NATURE STUDY OF ANIMALS.

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Four Questions.

In studying any new animal form the teacher is directed to follow the naturalist's four chief questions, as enunciated by Professor James Arthur Thomson in his pamphlet, "Some Suggestions to Teachers for Seasonal Nature Study."

The first question is *What is this?*—An enquiry into form and structure. What is the living creature in itself and in its parts? What is it as we see it with the unaided eye, and as we see it under a magnifying glass, or a microscope? What is it as a thing by itself, and when compared with its fellows and kindred?

The second question is *How does it act?*—An enquiry into habits and functions — how it acts and goes, and how it sets other creatures like itself acting and going. How does it get on in life, and what is the "particular go" of it?

The third question is *Whence is this?*—An enquiry into development and history. Where did this living creature come from? How did it begin? What was it like when it was young? What are the chapters in its growth and life history? What is known of the history of its race?

The fourth question is *How has it come to be as it is?*—An enquiry into causes. What factors have combined to make this living creature as we find it? What it is, where it is, as it is? In short, what have been the factors of its evolution?

Note the wide field these questions open up to every enquiring thoughtful mind. They are mentioned at this time not for the scholar, but for the teacher. It is her right and duty to first explore this expanse of life and afterwards to experience the joy of leading others into a wider, fuller and freer life.

Black Swallow-Tail Larva.

Apply these questions to the varied animal forms found in our gardens. What is this animal we find crawling on the tops of our carrots and parsnips? It is a caterpillar, a green caterpillar ringed with black and spotted with yellow. Note the appearance of its coat under a hand lens. How beautiful.

How does it act? Note how stupid it seems as it clings to the stalks, but touch its sides with a straw or a pin and note its resentment. The pair of orange coloured horn-like projections thrust out from the head region yield an ill-smelling fluid. They are organs of protection. Have other caterpillars any means of protection? The short hairs that cover some may well be likened to the spines of the porcupine, and the sphinx tries to terrify its enemies by a look. Place several of these caterpillars in a cage, keeping them well supplied with food, and watch them as they pass into the pupal stage. This caterpillar is the larva of a butterfly. Compare the resting stage of the butterfly with that of the moth. How is the pupa attached to its support? Compare it in this respect, with the pupa of the cabbage butterfly, and the mourning cloak.

Preserve several of the larvae and pupae in alcohol, keep other pupae in the cage, and next spring you will have a surprise and be able to procure the winged form, the butterfly. Kill some of these in a cyanide bottle and spread for mounting; feed the others honey, or a thick solution of sugar and they will most likely reward you with eggs. Preserve the eggs in alcohol. The eggs represent another stage in the life cycle of the animal. You have now that cycle complete — eggs, larvae, pupae, and adults or imagoes, as they are often called.

These forms properly arranged answer fairly well the third question — "Whence is this, etc?"

The answer to the fourth question will come in time, but only after patient study. It is the crowning question of biology; allow it to remain open for the present.

The Colorado Potato Beetle.

The Potato Beetle should be taken up at this time of year, and is an easy study for the younger grades.

The first question calls for an examination of its parts. We call it an insect, why? Are butterflies insects? Note that both butterflies and beetles possess jointed legs. How many pairs for each? Note that the body of each is divided into three parts — head, thorax and abdomen. Complete the definition of an insect.

Collect other small animals from ponds and fields, and from under stones and sticks,