

IV.—The Cabbage Butterfly is found in abundance. Note its manner of depositing its eggs in the nasturtium or cabbage. Watch it flitting over these plants on bright days. What is it doing? How many eggs in a bunch? Examine an egg under a hand lens, noting its markings and shape.

In Bird study the crow, robin, and bluejay are in evidence.

In more advanced classes the life history and life cycle of the Cabbage Butterfly and Housefly should be attempted.

In the study of Cabbage Butterfly learn to distinguish male from female. The male shows one round black spot on the fore wing; the female two. For the life cycle begin with the egg, which hatches into the larva, the green worm, the chief feeding stage of the animal, then its resting stage, pupal stage, in which it remains during the winter, and finally its adult or winged form, the imago.

Diagram this cycle on the board, leaving spaces for the insertion of the name of the stage at the beginning of each quadrant. This presents the life history in a striking form, and affords good subjects for composition work for older pupils.

Encourage the capture of a number of Cabbage Butterfly larvae. Place in a cage made from an empty chalk box, filled with a wire-cloth cover, supply fresh cabbage or nasturtium leaves each day, removing the old ones. Notice their feeding habits, and their passing into the pupal stage. Keep cage in a cool place for spring work. The butterfly will come out in April or early May, or much earlier if cage is kept in warm school room. Search for similar pupae on fences and buildings near turnip or cabbage fields or nasturtium beds. Is it natural for the pupae to be exposed to cold during winter? Take your hint from nature, and copy as far as possible natural conditions.

As the Housefly passes through its life cycle in about fifteen days it presents some advantages over the Cabbage Butterfly. It deposits its eggs on fresh horse manure. These hatch within a day into smooth, white conical, footless larva, called maggots. The larva feed for about a week and then pass into the pupal stage, and in a week more the adult or winged form appears. With but little care students can see all these changes, and can collect and preserve the specimens from each stage.

High School grades should study the Potato-Beetle in a similar way. Here the life cycle is

also of short duration. The larvae "soft-bugs," should be placed in a cage with the ends also of wire cloth, and the cage placed on end with about four inches of moist earth from the potato field in it. You will get best results by placing the cage in earth in the garden to the depth of four inches in order to keep the earth in it properly moist. Feed your larvae with potato leaves. If you selected large larvae they will soon burrow in the earth, and in a few weeks the adult, winged form will appear.

Another striped beetle, somewhat like the Potato-Beetle, as to color, though very much smaller, is found on pumpkin, squash and cucumber vines. It is the Striped Cucumber-Beetle.

How does it compare in activity with the Potato-Beetle? The striped Beetles are the adult or winged forms. Have you ever found the larva? In the Potato-Beetle the larvae are common and are the chief source of injury to our crops; in the Striped-Beetle the adults eat the young leaves of our cucumbers, squash, etc., and even search out the sprouting seeds and by nipping off the young sprouts destroy the plant before it is even out of the ground. Further, when the vines have grown large we often find one that begins to wilt and finally dies outright. No wound or injury is to be found in the vine above ground, but upon carefully examining the roots they are found to be pierced here and there with small holes. Examine carefully and you will detect the cause, either embedded in the root or lurking close by. They are little whitish worms about a third of an inch long, and as thick as a good sized pin; the head is of brownish black and horny, and there is a plate of same color and consistency on the last segment. These are the larvae of the Striped-Beetle. The eggs are deposited near the roots. When full grown the larvae leave the roots and pupate in the surrounding earth, and after about three weeks the adult forms appear.

Work may also be undertaken on the larva of insects infesting apples, and peas.

Directions for making apparatus:

A good poison bottle for insects is made by placing about half an ounce of potassium cyanide broken in small pieces, in a wide mouth bottle — a vaseline bottle does very well for all save the larger moths and butterflies. Moisten with water, place over it enough cotton to give a level padded surface, and force down a disk of tightly fitting sheet cork or