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A PEST OF WOODLAND AND GROVE.

F. H. HALL AND V. H. LOWE.

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*Connected with Fertilizer Control.

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POPULAR EDITION*

OF

BULLETIN No. 159.

A PEST OF WOODLAND AND GROVE.

F. H. HALL.

An insect army reinforced. The season of 1898 brought disappointment and disgust to many apple growers. They found their trees stripped of foliage and their crops ruined by an army of caterpillars which added insult to injury by decking the devastated orchards with unsightly tents as a constant reminder of past damage and a visible threat of future harm. This year, 1899, the foe has been joined by a kindred enemy, naturally a forest dweller, whose presence in the orchard is of importance mainly as showing the possible damage to fruit interests which lies latent in the invader's omnivorous appetite. In orchards the forest tent-caterpillars have only supplemented the work of the apple-tree tent-caterpillars; but in woodland, groves, parks, and city streets they have proven the pre-eminently destructive insects of the season.

Forest feeders. The forest tent-caterpillars have worked to some extent in our forests every year but usually their numbers have been so small and their damage so slight that they have passed unnoticed. This year, however, they were present in alarming abundance in many sections

* This is a brief review of Bulletin No. 159 of this Station on The Forest Tent-Caterpillar, by V. H. Lowe. Any one especially interested in the detailed account of the investigations will be furnished, on application, with a copy of the complete bulletin. The names of those who so request will be placed on the Station mailing list and they will receive future bulletins, popular or complete as desired. Bulletins are issued at irregular intervals, as investigations are completed; not monthly.

of the State, especially along the western, northern and eastern slopes of the Adirondacks, the valley of the upper Hudson, the Mohawk Valley, the Catskill region, in the southern part of Onondaga and Madison counties, throughout Cortland, Chenango and Otsego counties, and in the upper Genesee Valley. They were also present in noticeable numbers in all other counties of the State except perhaps a few in the extreme west. They devastated alike trees upon the mountain slopes, forest patches in settled country, isolated groves, and shade trees along roads and streets. They did most damage to sugar maples but also fed largely on basswood and elm ; in some localities, upon poplar and oak. In orchards they chose apple, plum and cherry. They are however, hearty feeders, not specially particular as to the kind of leaf which falls in their destructive way ; for they have been found feeding upon plants of thirty species distributed among sixteen botanical families.

The forest tent-caterpillar in all its stages is so similar to the apple-tree tent-caterpillar described in Bulletin 152, that extended descriptions seem unnecessary here.

The egg clusters or bands are represented in Fig. 1. They differ from those of the apple-tree tent-caterpillar in being cut off more abruptly at the end and in color of the frothy covering which is dull gray instead of brown. These bands remain upon the branches from the middle of July throughout the winter, the little caterpillars emerging in the spring.

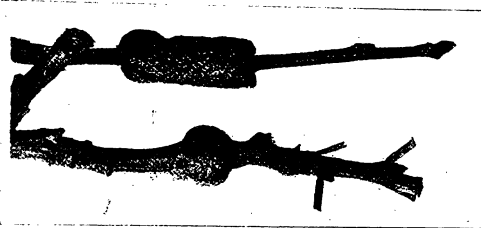


FIG. 1.—Egg masses of forest tent-caterpillar.

The most familiar form, the larva or caterpillar, emerges from the eggs with the first warm days of spring, late March or early April, grows rapidly, feeds voraciously and attains its full size in about six weeks if food is plenty or longer if food is scarce. They usu-

ally pass through four molts, attaining a length of an inch and a half to two inches or more. They are black in color, with a row of white spots upon the back, a broad stripe of pale orange-yellow and a narrower cream-colored stripe along each side and with other scattered white or yellowish spots. Many minute tubercles dot the surface of the body from which arise hairs of various colors, whitish, blackish or fox colored. Their appearance when full grown is shown upon the title page and by the two caterpillars at the right of Fig. 2. The larva at the left of this figure is the apple-tree tent-caterpillar and shows the characteristic white line upon the back of this species as contrasted with the row of white spots upon the back of the forest species.

These caterpillars, unlike the apple-tree tent-caterpillars and

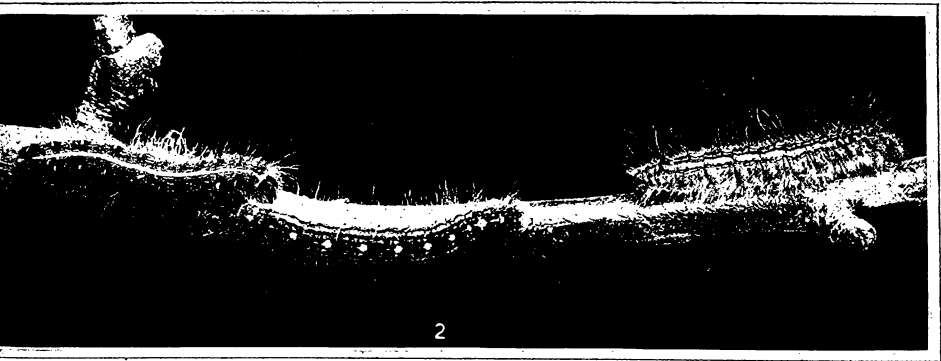


FIG. 2. —*Larva of apple-tree tent-caterpillar and two larvæ of forest tent-caterpillar.*

notwithstanding the name, do not construct regular tents or nests ; but spin threads of silk which are left upon the branches and leaves wherever the caterpillars crawl. When the tree upon which they are feeding is suddenly jarred, the larvæ drop and unless too large and heavy may remain suspended by these threads. Where many of these caterpillars are feeding together their repeated journeys to and fro over the branches and leaves may cover the latter with threads and so give the appearance of nests. These are not used for protection so far as known. When not feeding they cluster in large numbers upon the limbs and trunks of the

infested trees, as shown upon the title page. They have been known to feed with the apple-tree tent-caterpillar and to accompany the latter to their nests. This last, however, is uncommon and it is not probable that they enter these nests, but simply cling outside.

The caterpillars become very restless after their last molt, and wander about seeking places to pupate. In their forest homes, where foliage is still plentiful, they commonly spin their cocoons in shelters made by rolling up roughly a leaf or two as shown in Fig. 3. Last year, owing perhaps to scarcity of foliage where they had done much damage, they did not all protect their cocoons but spun them,



FIG. 3.—Protected cocoon of forest tent-caterpillar.

as did the apple-tree tent-caterpillars, upon fences, in crevices of the bark on trees, on buildings, etc. These little silken cradles are yellowish white in color, an inch or so long, loosely woven and covered with yellowish powder.

The moths are very much alike in both species, **Moths.** *Clisiocampa americana*, the apple-tree tent-caterpillar, and *C. distria*, the forest tent-caterpillar. Both are reddish-brown in color, and the front wings of both are crossed by two parallel bands, light in the apple-tree tent caterpillar, dark in the species we are discussing. The moths of this species vary quite widely in both size and coloration; and two varieties have been named; one variety having a single wide dark band across the wings instead of two parallel narrow ones, the other variety having no bands at all.

The moths emerge from the cocoons during late June and early July, soon mate, lay their eggs and die.

Nature provides many a counterpoise to keep her machinery balanced; the rapid increase of injurious insects can not long continue without opposition. Climatic conditions may soon check the spread of these caterpillars; many species of birds prey upon the insect in its various stages; two or three beetles and three bugs are known to devour the caterpillars or their eggs; more than ten species of insects lay their eggs within caterpillars or cocoons so that their larvæ may feed upon the juices of the doomed pupæ; and a bacterial disease materially reduced the numbers of this pest during the past season. Of these agencies probably only the birds can be encouraged by the farmer; for beneficial insects and diseases require too careful handling for any but experts to manage. The birds we can protect and encourage, and all should join in the movement. Chickadees, cuckoos, American red start, Baltimore oriole, cat bird, robin, chipping sparrow, vireos, cedarbird, nuthatches, yellow birds and even the despised English sparrow are known to feed upon caterpillars or eggs; and all but the last should be made to feel our farms and woodlands their safe homes.

Like the apple tree tent-caterpillar, this pest can be combatted in all its stages; but its distribution in the forests, upon tall shade trees and in the orchards renders the problem complex. In the orchard and upon small shadetrees much may be effected by destroying the egg masses, by poisoning the caterpillars with arsenical sprays, by jarring the caterpillars from the trees and capturing them in curculio carts or sheets spread on the ground or preventing their return by bands of sticky material wrapped about the trunks, by killing them when collected in groups on the trunks and branches, and by collecting the cocoons.

The egg masses are quite large and distinct, and their glistening, frothy cover makes them quite conspicuous to the trained eye. They should be destroyed during apple picking, pruning, and all winter operations upon fruit or shade trees. If the

insects have been numerous it will probably pay to make a special search for the egg masses in infested localities.

Spraying is the most effectual remedy. A thorough coating of the leaves with Paris green, London purple, green arsenite or arsenite of lime (see Bulletins 143 and 152) when the young caterpillars are at work will get rid of most of them. Arsenate of lead has been found very effective by the Massachusetts Gipsy Moth Commission, and does not harm the foliage. This is made by dissolving in separate *wooden* (not metal) pails 11 ounces acetate of lead in 4 quarts of hot water, and 4 ounces arsenate of soda (50 per ct.) in 2 quarts of hot water. When dissolved mix in a hogs-head containing 150 gallons of water. The solution can be made stronger by mixing with less water, but the proportions of acetate of lead and arsenate of soda (11 to 4) must always be maintained. For spraying large shade trees a steam sprayer may be necessary; but it will be a wise investment for any town, the beauty of whose shade trees the caterpillars threaten.

The caterpillars clustered upon trunks or branches may be killed in any convenient way. Swabbing with an old broom stub soaked in kerosene is perhaps as effective and convenient as any.

Jarring is practicable only with small trees. With these a quick sharp blow with a padded mallet will bring the caterpillars down to the sheets or curculio cart below. To prevent the return of stragglers and the coming of restless invaders from neighboring orchards or forests a wide band of cotton wool, sticky fly paper, sheets covered with tar and oil (tar 1, raw oil 2) or raupenleim should be wrapped closely about the trunk. The sticky substances should be placed on strips of paper, not applied directly to the bark, and should be renewed when the caterpillars bridge them.

The cocoons are even more conspicuous than the eggs and should be gathered and destroyed. It may be well to place them in a box till the moths hatch, preventing their escape by netting. By so doing all parasites will be allowed to mature, and slipping through the netting, will continue their good work.

When the insects are at work in forests over wide areas little can be done by individual effort. Banding the trees will be of value, and many caterpillars may be destroyed on the trunks by swabbing.