A BRIEF HISTORY OF OUTBREAKS OF THE DOUGLAS-FIR TUSSOCK MOTH, *HEMEROCAMPA PSEUDOTSUGATA* McD., IN BRITISH COLUMBIA[1]

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The Douglas-fir tussock moth was first reported defoliating Douglas fir, *Pseudotsuga menziesii* (Mirb.) Franco, near Chase in 1916. In 1921 the type specimens were obtained from this locality and described by McDunnough as a new species, *Hemerocampa pseudotsugata*. Prior to this the species was referred to as *Hemerocampa vetusta* form *gulosa* Hy. Edw. Since 1916 outbreaks have recurred at intervals in British Columbia, usually in semi-arid Douglas fir or Douglas-fir — ponderosa-pine forests. Severe infestation has resulted in top killing or complete tree mortality. The following notes on outbreaks of Douglas-fir tussock moth were compiled from the files of the Forest Biology Laboratory at Vernon.

HISTORY OF OUTBREAKS

1916—The Douglas-fir tussock moth was causing some damage to Douglas fir growing in and near Chase[3].

1917—A small but severe infestation occurred at Hedley. The tussock moth continued to kill Douglas fir and some ponderosa pine trees in the vicinity of Chase[3].

1918—The Douglas-fir tussock moth remained active near Chase and Hedley; also minor outbreaks were reported at Salmon Arm and Armstrong.

1919—Infestations continued at Chase and Armstrong with new outbreaks at Vernon and Kamloops. Defoliation of Douglas fir was severe; the ponderosa pine foliage was damaged where the preferred host, fir, had been completely defoliated.

1920—The insect remained active between Vernon and Kelowna and in the marginal fir stands in the vicinity of Kamloops. A population decline occurred in the other infestations.

1921—Infestations remained active from Chase west to Kamloops and from Vernon south to Kelowna. Entirely defoliated trees had died; reproduction, saplings, and pole-sized Douglas fir trees suffered the highest mortality. Heavy defoliation of the mature or semi-mature fir often resulted in the death of the upper third of the crown.

1922—A large population hatched in the spring, but the larvae died before maturing, thus bringing the infestation to an abrupt end.

1928—No further activity was described until 1928 when two infestations developed, one near Kamloops and the other near Vernon. These outbreaks were in Douglas fir growing adjacent to ranch buildings.

1929—Outbreaks were reported from Chase, Little Shuswap Lake, Cascade, and Kettle Valley districts. Greatest damage occurred in Sullivan Valley where young Douglas fir and ponderosa pine trees on 100 acres were killed.

1930—The Douglas-fir tussock moth outbreaks remained active. They ranged in size from less than an acre to 1,000 acres. Reports indicated that there was damage near Chase, Grand Forks, Kettle Valley, south from Adams Lake to Squilax, between Haywood's Corner and Deep Creek, North Thompson Valley in the vicinity of McLure and Sullivan Creek, along Paul Lake road bordering Niskonlith Forest Reserve, in the marginal Douglas fir south of the South Thompson River and in the BX District northeast of Vernon.

1931—The infestations reported during 1930 persisted and many increased in size. Also, larvae were noted defoliating Douglas fir near Okanagan Landing.

1932—The population subsided throughout the areas of infestation.

1936—After an interval of four years, small outbreaks occurred in Douglas-fir trees near farm buildings in the Armstrong and Salmon Arm districts.

1937—Additional outbreaks appeared in groups of Douglas-fir trees about farm buildings near Armstrong. Small infestations occurred at Vernon.

1938—The infestations at Vernon and Armstrong increased a little in extent but no new outbreaks were reported.

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1. Contribution No. 401, Forest Biology Division, Science Service, Department of Agriculture, Ottawa, Canada.
2. Forest Biology Laboratory, Vernon, B.C.
3. The Agricultural Gazette of Canada, Vol. 6, No. 2, February, 1919. Notes on the Tussock Moth, Hemerocampa vetusta gulosa Hy Edw., by W. B. Anderson.

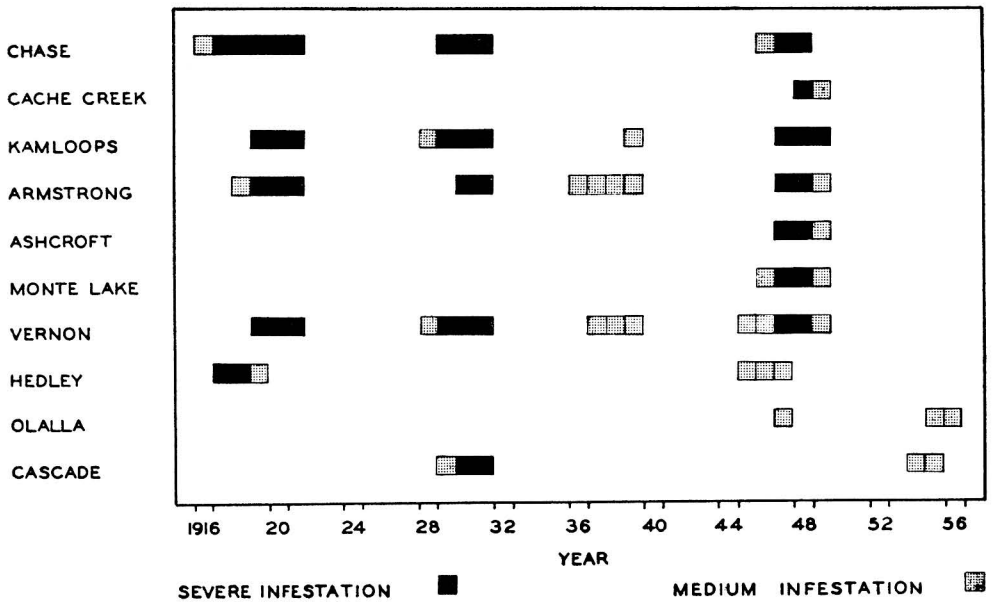

Fig. 1.—Records of occurrence of *Hemerocampa pseudotsugata* McD. infestations from 1916 to 1956 in the interior of British Columbia.

1939—The anticipated increase in population did not materialize. Although larvae were numerous during June and July near Vernon, Larkin, and Armstrong, there was a general population collapse apparently due to a virus. An outbreak reported from the North Thompson Valley during 1939 also subsided.

1945—The Douglas-fir tussock moth reappeared at Vernon and Hedley. Small outbreaks were observed near buildings at these localities.

1946—The infestations at Vernon and Hedley continued, and tussock moth activity was reported from Chase and Princeton.

1947—Young Douglas-fir trees near Chase, Squilax, Pritchard, Monte Lake, Stump Lake, Oregon Jack Creek, Hedley, Vernon, and Armstrong were severely defoliated.

1948—Damage by tussock moth larvae was widespread. Infestations were observed at Armstrong, Vernon, Oregon Jack Creek, Ashcroft, Lower Hat Creek Valley, Walhachin, North Thompson River Valley from Kamloops north to Barriere, and Monte Lake west to Monte Creek. Mortality of Douglas-fir and ponderosa pine trees occurred at all infestations.

1949—The infestations subsided. A survey in the spring of 1949 indicated that the only persistent large population was in the vicinity of Savona. This population collapsed during the summer due mainly to a virus.

1954—A small outbreak was noted at Cascade.

1955—The outbreak at Cascade subsided. A virus apparently was responsible. A light population was discovered at Olalla.

1956—Tussock moth activity near Olalla ceased during the summer. At the time of writing, the cause had not been determined.

From the above listed outbreaks of Douglas-fir tussock moth it is apparent that severe infestations have recurred at intervals (Fig. 1) in a rather limited part of interior British Columbia (Fig. 2). Most of the outbreaks have been in open-grown stands of Douglas-fir trees. The infestations appear to build up quickly in a relatively few suitable sites, last for a short period, and then collapse. Between outbreaks, there are years when

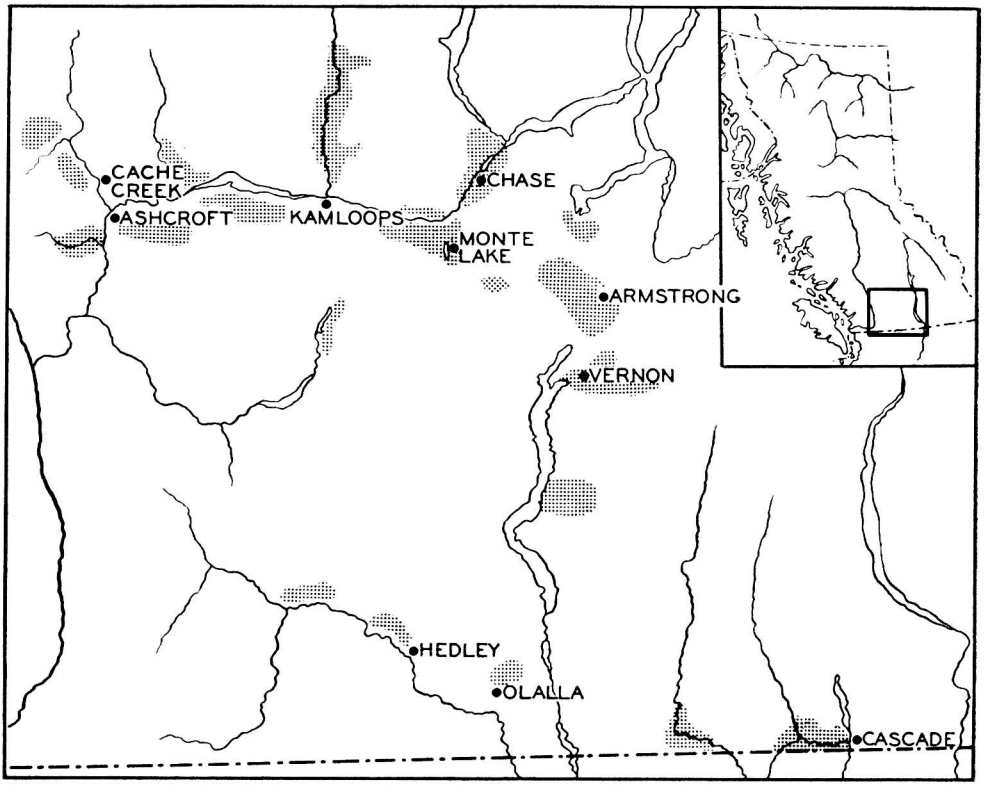

Fig. 2.—Location of past outbreaks of *Hemerocampa pseudotsugata* McD. in British Columbia.

no larvae are taken in the routine survey samples over most of the range of the Douglas-fir tussock moth. On the other hand, there are a few localities, such as Long Mountain near Oyama, where outbreaks have been unknown, but which usually have a small persistent population.

Caenurgina erechtea **Blkme.**

The following notes are supplementary to my article on the species in the Proc. Ent. Soc. of B.C. **52**: 16-21, 1956

Ova were obtained from the summer form on July 20, 1956. These hatched on July 30. The larvae were fully fed about August 26, and pupated soon afterwards. Adults emerged September 21 to 26, all of the large summer form. Matings occurred and ova were obtained October 8, and for a few days after. Some of the ova hatched, but the larvae did not feed; the remainder failed to hatch though the embryos were fully formed.

From material in collections it was assumed that the summer brood would have overwintered in the pupal stage, giving rise to the small spring form. However, these observations suggest that two generations of the summer form are usual in this area; and it is conceivable that, given ideal growing conditions, and a long summer season, this species might be triple-brooded. In that case progeny from an early, third generation would develop sufficiently to produce overwintering pupae.—*George A. Hardy, Provincial Museum, Victoria, B.C.*