

products shows the former to have considerable merit from the standpoint of cost and convenience. Tests in the lubrication of high-speed fire-pumps showed that the use of naphthenic base oils, instead of paraffin base oils, could increase considerably the service life of the motor. Additives are now being produced by oil companies that give almost equivalent results when used with paraffin base oils.

Three four-week fire control training courses were conducted in 1964, training 60 instructors and bringing the total of those completing the course to 167; for the first time, the attendance included out-of-the-province students and woods industry personnel. During the year, 500 Indians were given a four- to seven-day course in fire fighting.

All ten Department Otter aircraft have been equipped with a new 200-gal. water-dropping tank suspended under the fuselage. A similar type of tank is being designed for the Department's Beaver aircraft.

**Manitoba.**—The central administration of Manitoba's forests is organized into two Branches—Forest Management and Forest Protection. Each is in charge of a director and is a Branch of the Department of Mines and Natural Resources. The province is divided into eight regions, each under a regional supervisor who is responsible to the Directors of the Management and Protection Branches.

The Management Branch co-ordinates control measures for the propagation, improvement and management of the forests, the harvest of forest products, and forest inventory surveys. Two nursery stations are maintained to supply stock for reforestation of denuded Crown land and some natural seed areas have been established for nursery stock. Seedlings are supplied to farmers for shelterbelts and woodlots and to commercial Christmas tree producers. The program of forest stand improvement comprises thinning, clearing and chemical spraying to remove undesirable species and encourage growth of preferred trees. Forest inventories cover 3,000 to 4,000 sq. miles annually and on the basis of these inventories working plans with annual allowable cuts on a sustained yield basis have been brought into operation.

Timber cutting rights are awarded by Forest Management Licences, Timber Sales and, in certain cases (particularly for salvage operations), by Timber Permits. Forest Management Licences may be granted for periods of up to 20 years and are renewable. Timber Sales may be for varying periods from one year upward and Timber Permits for periods of up to one year. At present, one long-term Pulpwood Berth with an area of 2,745 sq. miles and 12 long-term Timber Berths, all granted prior to 1930, are in force.

The area of the province under forest fire protection is 120,000 sq. miles with zones of priority established in the less accessible areas. Fires are detected through a comprehensive network of lookout towers and supporting air and ground patrols, all tied together by radio and departmental or public telephones. Two Canso water-bombers and two helicopters are rented for the worst of the fire season to back up the aircraft of the Manitoba Government Air Service.

The province has no forestry research organization but co-operates with several federal services which maintain two research areas. The Department co-operates fully with federal authorities in investigating and controlling forest damage resulting from insects and diseases. Public education in the fields of fire prevention and forest conservation is carried out and use is made of all usual methods including radio, television, newspapers, signs, talks to school children and club members, film tours, etc.

**Saskatchewan.**—The forests of Saskatchewan are located mainly in the northern half of the province and cover 117,738 sq. miles, or 53 p.c. of the total land area. Provincial forests constitute approximately 92 p.c. of all forest land in the province and are managed and developed by the Forestry Branch of the Department of Natural Resources.

The Forestry Branch, consisting of six divisions—Administration, Fire Control, Forest Management, Forest Research, Inventory and Silviculture—is responsible for developing and evaluating forest policies and management programs based on the findings of