

of fuel-type classification methods and mapping techniques, the development of a method for rating fire season severity and fire protection organization efficiency, and the testing of fire suppression equipment, such as back-pack tanks and forestry hose.

A number of provincial forest protection services are also engaged in research activities and notable advances have been made in several provinces in the development of forest communications equipment, the dropping of supplies to fire fighters by parachute, and the design of mechanical fire fighting equipment.

Research in forest inventory methods is of increasing importance because of the greatly expanded inventory programs being conducted in most provinces. Data from air photographs are correlated with field work to develop new techniques of timber estimating, which is being facilitated by the use of stand volume tables. Various methods of field sampling are being investigated and compared. Research is being continued in methods for measuring tree images and tree shadows to determine heights, crown widths, canopy density and other data from photographs taken in different seasons of the year under various conditions. The use of large scale photography of sample areas is also being investigated and studies are being made in the identification of species and sub-types. Construction of suitable photogrammetric and other scientific apparatus includes those required by the forestry tricamera method of air photography which has been developed to provide maximum forestry information at minimum cost, and the shadow height calculator, constructed to facilitate the determination of tree heights from shadows in air photographs.

Research in forest economics is concentrated on problems associated with the production of wood in the forest and are concerned with land use, land tenure, taxation, forest legislation and administrative techniques, forest management, forest labour and the valuation of forest lands. Economics research also involves continued study of the broad developments in forest industries.

**Forest Biology.**—The Division of Forest Biology of the Science Service, Federal Department of Agriculture, undertakes investigations dealing with the biology and control of insects and diseases affecting forest and shade trees. The Zoology Unit maintains ten regional laboratories at strategic points across the country. The Forest Pathology Unit operates six branch laboratories. A laboratory was recently established at Sault Ste. Marie, Ont. for fundamental research on virus, fungi and bacterial diseases of insects.

A special article dealing with Noxious Forest Insects and Their Control appears in the 1947 Year Book, pp. 389-400. A detailed account of the activities in forest pathology in Canada may be found in the 1948-49 Year Book, pp. 416-417.

**The Spruce Budworm.**—One of the largest and most dramatic chemical control operations ever undertaken against forest insects has been under way since the summer of 1952 against the spruce budworm in New Brunswick. The budworm is a defoliating insect which has seriously threatened the pulpwood forests in the northern half of the Province. By Mar. 31, 1955 a total of 3,600,000 acres had been sprayed from aircraft and 600,000 acres re-sprayed. At one stage in the spraying, studies showed from 87 to 99 p.c. mortality among the budworm larvæ. Plans for 1956 include spraying another 2,000,000 acres of forest using about 70 aircraft, operating from 12 airfields. Cost of the operation is being shared between the Federal Government, the Government of New Brunswick and the forest industries in the areas affected, the Federal Government paying the Provincial Government one-third of the cost of the operation, up to a maximum of \$3,000,000. The original three-year cost-sharing Agreement between the Federal Government and the Government of New Brunswick, ending Mar. 31, 1956, has been extended for a further three years. The Agreement is administered by the Forestry Branch of the federal Department of Northern Affairs and National Resources.