

limits. These associations have their own staffs which co-operate with those of the Board of Railway Commissioners and the Provincial Government. The latter contributes in the way of money grants and also pays for the protection of vacant Crown lands lying within the area of the associations' activities.

In the matter of forest fire protection along railway lines, the provincial services are assisted by the Dominion Railway Act administered by the Board of Railway Commissioners. This Act gives to that body wide powers relating to fire protection along railway lines under its jurisdiction in Canada. Certain officers of the various forest authorities are appointed *ex officio* officers of the Board of Railway Commissioners. These officers co-operate with the railway fire-ranging staffs employed by the various railway companies, the compulsory control of all lines coming under the jurisdiction of the Board being one of the requirements of the Dominion Railway Act.

The most important single development in forest fire protection in late years has been in the use of aircraft for the detection and suppression of incipient forest fires. Where lakes are numerous flying boats can be used for detection and for the transportation of fire fighters and their equipment to fires in remote areas. Where safe landing places are few and no other lookout system has been developed, as in northern Alberta, land machines are used for the detection and inspection of fire only; but in the Laurentian area, where lakes are numerous, flying boats are used both for observation and control. Specially developed aircraft equipped with wireless are employed on forest fire-protection operations; these enable the observer to report the location of the fire as soon as it has been detected. Aircraft are now being used extensively for exploring remote areas and mapping forest lands by means of aerial photography. Waste lands and the various forest types can be mapped more accurately and more economically by this means than by ground surveys. As a general rule aircraft are used in the more remote districts, while lookout towers, connected by telephone lines or equipped with wireless, are established in the more settled and more travelled forest areas. While these agencies have to a large extent supplanted the old canoe, horseback and foot patrol for detection of fires, a large ground staff with its equipment stored at strategic points will always be necessary for the fighting of larger fires and the maintenance of systems of communication and transportation, and of fire lanes and fire guards in the forest.

The most important improvement in forest fire-fighting equipment has been the portable gasoline pumps. These pumps, which each weigh from 45 to a little over 100 pounds, can be carried to a fire by car, canoe, motor boat, automobile, aircraft, pack saddle or back pack. They can deliver efficient water pressure as far as seven thousand feet from a water supply and, when used in relays, at a much greater distance. Smaller hand pumps are also used effectively in many cases.

In addition to these improved measures, legislation has also tended to reduce the fire menace. The establishment of closed seasons for brush burning, and seasons during which permits are required for setting out fires and for travel in the forest during dangerous dry periods, have been of enormous value as preventive measures.

None of these measures would be effective without the support of the general public and in 1900 the Canadian Forestry Association was founded, its chief object being the securing of popular co-operation in reducing the forest fire hazard. This Association now has a membership of 32,000 and an income of \$136,000, mostly secured by voluntary private subscription. Fifteen of the Association's paid lecturers tour the country, using special railway lecture cars and motor trucks equipped