apparently began on June 5 on the upper sites as compared with June 8 on the lower plots. Moisture conditions seemed to govern the length of growing season. The trees on the highest plot reached their peak of growth on July 20 and on the next highest plot on July 24; the growth on the two lower plots slowed down on July 24 but the trees continued to put on a small increment until August 13. From July 16 to 23 the weather was wet but on July 24 the drought index rose sharply and continued upward for some time. At this time tree growth stopped or slowed down considerably.—R. F. Shepherd.

Initial Research Program of the Laboratory of Forest Pathology, Calgary, Alberta.—The 1952 field season marks the initial program of research undertaken by the Calgary Laboratory of Forest Pathology which was established recently to serve the region embracing the Province of Alberta, and the National Parks in British Columbia and Alberta.

The Forest Disease Survey has been organized as a means to obtain information on the presence, distribution, and development of native and exotic tree diseases. One graduate employee has co-ordinated the activities of the rangers of the Unit of Forest Zoology and the staffs of allied provincial and federal Forest Services to assist in this initial survey of tree diseases in the Alberta region.

Studies of decay in spruce are designed to relate decay to site factors such as soil (quality, texture, nitrogen content, and pH), and vegetation; to examine relationships of organisms associated with decay; and to show the significance of decay to improved forest inventory procedures and to factors as diameter, age, density, and growth rate. A red stain condition in pine is responsible for serious losses in the mine prop, pole, and tie industries in the province. Preliminary investigations on this problem are designed to determine the identity and nature of the agents associated with red stain and to demonstrate the importance of this abnormality in the utilization and management of pine forests. The initial studies have been located exclusively in fire-injured pine stands to show concurrently the significance of fire scars in the occurrence of stain and decay.

In co-operation with the Forestry Branch, Department of Mines and Resources, and the Unit of Forest Zoology, long-term investigations have been established to study the rate of deterioration of pine slash. Sample plots ¼ acre in size are located within nine 10-acre blocks of an 84-year old stand of pure lodgepole pine treated by various silvicultural cutting. The treatments applied by the Forestry Branch include conversion cuttings, harvest cuttings, and thinnings. The project has been devised to assess the influence of the different silvicultural cutting treatments on the rate of deterioration of slash; the possible forest disease danger of decaying slash; the relation between slash deterioration and fire danger; the importance of the fungi associated with slash decay; the factors that favour decay; the relation of insects to deterioration and the distribution of slash fungi; and the comparative rates of deterioration of slash sprayed with nutrients and with blended cultures of *Lenzites saepiaria*.

This season preliminary observational work on dwarf mistletoe of conifers was made concurrently with the Forest Disease Survey. Limited physiological and biological studies in the *Polyporaceae* and *Thelephoraceae* are being maintained at the main laboratory at Calgary. A stock culture collection of forest disease organisms prevalent in the region is being developed.—V. J. Nordin.

BRITISH COLUMBIA

Blister Rust Resistant White Pine.—The object of this study is to determine if there exist in British Columbia, western white pine trees (*Pinus monticola Dougl.*) which are resistant to the white-pine blister rust fungus (*Cronartium ribicola* Fischer).

This disease was introduced in 1910 near Vancouver and has spread in British Columbia throughout the range of the five-needle pines and also throughout the wider range of its alternate host, the wild and cultivated currants (*Ribes* spp.). By its girdling action in the bark following infection through the needles, the disease has caused serious mortality to all age classes of white pine. In young stands of open-pollinated reproduction, trunk cankers are commonly recorded with a frequency of 90 per cent.

Much of the study since 1948 has involved scouting and plot establishment to locate and evaluate trees for future resistance testing. This has involved examination of areas with heavy infection to find any individuals lacking evidence of disease development or with fewer symptoms than found in adjacent trees. Existing Forest Service sample plots were examined because some white pine trees in these had been under observation since 1923. Additional plots for rust observation were established in both the coast and interior white pine regions. Areas suitable for blister rust disease gardens and field test plots were also located. On the basis of several years' data, 58 trees on the coast and 33 from the interior were selected as superior individuals suitable for resistance testing. These trees range in age from 5 to 150 years and in height from 4 to 125 feet. Some are entirely free of cankers, others have minor twig or branch cankers. Critical testing is necessary to ensure that all the selected trees have not merely escaped the disease.

Scions from the selected clones were collected during the dormant period, grafted on disease-free rootstocks, and then kept in a heated humidity chamber until the graft union was completed. This involved grafting procedure was necessary since satisfactory rooting compounds were not available for white pine.

Testing commenced in 1950, but the initial grafts were all lost from frost action. Testing, resumed this year, was restricted by greenhouse facilities. Scions were collected in February from 16 clones in the coast region. Five hundred and sixteen grafts were made, using disease-free rootstock imported from Montana. When the graft unions had formed, the material was outplanted with suitable controls into a disease garden at the Forest Service nursery at Duncan, and into several field test plots where heavy natural infection exists. Following an experimental design, 8 replicated shaded scion beds were established in the disease garden. A large number of *Ribes spp.* and infected white pines had previously been planted to intensify natural infection in this disease garden.

In August, four of the Duncan scion beds were inoculated artificially. This involved selecting heavily infected currant leaves during the annual period when discharge of infectious spores occurs from the currants to the white pines. These leaves were then individually fastened over each small grafted pine and over the controls. A high humidity was maintained, using cloth chambers with a sprinkler system. Spore traps were examined to assure that spore discharge from the leaves had occurred in the humidity cages. Temperature and humidity records were maintained.

Selected white pine grafts for resistance testing under coastal disease conditions have been received from the eastern and western white pine regions of United States. This material was artificially inoculated at Duncan last year, and has now been placed in field test plots. The results of all inoculations on local and exotic material should be apparent within two years. An evaluation of the resistance of the original parent selections, based on the degree of resistance of the surviving grafts, will then be possible.

Controlled pollination studies and the testing of clones from the interior region of British Columbia will be delayd until 1954.—W. A. Porter.

The Effects of the Flooding of Timber on Bark Beetle Populations.—In 1952, the plots established at Ootsa Lake, Tweedsmuir Park in connection with the flooding of large areas of timber by an industrial development were re-examined. At the time of re-examination in August no flooding had taken place. Nevertheless, all the standing, tagged trees in the plots were checked and none were found to have an attack of bark beetles. Some of the tagged trees and some of the felled trap-trees had been removed by a small logging operation.

The remaining eleven spruce and thirteen lodgepole-pine trap trees which had been felled in September of 1951 were examined. Bark was removed from portions of the stump and upper roots and at intervals along the bole. A sufficient sample was thus taken to indicate, largely on a qualitative basis, what scolytids normally occur in the area and what potential attackers of flood-weakened trees are present. Any bark beetles found were collected and preserved and were later identified at the Victoria laboratory.

The majority of the species present were taken from both hosts as shown in the following listing:—

Dryocoetes affaber Mann.—This polygamous species occurred very abundantly in spruce and somewhat less frequently in pine. It is definitely of secondary economic importance and there are very few records of attack in living trees.

Dryocoetes septentrionis Mann.—Only two galleries of this species were found in spruce. None were found in the lodgepole pine. It is also a secondary insect.

Ips pini Say.—This insect occurred very abundantly in pine and infrequently in the spruce. It is, as a rule, a secondary pest but under exceptionally favourable conditions may attack healthy trees.

Ips radiatae Hopk.—This species was only found in one pine trap tree. It is generally secondary but is capable of being a serious primary enemy.

Scierus annectens Lec.—This insect was abundant in both spruce and pine and is definitely secondary in importance.

Polygraphus rufipennis Kby.—Limited numbers of this bark beetle were taken from both spruce and pine. It seldom attacks healthy trees but is a very important secondary.

Dendroctonus borealis Hopk.—This species was taken only from spruce where it occurred most abundantly in the root collar, stump, and lower bole. It is a potentially dangerous beetle but usually confines its attacks to injured trees.

Hylurgops rugipennis Mann.—This secondary bark beetle was taken only from pine.

Trypodendron bivittatum Kby.—This ambrosia beetle was very common in both the spruce and the pine. The bulk of the attack was sustained by the stump in every case.