flies," the *Nymphalidae,* the largest family of butterflies. Note, also, its wings are notched, hence it is a member of the "Anglewings," the *Vanessids,* a sub-family of the *Nymphalidae,* and its scientific name is *Vanessa antiopa,* and often called the Antiopa Butterfly.

In the outlines for spring and summer work, the larva and life-history of this butterfly will be considered.

In passing, you should notice its habit of playing dead when held in the hand. In this state you may safely move it from hand to hand, drop it to the ground, hang it up by its claws, still it shows no signs of life, but toss it a few feet above your head, it instantly revives and is away in a moment. This curious habit is, undoubtedly, a great protection to the "Yellow Edge," for we know that birds and other animals must be assured by the motion of their prey that it is alive or they disdain it. In your work with animals try to discover how each species protects itself against its enemies. Applying the principle of natural selection to this case, it would be said that in early ages those Antiopas which varied in the direction of this particular form of protection (playing dead when disturbed) have survived, while those that did not were devoured or otherwise destroyed; hence a race exhibiting this characteristic is in existence today. The same principle may also be applied to explain the degeneration of the fore pair of legs mentioned above. In general it is applied to explain degeneration due to parasitism, as well as the development of increased complexity in animal structure. Be on the watch for manifestations of this principle, talk it over with your more advanced pupils in the high school and academy classes. Set them thinking and working, direct their energies, and keep them going.

Other kinds of moths and butterflies may be more readily obtained than those I have mentioned; if so study them, even if names be unknown to you. The name is of little consequence; it will come later.

The Fall Web-Worm.

The Fall Web-Worm is a good subject, and is found at this season infesting fruit-trees. The caterpillars either burrow in the ground or in sheltered crevices just above it, forming slight cocoons of silk, interwoven with hairs from their bodies. Within these cocoons they soon change to chrysalids of a dark-brown colour, smooth, polished, and with a swelling about the middle.

The larva of the Emperor Moth is also near the pupation period. "It is a gigantic creature, from three to four inches long, and nearly as thick as a man's thumb; its colour is pale green; the large warts or tubercles on the third and fourth segments are coral-red. The others on the back are yellow, except those of the second and terminal segments, which in common with the smaller tubercles along the side are blue." Look for those larvæ, feed them on apple leaves; and later watch for cocoons three or four inches long, in shrubbery and fruit-trees. When found take them to your school. The Emperor will come forth in the spring.

We have grouped together moths and butterflies, but we must now make some distinction.

BUTTERFLIES.

1. Day flying, usually.
2. Wings erect when resting.
3. Antennæ knobbed.
4. Pupa a chrysalid.

MOTHS.

1. Night flying, usually.
2. Wings sloping when resting
3. Antennæ not knobbed.
4. Pupa often in a cocoon.

Locusts, Grasshoppers and Crickets.

The insects often spoken of as grasshoppers are not true grasshoppers, but an allied race, the locusts. The two are readily distinguished by the locusts having short antennæ, while the true grasshoppers have thread-like antennæ much longer than their body.

The Katydids.

The Katydids are among the most interesting of our true grass-hoppers. They are large, green, tree-inhabiting insects, and are found throughout our range, though by no means so numerous as in the eastern and central United States. The whole body is of a green colour, and the wings are thin and veined, like a leaf. They afford a good illustration of what is called protective resemblance.

The crickets are widely distributed animals, and are mostly nocturnal in their habits. The chirp is made only by the male, and is produced by rubbing together the anterior wings. The rate of chirp is said to be entirely determined by temperature, so that we can compute the temperature by means of the formula:

$$T = 50 + \frac{N - 40}{4}$$