

I.

THE BEETLES AND THEIR HABITS.

THE LIFE STAGES.

The Bark-beetles are small, usually cylindric beetles, from one to nine millimetres in length, and brownish or black in colour when mature. They are found in company with their small, whitish, legless grubs, cutting tunnels in the bark or wood of trees. Figures on plates 4 and 5 illustrate types of the tunnels cut by them.

In common with other beetles there are four life stages: the egg, the larva or grub, the pupa or resting stage, and the adult beetle.

The eggs are usually oval, elongate-oval, subglobular, or rarely somewhat elongate; pearly white or translucent and watery; with a very delicate covering when deposited in niches and packed with boring dust, but with a thicker skin when left loose in the galleries (Pl. 3, figs. 1, 3). The surface modifications appear to be of minor importance. They are, of course, very small, but sometimes of an astonishing size in relation to the size of the mother beetle. The eggs of *Cryphalus* are almost as large as the beetle's abdomen.

The larvæ are always legless, whitish in colour, with darker, strongly chitinized head and mandibles, and with the thoracic segments distinctly larger than the others, in the true bark beetles (Pl. 1, fig. 2). In ambrosia-beetles of the genera *Anisandrus* and *Xyleborus*, the larvæ move about freely in the tunnels, and they are more elongate and distinctly more mobile than the others.

The characters of the larvæ will prove of considerable assistance in the classification of the family; and in addition, they are of decided practical value, since not infrequently the larvæ alone are obtainable in material sent in for determination. A discussion of the larval characters, however, must be left for a later publication.

A distinct prepupal, quiescent stage, lasting a few days, is common in the family.

The pupæ are formed in the ends of the larval mines, sometimes in pupal cells. They are white at first, becoming yellowish before transformation. They are variably armed with spines and stiff setæ, and present characters of decided importance (Pl. 1, fig. 3). The adults are yellowish when they emerge from the pupal skin, but rapidly become darker in colour, passing through yellow to reddish and dark brown or nearly black.

PLATE 1.

IPID BEETLES, ALL GREATLY ENLARGED. (ORIGINAL.)

- Fig. 1, *Dendroctonus monticolae* Hopk., upper left.
Fig. 2, *Dendroctonus monticolae* Hopk., larva, upper right.
Fig. 3, *Dendroctonus borealis* Hopk., pupa, right centre.
Fig. 4, *Pityophthorus nitidus* Sw., lower right,
Fig. 5, *Pityophthorus nitidus* Sw., details of the pronotum, left centre, antenna incorrect.
Fig. 6, *Pityophthorus nitidus* Sw., caudal view of the declivity, lower left.