

rethinned onions was estimated to average 24 tons per acre; the balance of the field was a total loss.

From the observations made on the experiment the following conclusions were drawn: The fresh bait was attractive to the fly. Where the plates had been allowed to dry no flies were attracted to the poisoned molasses remaining. Instead of weekly renewal of the bait as suggested by the Wisconsin experiments, it was found that daily renewal was necessary under our dry conditions. Instead of daily renewal of the bait, water was added to the plates to replace evaporated moisture; this possibly was not done until after the bait was so dry that the water would not mix readily with the poisoned molasses; consequently the flies were able to obtain moisture from the bait without absorbing the poison. In the middle of June infestation was found to be very heavy, and the second thinning appears to be mainly responsible for the excellent crop obtained, the cost of which was certainly warranted, but careful work is necessary to make the thinning a success.

In the spring of 1919 experiments will be conducted to find, if possible, a more attractive bait; also methods of application more suitable to our dry conditions in relation to the life-history will be tested.

References.

- (1) Gibson & Treherne, Ent. Branch, Ottawa, Bul. 12.
- (2) Severin & Severin, Jour. Econ. Ent., Vol. 8, 1915, p. 342.
- (3) Donald J. Caffrey, Ent. Rept., Connecticut, 1911, p. 287.
- (4) N. F. Howard, Journ. Econ. Ent., Vol. II., 1918, p. 82.

SOME NOTES ON THE TENT-CATERPILLAR.

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During the past summer the tent-caterpillars have been attracting the attention of every one in and around the Cities of Vancouver and Victoria, and judging from the supply of egg-masses to be seen at the present time this pest may be expected in even greater numbers in 1919 unless control-work is undertaken in a thorough and systematic manner. These caterpillars must not be confused with another destructive species, the fall web-worm (*Hyphantria* sp.), which were also very abundant in Vancouver and the Lower Fraser Valley last year, but which appear much later in the season, usually about the end of July, after the tent-caterpillars have disappeared.

Two distinct species of this insect occur in British Columbia — the common or orchard tent-caterpillar (*Malacosoma pluvialis*) and the forest tent-caterpillar (*M. disstria* var. *erosa*). Their life-histories, habits, and control are quite similar, however, and they will be treated together in this

short paper. In common with many of our native insects, this pest is subject to years of abundance followed by several years of scarcity, and this is but one of the many outbreaks recorded in the history of our continent. The caterpillars are voracious feeders, and during the years of abundance much damage is done, in addition to the unsightly appearance and inconvenience caused by their presence. The history of the forest tent-caterpillar as recorded in our available literature is given briefly on the accompanying chart. A more detailed account may be found in the Annual Report of the Entomological Society of Ontario, 1916.

It will be noted that outbreaks have occurred at intervals of eight to ten years and the average duration was about three years.

Life-history and Habits.—The insect spends the winter as a tiny caterpillar in the egg-shell. The eggs are deposited in masses of from 250 to 400 in the form of rings or masses on the terminal twigs and smaller branches of the trees. The masses are covered with a shellac-like material which serves to hold the eggs together and protect them from the weather as well.

The caterpillars emerge from the eggs in the early spring and feed upon the opening leaves. Those from each mass, or from several masses in the case of an outbreak, usually keep together and feed in congress until nearly full-grown. As the caterpillars grow they moult, or cast off their outer skins several times, and the dry skins are often found in large numbers on the tree-trunks and taken by many to be dead caterpillars.

When the caterpillars become full-grown, which usually requires about eight weeks, they spin their cocoons and enter their chrysalid or pupal stage. The cocoons may be found fastened to the leaves of trees, in crevices of the bark, under fence-rails, under the eaves of houses, and in many other places.

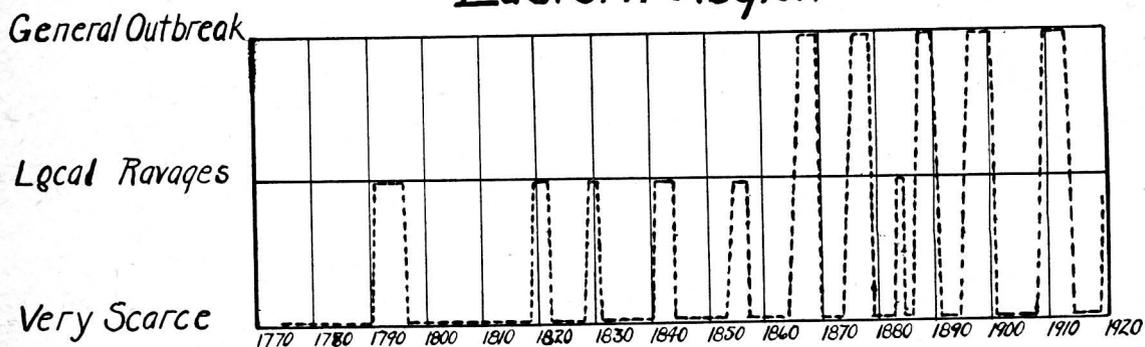
The moths emerge in from two to three weeks. They are medium-sized moths and are reddish-brown in colour, with two more or less distinct bands across each front wing near the middle. They fly at night, and after mating the males die within a day or two and the females deposit their eggs as soon as they have found a suitable location. The females will not deposit their eggs until they have been fertilized and may live for two or three weeks. There is only one generation a year, the eggs deposited in July remaining on the trees until the following spring.

Control.—The control of these insects in forest lands is not at present economically possible, but the following control methods are applicable to orchards, city lots, shade-trees, and parks:—

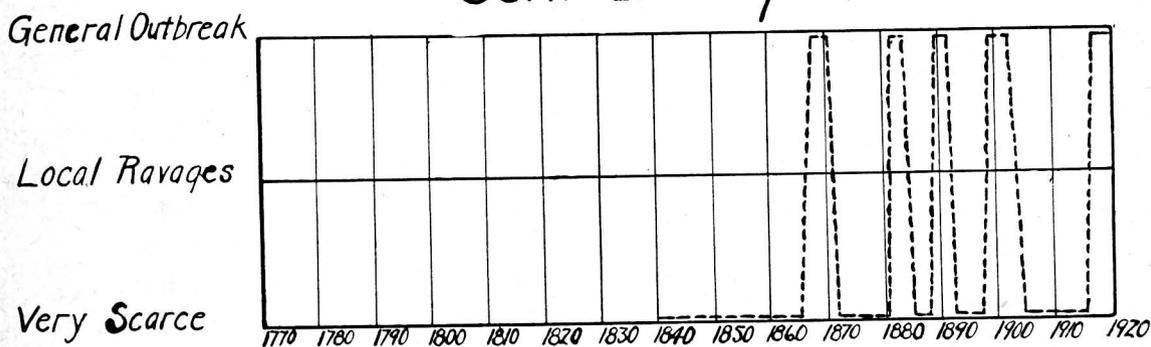
(1.) *Destruction of Egg-masses.*—During the winter months the egg-masses are easily seen on the twigs, especially on the smaller trees, and much good can be done by removing and burning them before hatching-time, and although some masses will be missed the caterpillars from these will be more easily controlled.

(2.) *Destruction of Clusters of Caterpillars.*—The forest tent-caterpillars may be removed when they are in clusters on the trunk or lower branches on the tree, either by scraping them off with a hoe or stiff wire

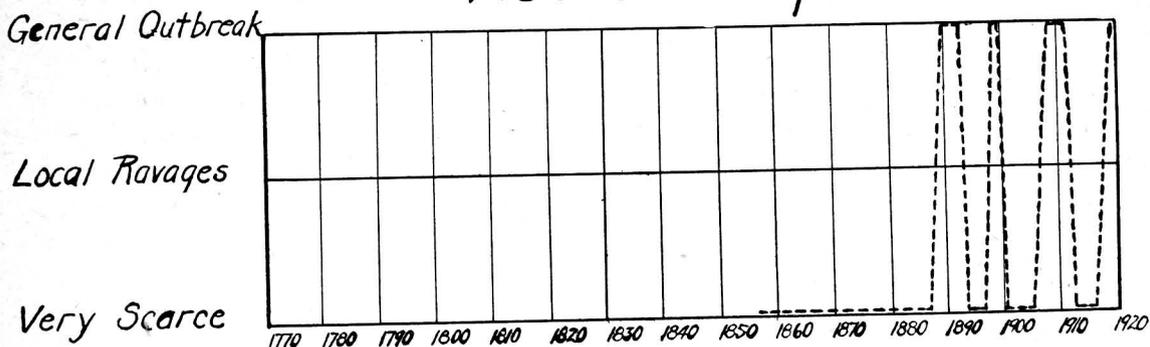
Eastern Region



Central Region



Western Region



History of the Forest Tent Caterpillar in North America. The dotted lines indicate the abundance of the insect.

brush or by applying a strong spray of kerosene emulsion directly on the caterpillars. The caterpillars of the other species may be quite readily destroyed by burning with a torch when they are resting in their web or tent on the trees.

(3.) *Spraying*.—This is perhaps the simplest and most economical method where quite large areas are infested, such as in parks and orchards. Any reliable stomach-poison may be used, the most available being Paris green and lead arsenate. Of these, lead arsenate is to be preferred on account of its better adhesive qualities. The spraying should be commenced as soon as possible after the caterpillars hatch, so that they may be killed before much damage is done to the trees. Also the older caterpillars require much stronger spraying mixtures, and as the foliage increases the amount of spray necessary becomes proportionately greater; hence it is doubly economical to spray early. Use $2\frac{1}{2}$ lb. of lead arsenate to 40 gallons of water; or 1 lb. of Paris green with 2 lb. of quicklime (to prevent burning) to 160 gallons of water.

(4.) *Jarring the Trees*.—The caterpillars usually drop to the ground when the tree on which they are feeding is jarred or shaken, so if one strikes the trunk and larger branches with a padded mallet most of the caterpillars will fall off, and the trunk may be banded with cotton or some adhesive mixture to prevent their return up the tree.

(5.) *Banding*.—Banding is more or less complementary to all the other control measures in order to prevent caterpillars from infested trees near by crawling on to trees which have been freed from the pests. Several materials may be used for banding, but the most convenient and effective material is a special tree tanglefoot prepared by the O. W. Thum Company, Grand Rapids, Michigan, the makers of sticky fly-paper. This should be applied as a band around the trunk about 4 or 5 inches wide and 4 or 5 feet from the ground. It must be renewed, if necessary, by scraping the surface and removing caterpillars which get stuck up in it.

The *natural control* of these insects was discussed in a paper prepared by Mr. J. D. Tothill for last year's annual meeting of this Society and will be found in the report of that meeting. I would merely mention the fact that insect parasites and predators, diseases, birds, weather conditions, and such-like, have been responsible for the years of scarcity noted in the past and will no doubt reduce the present outbreak in due time. In the meantime, however, we must make use of artificial methods of control to prevent the damage to our property which must otherwise result.