

Several braconid-flies are parasitic upon plant lice, aphids. Search for aphids and collect them from a variety of plants, as lamb's quarters, nasturtium, fruit trees, hop vines, and from garden plants on which they are often found in abundance. Take them upon pieces of plants placed in fruit jars to school for study. How many kinds can you find? Note that there are usually winged and wingless forms in each kind. On alder twigs you will find a white woolly species; examine them closely.

Make yourself familiar with their interesting life history as told in any good work on zoology. (*Life Histories of American Insects*, Weed. Macmillan Company, is especially good as a teacher's book.)

Examine aphids under a hand lens, and note their markings, and the projecting tubes or cornicles from the posterior and dorsal region of the abdomen. What insect is usually found associated with aphids? Ants are attracted by a sweet secretion from these little animals called honeydew, but the ladybird beetle and its larva are there for other reasons. For what reason? Isolate a few aphids with the ladybird and its larva, count them every day, and you will find your answer.

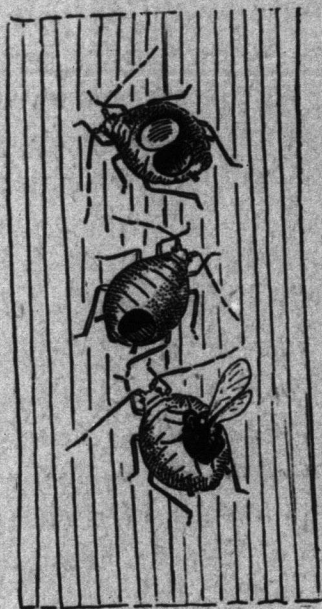


Fig. 3. Dead green aphids, showing holes from which parasites emerge. (Much enlarged)

Look for parasitized aphids; they are readily distinguished by their enlarged abdomen and lighter color. Keep several in a well covered fruit jar, and in a few days the small flies will appear. Where did the flies come from? Examine the aphids closely for your answer.

See Fig. 3 for braconid parasites and aphid hosts.

A similar little four-winged form, the chalcis-fly, is parasitic on the cabbage-worm and many other injurious insects. A single chrysalis of the cabbage-worm will often yield dozens of these little flies.

The parasitic forms mentioned are among our most beneficial insects, since they tend to keep in check many injurious forms. Here are subjects for composition exercises, which can easily have some basis in personal observation.

These parasitic forms, along with wasps, bees, and ants, belong to the order hymenoptera.

Observing proper care, capture several wasps and bees in glass tumblers, and carefully cover and use for school purposes. Note that they have four wings, all of the same texture, and that in flying they are not used separately but are joined together on each side. The wings are held together by small hooks which may be seen when enlarged under the microscope. Look for them. Are the hooks on the fore, or the hind wing?

In a study of wasps we may roughly divide them into two groups,—the solitary wasps, which live alone, and use mud in building their nests, and the social wasps, which live in communities, and build their nests of wood pulp, paper, which they prepare by chewing shreds of weathered wood, collected from buildings, fences and stumps, and mixing with it a gelatinous secretion to make it tenacious and waterproof.

Solitary wasps are known as miners, carpenters, or masons, according as they respectively make their nests in tunnels in the earth, in excavated cavities in wood, or locate them in suitable places around the walls of buildings, fences, etc.

The masons or mud-daubers are common. Search for their nests, open them, and examine the contents. These nests are provisioned with paralyzed spiders. The mother wasp seems to know that her baby wasp thrives best on fresh living food, and she possesses the secret art by stinging her victims just enough in a certain ganglion to paralyze without killing them, so that they remain alive till devoured by the young larva. After filling the nest with such food, she deposits an egg, then seals up the mud house and departs, giving no further attention to the young.

Social wasps live in colonies containing females,