beetle breeding grounds as the slash, and this should be considered when the burns are being logged. If the fire has occurred in the first half of the season and has charred only the bark near the ground, the timber on a burn must be cut during the first winter following the fire, or not later than the second winter, if anything is to be saved from the grubs of the large wood-borers.* Since the logs will contain these living grubs, even though cut the first winter after the fire, they must be got into water or sawed before spring opens; and when the latter is done the lumber should be dried as rapidly as possible. All green slash and small dying trees on the burn should be piled and burned to prevent the breeding of bark-beetles and other insects. Trees which have been thoroughly charred from base to top may be disregarded in so far as beetle control is concerned. Burns which were made late in the season are, of course, frequently immune from beetle injury, although this is true to a smaller degree in British Columbia than in Eastern Canada.

OTHER FACTORS.

Wind-falls, snow-breaks, and flood injuries provide more or less dying timber for beetle breeding grounds each season, particularly in the mountain sections. Whenever any extensive injury of this kind occurs in government parks or reserves, or on valuable private holdings, it is desirable to have the dying timber utilized or destroyed before it can give forth its crop of destructive beetles.

Natural Control Factors.

The influence of weather conditions upon the broods has already been discussed. The other natural agencies operating to check the development of the beetles in our forests are, parasites of various kinds, predacious insects, birds and fungi.

PARASITES.

Small hymenopterous parasites deposit their eggs on the larvæ or near them in their tunnels, and the young parasites kill the beetle larvæ by feeding upon their body juices (Pl. 19, fig. 2). The larger of these parasitic species deposit their eggs through the thin bark overlying the larval mines in the tops and branches; the minute species enter the egg-tunnels and lay their eggs often in the egg-niches. They affect different species of bark-beetles in varying degrees. The most destructive bark-beetles, breeding in heavy, thick-barked timber, are but little affected by them. On the other hand, some species, such, for instance, as *Leperisinus aculeatus* Say, are frequently very heavily parasitized, and the minute round holes through which the adult parasites eventually emerge from the bark are often thickly interspersed with the exit-holes of the beetles. A few of our species are sometimes heavily parasitized by mites which breed in the mines and destroy the larvæ about the time of pupation.

PREDATORS.

Predacious beetles and their larvæ are frequently abundant about and within the egg-tunnels and mines, and feed upon the bark-beetle adults, their eggs, and the larvæ.

The influence of parasites and predacious insects appears, on the whole, to be of minor importance in controlling bark-beetles in our forests; although it is possible that some of our secondary species, normally rather heavily parasitized, might otherwise be of primary importance.

*Except the largest timber of the Pacific Coast.