

When the grub is full-grown, it is of a pale, ochreous colour (darker when dead), with a few hairs scattered over its polished shining skin; it is semi-cylindrical, the back being convex, the belly more flat. It is divided into thirteen rings or divisions—the first of which is the head, on it there are two little horns or antennæ on each side of the mouth, which is small, and behind them a little black speck, which might be mistaken for an eye, but which does not appear to be so, insects which live in the dark usually not being provided with eyes, at least during that portion of their lives which is spent in the dark. The first three divisions or segments after the head, have each two small legs below, making six legs in all; these legs are four-jointed. Each of the divisions, except the two first, has a small breathing hole (spiracle) in each of the front corners—the last division has two larger ones and beneath it a false leg or prehensile foot, which assists it in walking.

THE PUPA OR CHRYSALIS.

After the caterpillar has changed its skin the number of times which nature has assigned, it undergoes another change more surprising still. It leaves the roots of the plants on which it has been feeding, and descends a considerable depth into the ground. It then forms an oval cell a little larger than itself, composed entirely of the surrounding particles of soil glued together, smooth in the inside, but not lined with silk as is the case with many other insects. This cell is called the cocoon. Inside of it, it again goes through the process of casting off or creeping out of its skin, but instead of coming out of the old skin of the same shape as before, it comes out now in a totally different form. It had a mouth before, it has none now. It had legs before, (short and small though they were), these are now gone; and it has entirely the

damp must be incessant, and the growth of the grubs would necessarily be greatly retarded. Judging from the duration of the larval life in other insects, it appears more probable that its real duration in the wireworm is only two or at most three years. It is doubtful whether the grub continues to feed during the winter—some say that they have known wheat suffering from their attacks during the entire winter. This appears doubtful; for during severe frosts they descend into the soil like other grubs which live over the winter, retiring deeper as the cold increases, and remaining in a torpid state till spring returns, when they revive with an appetite proportioned to the duration of their fast.

appearance of a mummy swathed up. We can see the traces of something like parts of a beetle under the skin, as we can see something like the outlines of the limbs and head, but it is a nearly motionless, oblong form.

This state is called the chrysalis or pupa, and while in it, it eats nothing, but remains motionless in its cocoon or cell. This is the stage intermediate between the grub and the beetle, and during it some very mysterious change takes place in its structure. If it is broken open shortly after it has gone into this state, little difference will be found in its structure from that of the grub. But a little later, its tissues will be found to have melted all down into a liquid milk-like pulp, among which, doubtless, traces of the principal nerves and vessels may be found, though the mass is disorganized and structureless. If examined at a still later period, it will be found that the milky pulp assumes the form of the vessels and structure of the beetle. It is like a paper manufactory. The old rags must be reduced into a pulp, before they can be made into the new paper.*

The wireworm usually goes into the pupa state in the month of July, and remains in it two or three weeks, coming out as a beetle about the first fortnight in August. But although this is the ordinary period, it is even more liable to variation than the length of time between the changes of skin in the grub. They often passed the winter

*These facts show that the theory entertained by the older writers, and even still held by some modern authors on the subject of the transformations of insects, is wholly erroneous. They supposed that the outer skin of the grub enclosed a succession of several skins under it each more delicate and soft, and indistinct than the one above it, but gradually like the expanding leaves of buds of plants, growing more substantial as they received more nourishment, and were more exposed to the day. In other words, they likened them to the rider in a circus who throws off one dress after another, appearing successively in a different guise—all the dresses having been ready one below the other from the first. But the laws of the development of organic structure are now better known, and from them we learn, what the pulpy state of the pupa, while preparing for its last change, might have suggested, that there is no such previous storing up or anticipatory preparation of organs or structure, but that each new change, whether a mere change of skin, or a change of form, is developed just as it is required.