

Computations to the volume per acre stage have kept pace with the field-work, but map compilation has lagged behind. As a result it has been possible to submit final volume estimates for one small unit only. Such maps as have been completed show more detailed and more accurate information on topography, bush edges, and forest type boundaries than has been available hitherto in the Service. They will be a valuable addition to the map records.

80. *Forest Botany*.—Good progress has been made by the Forest Experiment Station in the establishment of a national forest herbarium at Rotorua, the total number of indigenous species now being 389; for the exotic section of the herbarium 146 species have been collected and mounted. The study and periodic description of tree-seedling characteristics have progressed and a number of line drawings are ready for publication. Past and current data on the seasonal growth cycles (phenology) of a range of exotic coniferous tree species are being collated by the Station; a new allied project initiated by the Station during the year was the collection of data on the first concurrence of cones and viable seed, evidence which will be of considerable interest in future genetical research. The old exotic arboretum at Rotorua has been taken over and improved by the Forest Experiment Station and a commencement made in the formation of an indigenous arboretum in the same vicinity.

A further 820 trees were planted in the northern arboretum at Waipoua and the few failures of the previous year were replaced. When completed, this arboretum will comprise all the existing species of the genera *Agathis*, *Araucaria*, and *Phyllocladus*. A small arboretum was opened in Canterbury Conservancy to include pine, poplar, and willow species.

81. *Silvicultural Investigations*.—The Forest Experiment Station has been engaged on collection of data on the periodicity of seed years in both indigenous- and exotic-tree species; seed germination testing of a wide range of exotic and indigenous species; raising of elite stands from special-quality seed lots; vegetative propagation of insignis pine, including treatment by hormone products; experimental low pruning of ponderosa pine, lodgepole pine, spreading-leaved pine, and strobus pine; and preliminary work on the significance of the podsolization of pumice soils (in co-operation with the Soil Survey Branch, Department of Scientific and Industrial Research). A review of systems of tree classification was undertaken and comparative field tests carried out with a view to the adoption of a suitable standard system. The response to thinning of insignis pine and Douglas fir respectively has been the subject of sample investigations, and a further series of spacing trials was instituted in a South Island forest. The Forest Experiment Station now has supervisory control of all sample plots and experimental areas, and is engaged in a review of the whole series and the concurrent formulation of standing instructions for sample plot procedure. Studies of the natural regeneration of indigenous species (including kauri at Waipoua) have been continued.

A contribution to the study of the principles on which forest ecological survey is based, with particular reference to Otago and Southland forest types, has been published in the *New Zealand Journal of Forestry*.

82. *Grading of Timber*.—With the substantial increase in production and the greater diversity in the use of forest-grown exotic timbers, there has been a demand for grading rules to cover flooring, weatherboarding, interior fitments, and furniture. For the last-mentioned purpose the emphasis has been upon a minimum acceptable length of "cutting" and a stated percentage of cutting to be yielded by each board; in some instances a 2 ft. length of clear timber—i.e., a 2 ft. "clear cutting"—is an acceptable minimum length, but it is recognized that longer length cuttings up to 6 ft. containing dressable defects will also be yielded by this factory grade. Meanwhile the grade requirements are the subject of mutual agreement between buyer and seller, and the need for national grades is less urgent than is the case with the dressed building lines. From