

and night. Wheat and oats are their favorite plants, rye and barley less. They also feed on millet and corn when young and tender, but have no inclination for peas, beans, strawberry or grape foliage, unless forced. They can be made to eat beets, carrots, lettuce, radish, and cabbage, but their favorite food is the grasses and grains. In a hayfield they will leave the clover and devour every plant of timothy.

The writer had some caterpillars in a box with green pea plants and they did not eat a single leaf for two days, and then only nibbled some. Having become fully-developed caterpillars at the end of three or four weeks from the time of being hatched, they pass into the ground, just below the surface, or under stones, boards, or other rubbish, and enter the pupa stage, which lasts about two weeks, when the moth (*imago*) appears to lay her eggs shortly after. It is fawn-colored, with a small white spot near the center of the front wings; these, when spread, measure about 1½ inches across. The moth remains hidden during the day and begins to fly about towards night. The female lays from 300 to 600 eggs, in stringlike masses, 15 to 20 in a line. These hatch in about a week after being laid. It is a matter of great surprise to many how the army worms appear and disappear so suddenly, but a little reflection upon their life history explains the cause.

Hidden in the grass by day and feeding only at night, they escape observation; but if one or more dry seasons come they multiply rapidly, and large numbers winter in the larval condition, and during the following spring the moths appear and lay a great number of eggs, which hatch and produce a countless host of caterpillars, which for the want of food are forced to march, and thus become suddenly conspicuous. These, having received full development, pass into the ground to enter the pupa stage, and thus disappear as suddenly. The moths feed on the nectar of flowers, which they are more likely to find near low ground, and hence they appear to come from such places at the outset. There seems to be three generations represented in a season, or two broods in the year, here: the first wintering in the larval condition; the second forms the "armies"; and the third larval form derived from these after the imago (moth) has been developed; the last wintering as larvae. They usually hibernate in the larval form, but sometimes as the moth, and in some cases the pupa.

This insect has many enemies to keep it under control. Nearly all insectivorous birds relish it as a sweet morsel, and are ready to pounce upon it the moment the march begins. The bobolink in some parts of the United States is known as the army-worm bird. At Guelph this season the English sparrow has done great work in destroying this worm. Tiger beetles (*Cicindela*) and ground beetles are also ready to prey upon them; one of the latter (*Calosoma*) was found very plentiful among the worms at work on the College



Calosoma calidum—the beetle. [After Riley.]



Cicindela sp. [After Riley.]

Farm. But probably one of the greatest insect friends is a fly, the red-tailed Tachina fly (*Nemora leucutaria*). It lays one or more eggs near the head of the worm, in a position not readily reached by the insect to tear it off; these soon hatch, get into the worm, and feed upon it, and develop at the expense of the worm's life. At first none of the minute white eggs could be seen upon the worms attacking the oats at the College, but in a few days some were observed by the writer, and indicated that the chief deliverer had arrived. They daily increased, and the dissection of several specimens revealed the parasitic grub was happily at work, and that the invading host was doomed to perish by the way.

This beneficial fly resembles a large house fly, but has a red tip at the end of its body. There are also some small four-winged flies that aid in keeping this enemy under. Altogether there have been found upwards of twenty insects that attack and greatly assist in destroying the army worm. It will thus be seen that the moment these worms emerge from their hiding-places in grass fields, etc., they are pursued by a host of relentless foes.

Remedies.—1. As the insects breed largely in rank grass, such as is seen bordering swamps, it is well, where practicable, to burn such in the fall or spring. Clean cultivation and cleaning up fence-corners should be followed.

2. Where the worm has appeared, its progress may be stopped by plowing a furrow with its perpendicular side next the field to be protected. Small holes dug at intervals in the furrow will be useful in catching the worms failing to climb the steep sides and wandering aimlessly along the furrows. The number of worms trapped can be readily destroyed.

3. Where Paris green may be safely used, a strong mixture (one pound to 75 gallons of water) sprayed upon the plants likely to be first attacked will be effective. Windrows of green oats sprinkled in this way in the line of march will destroy myriads as they feed upon their favorite food. At the College immense numbers were destroyed in this way in a few hours. By actual count made by me on July 18th, 2,560 dead worms lay on a single square foot beneath the windrows.

4. Scattering dry straw upon the worms, where massed together, may be fired and many destroyed.

5. Sometimes conditions are such that great numbers may be crushed under a roller.

GARDEN AND ORCHARD.

Pear and Apple Blight.

There will have been noticed in many parts of Ontario, but especially in the vicinities of Hamilton and London, a species of pear blight which threatens to wipe out the pear trees as did the black knot the cherry trees in many sections a few years ago. The services of Prof. J. H. Panton, M.A., of the Ontario Agricultural College, have been demanded in some infested sections, where he has gone and reports as follows:—

"The trouble is caused by a germ known to science as *micrococcus amylovorus*. The terms 'pear blight,' 'twig blight,' and 'fire blight' are applied to this condition in fruit trees: the first to the attack upon the pear, the others when it affects the apples. It also attacks the quince. This bacterial disease causes the foliage to turn to a uniform brown, sometimes in two or three days. The leaves do not fall, but remain on the branches, giving the parts affected the appearance of having been scorched by fire; hence the term 'fire blight,' sometimes applied to the disease. The bark of affected stems becomes brown and shrunken. The microscopic germ which causes this trouble enters the tree through the blossoms, and also through the growing tips. The injury may be confined to one or a few limbs, or it may extend to the whole tree. Slow growing trees seem less liable to injury by blight than those of rapid growth; hence the importance of a steady growth in fruit trees. After the germs gain access to the tissues of the tree they multiply rapidly and in a short time show their presence by the dark, discolored bark. Unfortunately, as yet there is no known remedy, the only way of checking the disease being to cut out affected parts, about a foot below the lowest point of injury, and burn the refuse. It is a great mistake to simply cut out the twigs, etc., and throw them aside. They are full of germs, and should be burned, or they will soon scatter about and increase the trouble. Constant watchfulness and care are now necessary to raise fruit. Insect foes and injurious fungi have become very common, so that if we wish to be successful it is necessary to follow clean culture, which deprives insects of hiding-places and fungi protection, and we must spray promptly and thoroughly. Healthy trees always resist insect and fungoid pests much more successfully than those less vigorous."

VETERINARY.

Swine Fever.

About the middle of July an outbreak of swine fever—or, as it is sometimes called, "hog cholera"—made its appearance in the County of Cornwall, Ont. The Dominion veterinary officers promptly slaughtered and burned some 200 animals; the owner, who had secured them from the western portion of the Province, being compensated therefor according to the statute. Within the last fortnight another outbreak made its appearance in a large piggery near Toronto, for which hogs are purchased on the market for fattening. Just after purchase some of the pigs began to show signs of weakness, labored breathing, death following in a few days. One veterinary who was called in said the trouble was due to too strong feed, and recommended a change of diet, but no benefit resulted. Dr. Andrew Smith, head of the Ontario Veterinary College, next made an examination, and pronounced the disorder "cholera," ordering the whole lot of 258 destroyed.

In both the above cases not only were the hogs cremated, but all portions of the buildings with which they came in contact were burned and the entire premises thoroughly disinfected.

It is thought that the above cases originated from lingering germs of the Essex Co. outbreak last fall, which was supposed in some way to have come from Michigan or the Western States, where the disorder was prevalent at that time. These instances but emphasize the necessity for effective machinery for detecting and stamping out animal disorders, and preventing their gaining access to our herds. No half-hearted measures on the part of the authorities (such as in cases of cholera—burying the dead swine and covering with lime) will answer. Persons purchasing stock for feeding or other purposes cannot be too careful that it comes from a locality out of the reach of contagion.

The man that would have sound, nicely-formed hoofs on his horses when he comes to sell them, must give attention to the hoofs of his colts.

The Abuse of Tuberculin.

Prof. Brown, the eminent British veterinary authority, has recently expressed a warning regarding the use (or, rather, abuse) of tuberculin, pointing out, in the first place, that it is a poison. Of course, it should always be borne in mind that tuberculin is not a remedy, but simply an aid in determining whether or not an animal is affected with tuberculosis. Another point not to be overlooked is that the injection of tuberculin has caused the distribution of the tubercle bacillus to parts of the body in which it had not been previously detected. Prof. Brown also points out that there is reason to believe that repeated injections will render an animal insusceptible to the action of tuberculin, so that an unscrupulous individual might be enabled, by repeated injections, to palm off diseased cows, that had in the first instance reacted under the test, and so defraud and inflict great injury upon the purchaser. The *ADVOCATE* takes the same ground regarding tuberculin now that it has all along, viz., that while there is evidently so much to be learned regarding the use and effects of tuberculin, its use as a diagnostic agent, except by competent, experienced hands, should not be attempted.

APIARY.

The Prevention of Swarming.

No bee-keeper wants swarms to come off after this time of year, as they cannot, as a rule, gather enough stores to support themselves during the coming winter. It is therefore well to understand how to prevent swarming, when desired, at all seasons.

Mr. C. P. Dadant gives good advice upon this subject in the "American Bee Journal," from which we glean:—

"Liberal breeding-room is necessary. No matter what method we pursue, if the queen is crowded or dissatisfied we need not look for the bees to stay. We therefore want plenty of room in the brood-chamber space, and we want it all in one story. In the second place, we want plenty of room and, if possible, plenty of empty comb for the bees to lodge their crop, especially during the honey flow. Hence we want a wide ceiling that may enable us to put on a large super. Bees swarm because the circumstances do not suit them. Towards the end of the harvest, however, when the queen becomes tired of incessant egg-laying, it is of much less importance to keep them supplied with so much space, and a little crowding does them no harm.

"Drone-rearing is a factor in swarming. In nearly every instance the colonies that swarm are those that have reared quite a large number of drones, other things being equal. The drone is stupid, big, and noisy, and becomes a thorn in the side of the workers, hence their dissatisfaction

with home surroundings. It is therefore well to prevent the hatching of a lot of drones by removing the drone-comb and replacing it with worker-comb. This should be done in the spring, as a preventive, as the harm from such a cause is done for this season.

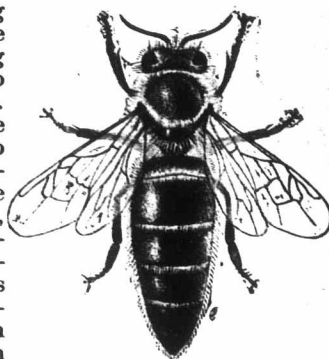
"Shade is an important factor in preventing swarming. A high temperature, increased by a pouring sun, must of necessity add to the discomfort of a swarm of bees.

"Ventilation, too, must be given. When bees come out and cluster at the bottom of the front of the hive, they are usually after fresh air. This hinders time and promotes a tendency to divide the family. A loose bottom enables the bee-keeper to raise the hive up whenever needed, and to give as much space for ventilation as may be necessary."

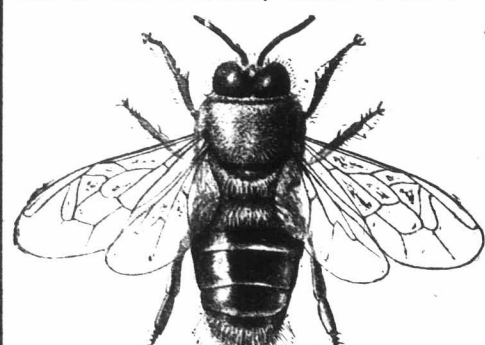
We are indebted to the U. S. Dept. of Agriculture for the use of the above bee illustrations. The bees represented are shown twice natural size.



[Worker—Carniolan.]



[Queen—Carniolan.]



[Drone—Carniolan.]