This pest is only reported from Summerland, where a considerable number of trees have been killed by it; probably present to some extent in all the peach districts.

THE PEACH-TWIG BORER (*Anarsia lineatella*).

A serious pest in the southern Okanagan, and very abundant this year, probably owing to neglect of thorough spraying.

Mr. Lyne: To review all the insects mentioned by Mr. Ruhman would consume several days. I will confine my attention to those of most importance. The *Plusia* generally occur spasmodically owing to the extent of parasitism they are subject to in this country. Onion-thrips are very prevalent this year in Kelowna, and affected fields are especially easy to notice owing to the sickly greyish discoloration of the leaves and stalk of the onion. The result has been a reduction of growth. Onion-ground should be ploughed in the fall, the idea being to make it a difficult matter for the adults in the soil to emerge next season. Stir soil during the winter, if possible, to let the frost act. Except for the presence of the codling-moth in this locality, the peach-twig borer is very prevalent and destructive and most important. Unless spraying is done very few sound peaches will be found next year. We know this insect as very serious. This Society is posted as to procedure, for the life-history was published last year in Bulletin No. 3 of our series. Methods of combating this pest will be found in the account. The larvæ hibernate or pass the winter in crotches of the tree under bark, etc. The peach-root borer is another injurious insect of prime importance. The larvæ attack apricot and plum, as well as peach. These larvæ, which may be found around the root, and a mass of gum will indicate their presence, and must be cut out by hand, using a curved bladed knife for the purpose. An account of this insect appeared in Bulletin No. 3 of last year's proceedings. Copies of this bulletin can no doubt be obtained from the Secretary at any time.

THE CONTROL OF INCIPIENT INFESTATION OF CODLING-MOTH IN A NEW DISTRICT.

By W. H. LYNE, ASSISTANT PROVINCIAL INSPECTOR OF FRUIT PESTS.

The most practical method of dealing with a local incipient infestation of codling-moth depends upon the particular season of the year at which the infestation is discovered, and the time decided upon to commence operations with a view to its extermination. I need hardly preface my remarks by saying that it is the first object of this Department to exterminate an outbreak of this moth immediately on its arrival, for the Department has been brought up side by side with the growth and development of the fruit-growing industry of the Province.

So far experience has taught us that there are only two drastic methods that will give satisfactory results. One of these consists in *destroying every particle of fruit within the infected area during the early summer*, in order to prevent the larva

completing its life-cycle and carrying the infection over to another season. It should be realized, at this point, that our Province is now practically free of codling-moth; consequently, with our staff of fieldmen posted in various parts of the country, we are for the most part able to "spot" an infestation before it has had an opportunity to get ahead of us. This point should be thoroughly realized, otherwise my few remarks may appear to be too theoretical, whereas they actually represent past experience and fact. The other recourse is that of *systematic spraying with arsenate of lead, banding the trees, and a rigid quarantine of all fruit within the infected district.*

It often happens that the infection is not discovered until late in the season at a time when the first brood of larvæ have had their "innings" at the fruit, and many of them have already passed the pupa stage and new moths are on the wing. This could happen as early as the month of August in this latitude. Under these circumstances it would be very foolish to proceed with the destruction of the fruit unless the area was very small indeed. Because by the time the area of infection could be ascertained and every particle of fruit destroyed the second brood would be so far under way as to give many of the larvæ an opportunity to leave the fruit, spin their cocoons in a small hiding-place under the bark or elsewhere, and there remain until the following season, and the great sacrifice of fruit would not have resulted in utter extermination. So if the destruction of the fruit is the method to be adopted, with a view to utter extermination, as a reward for the sacrifice, it will be necessary to start destroying the fruit so early in the season as to ensure the destruction of every particle before the season is far enough advanced to allow any larvæ the chance to winter over.

This work of destroying the fruit is not nearly so simple a process as the mere mention of it might lead people to believe. Any experienced apple, pear, crab, or quince grower will agree that, even when harvesting the matured fruit is over, they will often think every bit of fruit on a certain tree had been gathered, to find when the tree finally loses its foliage that many specimens remain still adhering. This will give one an idea of how much more difficult it is to thoroughly dispose of partly developed fruit at the time it is necessary to make a thorough clean-up. It is also hard to realize the amount of opposition and refusal to co-operate on the part of many of the people whose future interests are at stake. Without the thorough and hearty co-operation of every one concerned, the extermination of the codling-moth is very difficult, if not impossible, as a very little fruit allowed to remain in the trees or even on the ground throughout a scattered district may defeat this attempt to eradicate the infection.

To review the other method already mentioned, consisting of strict quarantine, inspection, banding the trees, and spraying, I will give the details that were carried out in dealing with an infected district of about one square mile in extent. The cause of infection was traced to a settler having arrived in the spring, with his household effects, from an infected district in Ontario, and the larvæ were carried in some of the packing-cases in the pupal form. It was not until the beginning of September that infection in three or four adjoining orchards was first discovered, many of the first brood of larvæ being found in cocoons under the bark of infected trees, and also some newly hatched larvæ in the fruit ranging from a few days old and upwards. Several apples were found in which larvæ had completed their work and left, accounting partly for those found under the bark in their cocoons. The trees averaged seven or eight years old, mostly Jonathans, McIntosh, and Wagener, all bearing considerable fruit. Four Assistant Inspectors were immediately ordered to inspect the whole district with a view to locating the exact area of infection. This proved to be one square mile in extent. No fruit was allowed to leave this district, and outside packing-houses were not allowed to send in any picking or packing boxes that would go into circulation again in outside districts or packing-houses. A temporary packing-house was erected in the infected district, to which

all fruit was ordered to be taken. During this time the Inspectors were still busy locating the infection, which proved finally to exist only in three or four orchards. When this condition was ascertained they were instructed to destroy every larva that could be found in the fruit, on the trees, or under the bark or crevices. The trunks and limbs of the trees were scraped clean of rough bark and banded with gunny-sack. As a further precaution, every apple, crab, pear, and quince was carefully inspected by our own Inspectors at the packing-house provided for the exclusive handling of fruit within the infested district.

After passing this inspection the fruit was packed and hauled direct to the cars to which they were consigned for shipment to points outside the Province. The following spring and summer every apple, crab, pear, and quince tree in the infected district received a thorough spraying with arsenate of lead, and during the balance of the season the orchards were patrolled by two of our Inspectors on the look-out for the first sign of reinfection, but none has been found during the last two years. This fact in itself speaks for the efficacy of the proceedings, and fortunately we are conscientious enough to recognize infection when it appears, and so may truthfully say we do not know that any codling-moth infection exists in the orchards above mentioned. Given a free hand and thorough co-operation on the part of the growers, we believe all normal infestations may be conquered.

Mr. Treherne: This admirable paper speaks for itself and represents a clear case of conscientious effort for the welfare of the Province. It has been frequently mentioned, privately and officially, that the cost of control and the wholesale total elimination of orchard pests is more than the cost would be to the grower if the pests were present. This is without doubt true, and probably, in some cases, the expense is greater, but the name and value of having clean fruit in the markets of the world is worth more than all the costs of control put together. It is largely a matter for the future, but undoubtedly the cash value will become apparent some day, and that not far distant. I should like to ask Mr. Lyne if he has practised the former method he mentioned—viz., the total purchase and condemnation of fruit in an area found to be infected.

Mr. Lyne: Why, certainly. We had a case last summer at Armstrong, brought to our attention first by Mr. Brittain. He observed in the month of June a larva in a fruit when the apples were still quite small. Immediately we went to work and rounded up the infection, which finally we found was confined to three orchards of approximately 800 trees, five- to eight-year-olds, of which, if I remember correctly, about twenty were actually found infected. We bought the crop outright on the trees in the early summer, amounting to approximately 1,000 boxes, and boiled the fruit in sacks in scalding water. Since then no further report of infection has come in from this district.

Mr. Taylor: How many outbreaks have occurred in the Province at one time and another?

Mr. Lyne: Four or five definite outbreaks have occurred.

A member: And do you consider the methods you advocate satisfactory under all ordinary conditions?

Mr. Lyne: So long as we retain the confidence and the co-operation of the fruit-growers, certainly. I may say we have been very fortunate in being able to catch incipient infestation so rapidly. So long as the codling-moth remains a rarity and we have an efficient orchard patrol, we will keep out the moth for many years yet.

Mr. Treherne: I am inclined to agree with Mr. Lyne that provided a careful orchard patrol is continued and Inspectors be properly informed, and the Department is properly endorsed by the Government, the matter of control of incipient infestation by codling-moth is simple, and growers should rely on and endorse the work. I may mention, however, that the moth is gradually working its way northwards from the State of Washington; hence, we cannot always hope to be immune from attack.