

opens by a lid-like cover at one end and out comes a little four-winged fly, one of its parasites. By means of a long sting-like ovipositor these flies pierce the skin and deposit eggs in the caterpillar. The eggs hatch into small maggots, which feed and grow, and finally come to the surface as already described. The sting of wasps and bees is merely a modified ovipositor; nature has modified it for another use, and many of us have learned how well it serves its new purpose of defence.

But this pest has another parasitic enemy that helps to keep it in check — and keeps the balance of nature true. This enemy searches it out and deposits its eggs in the pupae. The eggs hatch, and the little parasitic larvae feed upon the tissue of the developing butterfly; they grow and finally change into their adult form, and then emerge into the light as little bronze-colored flies.

Exercises in the Life History of the Cabbage Butterfly. (Modified from exercises given in *Elementary Entomology*, by Sanderson and Jackson).

**MATERIAL.** These instructions are given for the study of the cabbage butterfly, though they may be applied to any other butterfly or moth, substituting, of course, the proper food plants, etc.

Each student should be provided with a flower-pot in which is growing a young cabbage or nasturtium plant. If the work is begun by the middle of September the butterflies should be collected and one pair placed in each of a number of breeding cages, with a young plant in each cage. Make daily observations for the presence of eggs. Observe how long it takes them to hatch. After they hatch place a lantern globe, the top of which has been covered with cheese-cloth, over each plant.

**Exercise I. Egg deposition.** Student should if possible, determine and make notes of the following points:

1. On what part of the leaf are the eggs deposited?
2. Are they deposited in clusters or singly?
3. The number of eggs deposited by one female.
4. The period of incubation.
5. Describe and make drawings of the eggs.

**Exercise II. Observations on the larvae.**

1. Determine and make notes of the number of molts.
2. Describe each of the larval stages.

**Exercise III. Observations on the pupae.** If possible, observe the transformation of the larvae to the pupal form.

1. Note the location selected for pupation, and the attachment of the pupae.
2. Observe the length of time in the pupal stage, noting the conditions under which they are kept.
3. Draw and describe.

*Note.*— If wanted for immediate use, the pupae should be placed at once, after pupation, in a light warm room, where they will probably emerge in a short time; if to be kept till spring, they should be removed to a cool dark place. Low temperatures are not injurious, but excessive moisture must be avoided. During the first part of April the pupae may be brought out and again placed under observation.

**Exercise IV. The emergence of the adult (butterfly).**

1. Note the date and the method of emergence.
2. Write a brief description of the adult.

#### FOR DICTATION.

which	separate	develop
whether	February	beneficial
grammar	accommodate	embarrass
business	acquiesce	privilege
parallel	judgment	until
management	analysis	lettuce
elm	precede	occasion
divisible	changeable	supersede
occurrence	committee	disappear
mischief	character	pursue
origin	exercise	handkerchief
potato	iron	together
beginning	surprise	thorough
Negroes	descendant	principal
professor	detained	government
analyze	vertical	governor
cleanse	noticeable	prejudice
regretted	miniature	restaurant
curiosity	umbrella	poem
brethren	particular	persevere
arctic	except	adjacent
pumpkin	admittance	recognize
similar	deceit	irrelevant
foreigner	niece	hygiene
seize	chimney	alley
ceiling	capital	necessarily