

NOXIOUS FOREST INSECTS AND THEIR CONTROL

NOTE.—This article has been prepared by J. J. de Gryse, Chief, Forest Insect Investigations, Division of Entomology, Department of Agriculture, Ottawa. This account of the activities of the Forest Insect Investigations Unit of the Dominion Division of Entomology would not be complete without acknowledgment of the generous co-operation received from numerous outside organizations, foremost among which are the Dominion and Provincial Forest Services, the Canadian Pulp and Paper Association, the Ontario Forest Industries Association, the Quebec Forest Industries Limited and the Canadian Lumbermen's Association. Special mention should be made of the assistance given by the Quebec Forest Entomological Service in the Dominion Forest Insect Survey. In all projects common to Canada and the United States, the closest contact has been maintained with the United States Bureau of Entomology and Plant Quarantine, the forest entomologists of the northeastern States and the several boards and committees organized by the industry for the promotion of forest insect control.

EXTENT AND CHARACTERISTICS OF THE PROBLEM

A sound appreciation of the losses caused by forest insects over a given period of time cannot be based only on an estimate of damage to productive forests because insect outbreaks in inaccessible stands may have an important bearing on the fate of commercial forests. A common but erroneous practice is to evaluate insect damage by a measure of dead or dying stands and to ignore the depreciation entailed by the ravages of insects which actually do not kill the timber but merely render it unfit for profitable utilization. Loss of increment resulting from repeated attacks of defoliators is rarely, if ever, taken into consideration. The same may be said of loss of vitality, the effects of forest depletion on the so-called forest influences, the deterioration of fire-killed timber and of logs left in the woods. Increased fire risk in insect-killed stands, damage to stored stock, and even to manufactured articles, as well as a number of other factors should be taken into account to give a true idea of the destructive role played by insects affecting forests and forest products.

The losses thus sustained in Canada, as a result of insect depredations, although they cannot be accurately computed, are no doubt appalling. Some years ago an outbreak of the European larch sawfly destroyed practically all commercial larch stands in Eastern Canada. Since 1909, the spruce budworm has taken a toll of about 250,000,000 cords of spruce and balsam. The eastern spruce bark-beetle, the hemlock looper, the jack pine sawfly, the black-headed budworm, the balsam woolly aphid, and several other species have all, at one time or another, appeared in destructive numbers over large areas. In some cases the changes brought about in the composition of the forest by insect outbreaks have been distinctly prejudicial to the commercial value of succeeding stands—more useful species having been replaced by less valuable ones. When fire follows in the wake of such outbreaks it may take centuries to repair the damage. At best, a merchantable forest crop, once lost, cannot be replaced in less than 50 to 100 years.

EXTENT OF RECENT LOSSES AND INSECT PESTS CAUSING THEM

The Spruce Budworm.—The first authentic report of a spruce budworm outbreak in Canada dates back as far as 1807, when parts of Maine, New Brunswick and Quebec were affected. Information on this outbreak is rather fragmentary; how much damage was caused is unknown. Seventy years later another outbreak was active in the same general region. Damage was severe and extensive. This outbreak lasted probably about 4 or 5 years. Then, after a lapse of 30 years, the budworm again appeared on the scene. This was in 1909. It is difficult to under-