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A FEW FRUIT-TREE FOES.

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

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POPULAR EDITION*
OF
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A FEW FRUIT-TREE FOES.

F. H. HALL.

THE FOREST TENT-CATERPILLAR.

The "maple worms" seem unsatisfied with the diet **From forests** which this name implies. The forests, even, **no to fruit-trees.** longer content them; but, with discriminating appetites, they have found that fruit-tree foliage is good; and they are coming more and more to gratify their voracity in the orchards. This is especially true where the orchards lie adjacent to infested forests, groves and shade trees; for many instances were observed or were reported to the Station last season, where countless numbers of the pretty, if destructive, caterpillars (Figs. 1 and 2, Plate I), were seen marching along the fences, even wire fences, or over the ground, from the partially stripped forests or groves to the adjacent orchards with their fresh foliage of apple, pear, peach or plum.

In such cases much may be done to protect the **Protection.** favorite fruit trees, so threatened by the devouring thousands, by surrounding the tree trunks with barriers to check the caterpillars or bands to catch them. For the latter purpose sticky fly-paper may be used; or bands of tough paper smeared thickly with tar (1 part) and raw oil (2 parts), with lard and sulphur in equal parts, or with raupen-

*This is a brief review of Bulletin No. 180 of this Station, entitled Miscellaneous Notes on Injurious Insects, by V. H. Lowe. Anyone especially interested in any of the insects discussed will be furnished, on application, with a copy of the complete bulletin. The names of those who so request will be placed upon the Station mailing list to receive future bulletins, popular or complete as desired. Bulletins are issued at irregular intervals, as investigations are completed, not monthly.

leim. These bands should be at least one foot wide. Belts of cotton, wool or waste, collars of tin with flaring lower edges, or the insect traps now on the market, make effective obstructions to the ascent of the caterpillars, whether they come from other trees or have been washed from the protected trees and seek to reascend. Water from city hydrants may be made quite effective to wash these pests from shade trees within reach ; but this does not kill the "worms" or destroy the brood for next season. It only prevents their ravages upon the few trees thus guarded.

In orchards and on small shade trees, or even on large ones in a city earnest enough in its warfare against the caterpillars to buy a power sprayer, the use of arsenites is the most efficient and satisfactory method to get ahead of the little devourers. The "little" is here used advisedly and merits memorizing ; for the *young* caterpillars are quite susceptible to poison and are easily destroyed by keeping a small amount of arsenite thinly distributed over the leaves. The *old* larvæ, however, after they are perhaps an inch long, seem hardened in their destructiveness, and difficult to kill, even when fed poison in quite large quantities. Early watchfulness, to detect the little pests on their first appearance, which will be almost with spring's first warm days, is much more valuable than later hard work. Any of the arsenites, thoroughly applied, will do good service. Paris green and arsenite of lime are satisfactory ; but for some reasons arsenate of lead is better ; as it sticks to the foliage longer and seems more certain. This may now be obtained, already prepared, from some of the wholesale dealers in insecticides ; or it may be made at home by following the directions given in Bulletin 159.

Use as much care as we may, however, some of the caterpillars will escape the poison, will eat their fill and gain full size ; when they often collect in masses on the trunks of trees and may easily be killed with a light application of kerosene from a sprayer or from a cruder implement like an old broom or a swab. Killing them at this time does not prevent the damage of the current season, but it lessens the probability of greater numbers the following season. So also the silken cocoons, which are formed in late May or early

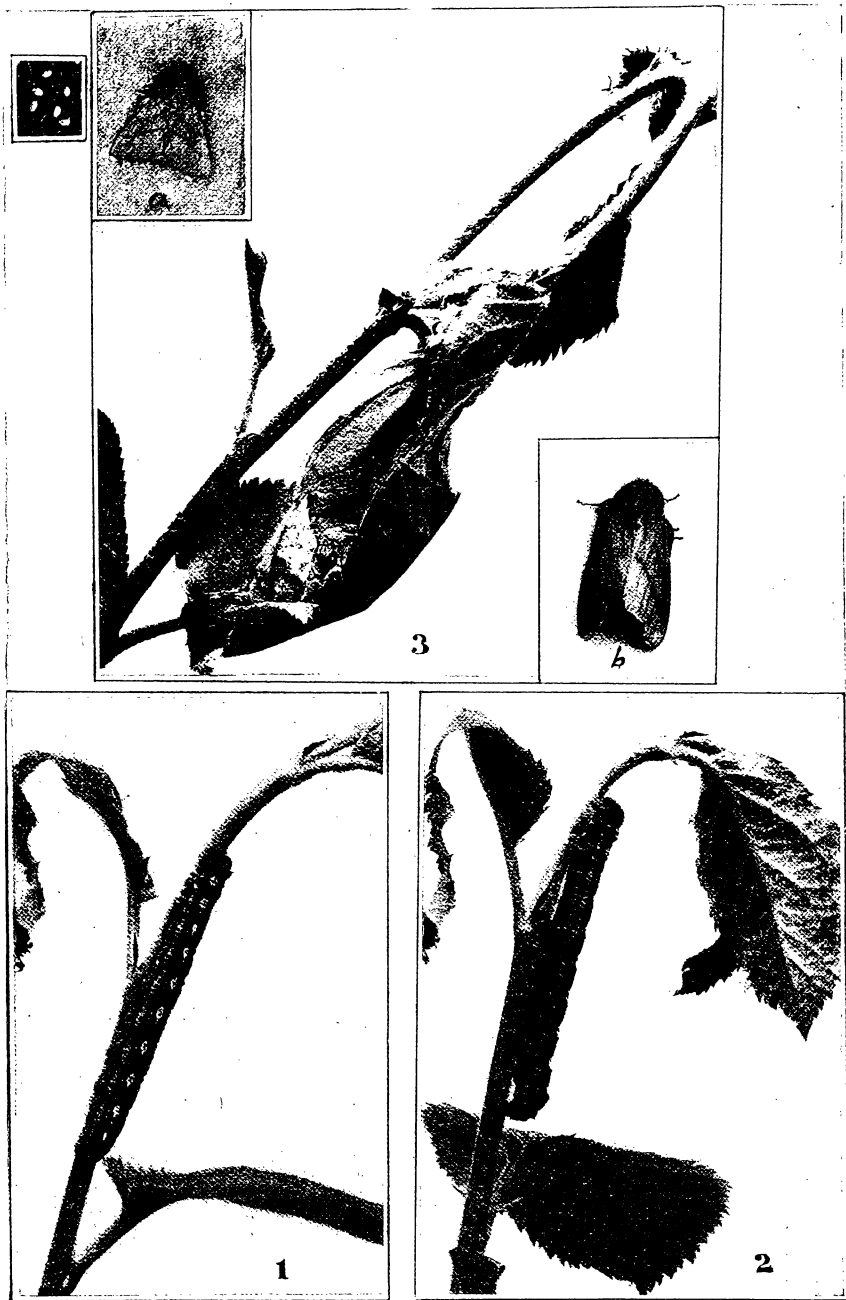


PLATE I.—LARVÆ, COCOON AND MOTHS OF FOREST TENT-CATERPILLAR.

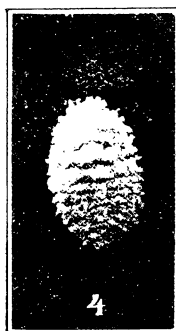
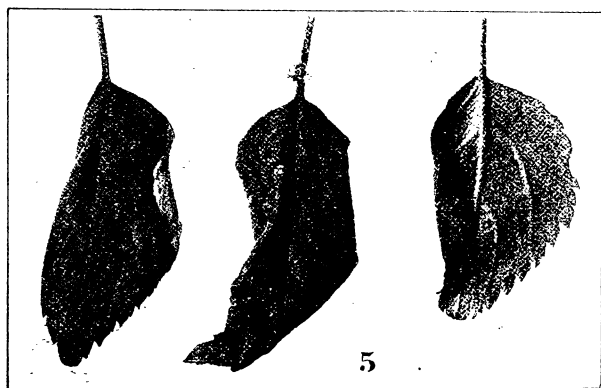
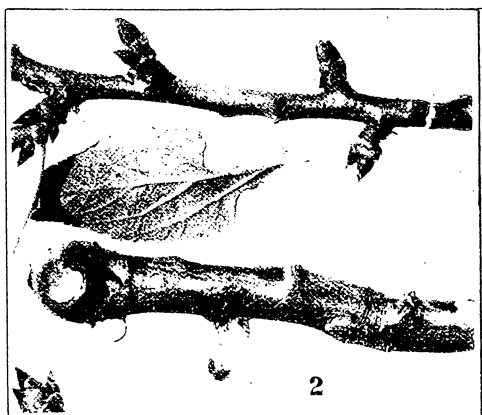


PLATE II.—1-3, WORK OF FRUIT BARK-BEETLE ; 4, ENLARGED QUINCE MEALY-BUG ; 5, WORK OF APPLE LEAF MINERS.

June should be destroyed whenever found. It is often a very helpful plan to enlist the children in this collecting by offering a small sum for each quart of cocoons, or each hundred. Do not burn these cocoons. Put them in a barrel or box covered with netting; so that the parasites, which often hatch in the bodies of the pupæ within the cocoons, may escape, and the moths be shut in. The parasites are our best friends in this warfare with injurious insects. The cocoons will often be found rolled up in a leaf, therefore all distorted leaves should be included in our hunt for these, our enemies. Plate I, Fig. 3, shows a cocoon thus cleverly protected by a leaf. Again *prompt* action is necessary, for the moths Fig. 3, *a* and *b*, will have escaped from the cocoons within two weeks or so after the caterpillars leave the tree, and will soon have deposited the eggs from which the destroyers of the next spring come. One other resource still remains: These eggs are laid in little bands about the twigs, which are quite easily seen; and the destruction of each egg-mass means from 150 to 300 or more caterpillars less on the tree in the spring. In infested orchards these grayish or brownish, smooth, glistening bands, looking like excrescences on the twigs, should be sought whenever winter work is done in the orchard; and it frequently pays to make a special inspection of the trees to free them from these egg-masses.

THE FRUIT BARK-BEETLE.

Probably all orchardists, especially those growing peaches or plums, are familiar with the shot-hole punctures of the bark and the fret-work of tunnels and galleries which lie just beneath it, in dying and dead trees. This work of the fruit bark-beetle is frequently so extensive that large sections of the bark of trees only a short time dead can be easily detached, so completely has the burrowing of the beetles destroyed the tissues connecting bark and wood. It has been the common observation, however, that it is only upon dead, dying, or greatly-weakened trees that these beetles work; so they were not regarded as a very serious pest. Within a few years, however, the beetles, like the forest tent-caterpillars, seem to have extended their field; and in so doing they have become more serious enemies. They are now known to attack vigorous,

**Old foe in
new role.**

healthy trees, boring into both trunk and branches. In peach orchards in Niagara County their work has been startling during the past season, nearly every tree in some large orchards presenting over its entire trunk and large limbs near the trunk the appearance shown on a small section of bark at Plate II, Fig. 3. The beetles, by boring small holes through the healthy, growing bark, have set up an irritation in it; and the sap has been poured forth freely and has hardened into the gummy, toadstool like excrescences which disgust the eye and which harbor fungi and bacteria to further imperil the health of the trees. The loss of sap from punctures so numerous as this illustration shows, must be a severe drain on the trees; and as the weakened trees are the natural feeding grounds of the insects, the danger from their attacks is an increasing one. These trees so badly infested in the trunks, were not much troubled with punctures in the branches and twigs; but peach, plum, and cherry trees in other localities lost many leaves and small branches from punctures at the base of the bud or branch, without much injury to trunks and larger branches. The withered leaves, which indicate the presence of the beetles, are shown on the title page; a "shot-hole" at the base of a bud in Plate II, Fig. 1, and punctures in the twigs, with accompanying drops of hardened sap, at Fig. 2.

The beetles are small, less than a quarter-inch in length, rather broad for their length, and reddish-brown in color when young, black when older. Their life-history has not been fully worked out, but the broods probably overlap, as eggs, young larvæ, and beetles preparing to hibernate, were found in the burrows late in the fall. Both mature and immature forms feed in the burrows, and seem to prefer dry, if not dead, bark and cambium. A heavy rain which thoroughly soaked the bark of the trees seemed to check the feeding of the insects.

As the beetles feed and breed most freely in dead trees, all such trees should be taken out and burned; and brush should not be allowed to accumulate in piles anywhere near an orchard. One very bad attack in a Niagara County orchard could be traced directly to a brush pile in one corner of the field. All twigs and small

branches which show dead leaves along the twig, drops of sap exuded from the punctures or other traces of the beetles, should be cut off and burned to get rid of the eggs, larvæ and hibernating adults. As a preventive measure, coating the trunks of the trees with a caustic wash will be found effective. This should be applied once or twice about the middle of July; and may consist of whale-oil soap solution, two pounds to the gallon of water, with two ounces of carbolic acid added.

A QUINCE MEALY-BUG.

A minor pest. A quince orchard near Geneva was found to be infested, early in April with numbers of the little plant-louse-like bugs, of which one is shown, enlarged, in Plate II, Fig. 4. A group of the insects, natural size, is shown in the upper left-hand corner of Plate I. Nearly all of the trees showed some of the tiny, powder-covered, soft-bodied, wingless bugs; but none of them were so infested as to be perceptibly injured. These bugs are quite similar in structure and feeding habits to the plant lice; but unlike the lice, they are produced from eggs, and their mature form is not unlike that first hatched, except that the larvæ at first are pink in color, while the adults are white from their covering of powder. The eggs are laid along in late June and early July, and are placed in a double-walled cocoon of silk.

As these bugs are soft bodied and live openly on the twigs during spring and early summer, they can easily be controlled by spraying with whale-oil-soap solution, 1 to 5. The arsenites would have no effect, as, like all bugs, these meal-coated ones draw their food from beneath the surface. Where there is loose bark, scraping the trunks and branches to uncover the insects and egg cocoons, and painting the wood in winter with strong whale-oil-soap solution will be of benefit.

APPLE LEAF MINERS.

Leaf miners, those minute caterpillars or grubs **Uncommonly** which spend their lives between the surfaces of a **numerous.** thin leaf, are among the most common and at the same time most interesting of insects. Usually, however, they are not numerous enough to attract attention; so

their marvellous pits and galleries and tents and silk-lined tunnels pass unheeded. Two species were noted in special abundance on apple trees in western New York this past season ; but even when common, they do not begin their work until the leaves have nearly fulfilled their mission ; so little damage is done. Both species make their mines in the upper face of the leaf. That of one species is long, rather narrow and tentiform and distorts the leaf ; while that of the other species is much smaller, is trumpet shaped, and is plainly marked by the reddish-brown, dead, dried tissue of the leaf which covers it. The larva of the first species leaves the old mine when ready to pupate and spins a cocoon under the protection of the folded edge of a leaf which it skilfully draws over itself by threads of silk attached to the little teeth along the edge of the leaf. Plate II, Fig. 5. It feeds for some time in this retreat, but finally lines it most delicately and softly with silk and passes into the chrysalis state to spend the winter. Less is known of the second species, but it is believed to spend its entire immature life in the same mine, hibernating in the larval state.

As these little caterpillars live so completely shut away from poisons or caustic sprays, the most appropriate method of lessening their numbers is by destroying the fallen leaves, either by burning or by plowing under.

INJURY TO PEACHES BY TARNISHED PLANT-BUG.

The tarnished plant-bug is responsible for injuries to many plants, though it frequently does not receive all the discredit it deserves, its work being sometimes mistaken for disease. In the instance here recorded a new subject for attack has been found in young peach fruits. The insects seemed to come into the orchard of Elberta peaches from an adjoining woods of oak and chestnut. They worked mostly from the underside of the fruits, driving in their beaks and sucking out the juices. From the punctures the sap exudes causing a withering of the fruits. Many peaches were quite badly deformed by the work of the bugs. They appeared about June 10 and left late in the month.