

and then prepares for a winter's sleep. These preparations consist in the spinning of a large silken cocoon, about three inches long, which is fastened to the side of a twig, and within which the caterpillar coils itself up for a snug slumber.



Fig. 3. Cocoon of Cecropia Moth.

The outer wall of this cocoon is hard and tough—not unlike stout brown paper (Fig. 3), but within is a thick lining of strong silk, and inside this again, is a finer mantle of silk. Search for these cocoons as autumn approaches—look mostly on the branches of currant and raspberry bushes, also willow and poplar twigs; but remember, you may find fine specimens on other plants. The caterpillar, however, changes its form in a wonderful manner, soon after enclosing itself in its silken chamber. A tough, dark-colored shell forms around the body of the creature; and if we carefully remove the cocoon layers, the appearance will be something like that shown in Fig. 4, in which state it is called a *Chrysalis*.



Fig. 4. Chrysalis of Cecropia Moth with Cocoon removed.

This then is the second stage of existence; the caterpillar being the first, after the little creature has hatched from the egg. The chrysalis remains dormant, lying still and eating nothing during the winter months; effectually protected from the cold by its many layers of fairy drapery. As warm weather approaches, however, the little prisoner begins to stir, and soon bursts open its horny shell, its silken wrappings and leathery house, and escapes into the air as a fully developed moth.

Every one of us may witness these changes by catching the caterpillars and preserving them in a large box, and giving them plenty of leaves of the same kind as that on which they were found. A little earth should be put at the bottom of the box, and some dry brushwood above; and then to prevent the escape of the moths when they

mature, a piece of gauze or netting should be drawn over the box.

The changes described in the case of the Cecropia moth, may be witnessed with most other insects. Nearly all pass through changes such as these, differing, however, in detail. For example, only butterflies and moths develop caterpillars from the eggs. Many insects appear first as maggots, and in other forms. In this first stage, the caterpillar, or worm-like stage, the insect is called a *larva*, the word meaning in reality, a mask; because in this form, the insect is in a masked or disguised condition, there being little or no resemblance between this state and the adult form into which it will in time develop. In its sleeping state, the insect is called a *pupa*, the word meaning "baby" and given to the insect in this state because of a supposed resemblance between it and an infant dressed and tucked in its swaddling clothes. The *pupa* of a butterfly or moth is sometimes called a *chrysalis*, from a word meaning bright or golden, because many of them are of a brilliant hue. After escaping from its pupa case, the flying insect is known as an *imago*, because it is now the image, or full representative of its kind.

By way of further illustration, here is a larva or caterpillar, well known as the *potato worm*, on account of its ravenous liking for the potato plant.



Fig. 5. Caterpillar of Hawk Moth.

Is it not a lovely creature? In color it is green, with a number (usually seven or eight) of light-colored stripes on its sides, running in an oblique direction, and a large, curved projection, like a sharp thorn on its tail. When full grown, it measures about three inches. This caterpillar is a huge feeder; and, indeed, eating and growing seem to be the chief business of all larvae. They grow so fast, as a rule, that at short intervals the skin becomes too small; in which case they throw it off, as we would discard a worthless coat, and another covering of more convenient dimensions soon appears. Many insects pass a number of such moults before they reach the pupa state. The potato caterpillar or Hawk Moth larva buries itself in the

ground when about to become a chrysalis. In this condition it is brown in color, with a long projection bent from the head to the breast, and looking not unlike a pitcher handle (Fig. 6).



Fig. 6. Chrysalis of Hawk Moth.

This handle-like projection is in fact the tongue-case, in which the proboscis of the future moth is developing. It remains buried in the ground during the winter, and many of the chrysalids may be found in spring, turned up by the plow. If not disturbed, however, the moth escapes from the case, in May or June, and comes to the surface as a full grown imago. (Fig. 7.)

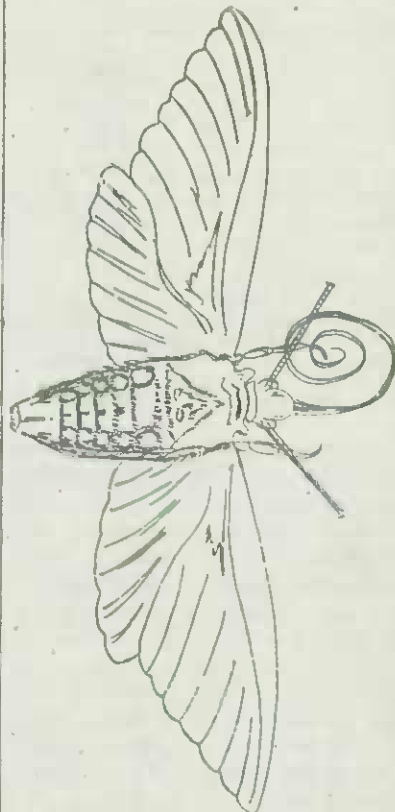


Fig. 7. Hawk Moth.

This is the common Hawk Moth, or as some people name it, the Humming-bird Moth. Its proper name, as recognized by entomologists, is the "Five-Spotted Sphynx." The insect may be seen on summer evenings darting from flower to flower, and hovering over the blossoms with a loud, humming sound, while it inserts its long proboscis, or tongue, and drains the nectar cup of the flowers.

Here (Fig. 8.) is an illustration of the eggs, larva, and imago of the