

The adults of the Ambrosia-beetles bestow a certain amount of care upon the young larvæ, furnishing them with the initial supply of food-fungus, referred to below, and removing the excrement from the tunnels outside the cradles.

The chief food of these beetles is a fungus known as Ambrosia, which they propagate within their tunnels. From this habit comes the name "Ambrosia-beetles." The tunnels are kept entirely free from chips and refuse, and the walls are covered by the fungus growth. So far as known, except in the cases of a few closely-allied forms, each species of beetle uses a characteristic species of fungus. The mycelium of the fungus pervades the tissue about the tunnels for one or two millimetres, colouring the wood dark brown or black, so that the tunnels have the appearance "of having been bored with a red-hot wire." By this means the tunnels of Ambrosia-beetles are easily distinguished from those of other wood borers. When new tunnels are cut, the fungus is carried there by the beetles, and started upon the tunnel walls, in some cases in specially-prepared tunnels upon beds of chips and excrement.

When working in large trees some species enlarge the same set of tunnels through several generations; but usually each generation excavates a new abode in dying parts of the same or other trees.

Very few of our timber-beetles enter healthy wood; almost invariably they select trees in which the sap is unhealthy, at least in the portion attacked. Their tunnels admit fungi to the deeper layers of wood, and ruin the timber for the most valuable uses.

THE TWIG-BEETLES.—The Twig-beetles include a few species belonging mainly to the genera *Hypothenemus*, *Pityophthorus* and *Micracis*. They bore into the bark and wood of terminal twigs of trees and shrubs both for food and for breeding purposes. They feed upon the bark and wood, and in some cases apparently upon buds and young shoots. Some engrave the wood surface as do the Bark-beetles; some have in addition deep chambers within the wood; and with others the primary tunnel is cut through the pith itself. With some species the eggs are laid free in the primary tunnels, and the larvæ either feed upon the tunnel walls or cut longer or shorter mines through the wood. Several species of this group have a very close relation to a fungus always found in their tunnels.

A summary of the borrowing habits of these first three groups brings out some interesting relations. Among the Bark-beetles the eggs are usually laid in niches along the sides of the primary tunnels, and the larval mines are usually well-developed. A few species cut their tunnels and mines entirely in the bark;