

Casualties at this rate being encountered only in Rotoehu Forest, the possibility of deficiencies in the soil were envisaged; and trials were begun to study the effect of applying boron, potassium, and other elements.

(8) *Thinning*.—Studies of the response to thinning of Douglas fir, *Pinus murrayana*, *Pinus laricio*, *Pinus patula*, *Pinus ponderosa*, *Pinus radiata*, *Pinus strobus*, and *Pinus taeda* were initiated in permanent sample plots. The plots in *Pinus radiata* will also be used to investigate the effect of thinning—and possibly underplanting—in podzolization of the soil under this species. The year's work in the establishment of permanent sample plots was largely centred in Rotorua Conservancy, where eleven new plots were laid out and measured, and most of them thinned. Four old plots were remeasured, and two of them thinned. One old Corsican-pine plot had to be abandoned owing to serious damage by wind. A set of new plots was established in Karioi Forest, Wellington Conservancy. Review of old plots in Southland and part of Canterbury Conservancies was begun, and tentative sites were selected for new plots.

(9) *Underplanting*.—The results of planting exotic conifers in indigenous forest after logging operations were studied. The field-work is nearing completion, and when complete an attempt will be made to assess the success of the policy.

(10) *Beech Regeneration*.—Regeneration experiments were continued in red and silver beech in virgin and logged parts of Rangataua Forest, Wellington Conservancy. For the past five years a negligible amount of seed has been produced in this forest, but there is evidence of a good crop in 1949.

FOREST MANAGEMENT RESEARCH

(1) *Yield Tables*.—Based on data collected from temporary sample plots in the exotic forests of Rotorua Conservancy, empirical yield tables were prepared for unthinned stands of *Pinus radiata*, *Pinus laricio*, and *Pseudotsuga taxifolia*. Plots were also established in *Pinus ponderosa* and *Larix decidua* stands, but the results have not yet been analysed.

During the course of this investigation data were collected to study the development of heartwood in these species, the purpose being to determine the yield of timber suitable for the manufacture of groundwood pulp. This work is discussed further under "Forest Products Research." Studies of the relationship between the usable volumes of timber in malformed and normal trees were also carried out.

In the course of routine work on the establishment of permanent sample plots further data were collected for the preparation of normal yield tables for the principal exotic species. For convenience, the initial programme of permanent sample plots has been centred on Rotorua Conservancy. However, a manual of instructions has now been issued, and this will facilitate the extension of this type of work to other conservancies. The first new plots in Auckland and Wellington Conservancies have already been established.

(2) *Volume Tables*.—The year has seen great progress in the production and testing of volume tables. New tables have been prepared for Douglas fir and Corsican pine in Rotorua Conservancy, and for insignis pine in Southland Conservancy. A revised volume table for insignis pine in Rotorua Conservancy was also compiled. Progress was made in the preparation of volume tables for kauri, ponderosa pine, and European larch. Revision of the volume tables for rimu was begun.

(3) *Assessment*.—Assessment methods in exotic forests received attention. Experimental work has indicated the superiority of the line plot method over the strip plots used hitherto. However, the computations are possibly more complex than can be handled by the staff available, and it may be necessary to prescribe the intensity of sampling instead of basing it on statistical examinations of results of a preliminary