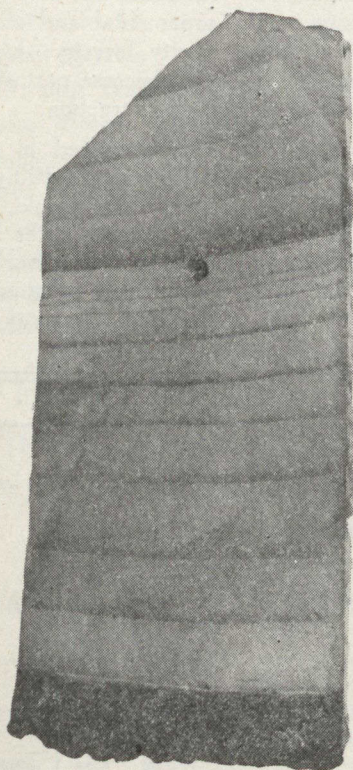


How Has the Budworm Spread Over Quebec?

(A Communication from the Entomological Branch, Dept. of Agriculture, Ottawa)



Budworm suppression in a living balsam from the Shipshaw River, Quebec. The 1912 ring (compressed, with dot) shows marked retardation, which followed the first year of budworm feeding in 1911.

In connection with our investigation of the recent budworm outbreak in Quebec, we are endeavouring to trace the rate of spread and progression of this epidemic through the Province. In order to make recommendations to prevent or control future outbreaks it is very essential to know if this epidemic originated in sev-

eral places simultaneously or spread from one point.

The time the budworm appeared in any region can be determined from the retardation in the annual rings of the trees. The accompanying photograph and explanation describe this feature. Small blocks of wood taken from living balsam showing the last 12-15 years growth is all that is necessary for this determination. The samples should be taken from healthy trees, preferably in stands containing much balsam. They need not be more than 1 inch wide, 1 inches long and the depth of 12-15 annual rings. At least six trees should be sampled.

For instance we know the outbreak appeared about Grand Lake Victoria in 1910 or 1911, and about the same time north of Lake St. John, south of Lake Abitibi the first appearance was in 1920. It spread down the south shore of the St. Lawrence from near Quebec in 1913 to Matane in 1915. What happened on the north shore and many other points in Quebec we do not know.

We are anxious to get data from any regions in Quebec and will greatly appreciate any assistance in securing these blocks of wood. They should be mailed without postage to the Entomological Branch (Division of Forest Insects), Department of Agriculture, Ottawa. Any accurate observations as to the time the forests started to turn brown from the feeding of the caterpillars and the length of time the outbreak lasted will be helpful; also estimates of the amount of timber killed in any locality.

over a long period at comparatively short distances only from the parent trees. Reproduction sometimes but not always followed single fires. Abundant seedlings were found on some soils, and none on others. Reproduction was found after fires in virgin forests, but second fires and fires in young second-growth stands left a barren waste.

The solution of the problem was found by the staff of the forest experiment station in a fact for the first time recognized in the annals of forestry in this or any other country—a peculiar and striking adaptation of nature which has perpetuated the magnificent fir forests of the Northwest notwithstanding the periodic occurrence of disastrous fires. In the duff of the heavy virgin stands enormous quantities of seed are stored, some of which retains its vitality over a number of years. When fire or cutting makes it possible for the sunlight to reach the ground the stored seed germinates, and seedlings by the thousands and millions begin their aggressive career, to hold the soil for their kind. If fire occurs after germination, the young seedlings are destroyed and nature's reserves are exhausted. It then becomes necessary to depend upon seed trees alone, and these seed up the surrounding areas very slowly and to comparatively short distances. If slash fires are very severe, the duff is largely or altogether consumed, and with it the seed necessary for a young stand. On cut-over areas, if a slash fire is delayed until after the stored seed germinates, the opportunity for prompt natural reproduction is lost.

In the discovery of seed storage lies the possibility of prompt natural replacement of the Douglas fir forests of the Pacific coast. There is still much to be worked out, but the direction which investigations must take has already been indicated, and, if they can be continued, it is only a question of time until the entire problem will be solved. The solution of this problem will determine whether we leave a heavy investment in seed trees, and how we dispose of slash. A new light is being thrown upon the entire question of fire protection. The forester realizes that he can no longer devote his efforts primarily to keeping fire out of virgin stands. Fires in stands too young to have deposited a reserve of seed on the forest floor mean artificial planting at high cost, and in the analysis a monetary loss almost as great as that caused by fire in virgin stands.

Practical Results From Research

By Earle H. Clapp, U. S. Forest Service

Soon after the Forest Service took over the administration of the National Forests in 1905 it became necessary in selling timber to determine silvicultural methods for cutting the Douglas fir stands of the Pacific Northwest. It was then thought that the needed information might be gleaned through general observations on private cut-over lands and old burns; but for a number of years the evidence there secured seemed to lead into a maze of conflicting indications. A forest experiment station was established in 1913 and this problem was one of the first assigned to its staff. It was found through the in-

tensive investigations then instituted that sometimes splendid natural, even-aged stands of seedlings literally clothed the ground over thousands of acres after a fire in virgin timber. In the splendid reproduction following fires the distribution of the seedlings seemed to bear no relation to the location of the seed trees. The densest reproduction might be found, under circumstances which seemed to eliminate wind-carried seed, at distances of a mile from the seed trees, or much higher on mountain slopes, or within high intervening ridges. If seed trees were present a few seedlings might come in each year