

The requirements of light and temperature that will produce optimum conditions for growth and development are being determined for the seedlings of many important species of trees. The physiological processes of growth and reproduction are under investigation in a limited number of species. The tree breeding program is directed towards selecting and developing superior strains and improving techniques for propagating new strains through artificial or controlled pollination.

Forest fire protection is a vital problem and is therefore a major concern of federal authorities. In forest fire research the federal Forestry Branch is working towards full co-operation with the provincial forest services in achieving the best methods of forest fire protection. The leading contributions of the Branch have been in the field of fire danger measurement and in the development of equipment and techniques for fire fighting. The more important studies being undertaken at present include development of methods and techniques for classifying fuel types and mapping them, development of methods of rating the severity of fire seasons and of determining the efficiency of fire-protection associations and testing of equipment, such as back-pack tanks and hose, used in fire suppression.

Research in forest inventory methods is of increasing importance because of greatly expanded programs of forest inventories being conducted in most provinces and in the northern territories. 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 continuing 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 equipment 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 which facilitates the determination of tree heights from shadows in air photographs. Studies in the development and use of new equipment are at present being directed to a considerable extent to testing the application of the relascope and wedge prism as instruments suitable for providing data for inventory purposes and in studies of growth of stands.

Forest Products Research.—The Forest Products Laboratories of Canada, a Division of the Forestry Branch of the Department of Northern Affairs and National Resources, conducts forest products research in its laboratories at Ottawa and Vancouver. This research is aimed at supplying the basic and practical knowledge required for the best possible utilization of Canada's forest resources and the provision of goods of satisfactory quality to the ultimate consumers. Research includes the determination of the physical, mechanical and chemical properties of wood and their relation to adaptability in use; studies of the factors affecting the quality of wood and of manufactured wood products; determination of the factors that cause wood waste in logging and manufacturing; research and investigation on the preservative treatment and painting of wood and on the use of wood for the manufacture of wallboards, alcohol, turpentine, and extractives; studies to determine possible new economic and more valuable uses for woods; and research aimed at determining methods and means for the practical and economical utilization of all wood substance available from the annual timber harvest. Additional work includes the application of laboratory findings to the standardization of lumber grades, development of structural forms and practices, and the improvement of timber specifications in the building codes of Canada. By means of numerous technical publications and through other channels continuous effort is devoted to the widespread dissemination of research results. To assure that research programs are kept abreast of industrial requirements, the Forest Products Laboratories maintain close co-operation with similar organizations in other countries, as well as with the provinces and the forest-based industries generally.