

pruning, thinning and girdling. In addition to normal woods labour, over 6,000 man-days of inmate labour from three minimum security camps (see p. 404) were used on stand improvement projects in Crown and agreement forests units.

The volume of wood of all species cut from Crown land during the year ended Mar. 31, 1962 was lower by approximately 1,000,000 cu. feet than that cut during the previous fiscal year, representing a decrease of 4.0 p.c. in the cut of softwood species and 1.4 p.c. in the cut of hardwoods. The volume of primary pulpwood species cut (spruce, balsam, and jack pine) increased by about 4,400,000 cu. feet. An over-all decrease in the pulpwood cut is accounted for by a reduced cut in other softwood species.

Forest research was continued in 1962 on the growth characteristics and relationships in their stands of the principal tree species, with the object of developing cultural practices to ensure maximum production. The site research program continued to provide a framework for forest management by classifying and mapping combinations of land form, soil and climate, and rating the various combinations for tree growth. The applicability of this classification to land use was tested. Tree breeding was continued in the development of disease-resistant white pine and poplars of rapid growth and good form. Experimental work was pursued toward the improvement of nursery and planting techniques. Mensurational studies involving growth and yield, and possible substitutions for log scaling were carried on. Testing of pumps and other forest fire protection equipment continued. A special study was made of airborne infrared heat sensory equipment for fire detection.

During the 1962 forest fire season, 1,510 fires occurred in Ontario, burning an estimated total of 13,700 acres. Although the number of fires was about 15 p.c. above the annual average for the previous decade, the area burned was the third lowest on record. Lightning accounted for 20 p.c. of the fires reported. The Department's fire-fighting fleet consisted of 33 *Beaver* aircraft, 10 *Otter* aircraft and one *Super Widgeon* and operated out of 28 air bases during the fire season, logging 14,485 hours of flight time; 11 of these bases were operated throughout the year. In addition, five leased *Bell Super-G* type helicopters were used between May 1 and Sept. 30 and a large *Vertol H21* with a 200-gal. water tank was employed on fires in the Kapuskasing and Sudbury areas.

Manitoba.—The forests of Manitoba are administered by the Forest Service, a Branch of the Department of Mines and Natural Resources. The Service is headed by a Provincial Forester and for purposes of administration the province is divided into eight Forest Regions each in charge of a Regional Supervisor responsible to the Provincial Forester for forest activities within his region. The Forest Service is also responsible for the development, maintenance and operation of parks and recreation on Crown lands throughout the province (see p. 40).

The cutting of timber is governed by timber sale, licensed timber berth, pulpwood lease, or timber permit. Timber sales are disposed of by public auction or sealed tender and cover periods of from one to seven years; timber berths cover certain areas granted before 1930, the date of the transfer of the natural resources from the Federal Government to the province; pulpwood leases are granted over an area of 2,748 sq. miles; and timber permits are granted to settlers and small operators at appraised rates for a period of one year or less. On the basis of a forest resources inventory completed in 1956 and other information, working plans with annual allowable cuts on a sustained-yield basis have been brought into operation in the more accessible areas.

Forest fire protection is a most important activity of the Forest Service. Fires are detected by air patrol, lookout tower and road patrol, and rapid communication is maintained within the Service by radio and telephone. The Air Service transports men and equipment to fires in areas beyond the reach of roads. The main air base is at Lac du Bonnet and summer air bases are maintained at The Pas, Norway House and Thicket Portage. The total area under fire protection is about 97,000 sq. miles.

Regeneration of the forest is dependent mainly on natural means although over 10,000,000 trees were planted during the past ten years as part of the federal-provincial