

34. *Natural Regeneration.*—In Compartment 8, Omahuta Forest, departmental felling and extraction under working plan has been in progress for some time. Owing to urgent orders for selected timber for war purposes it was not possible to clean up the felling area at the time, but later in the year all the kauri-trees above the minimum d.b.h. limit of 33 in. were taken, with the exception of seed-trees were necessary. This, the first kauri stand to be felled under a silvicultural system, is of great interest as it demonstrates the appearance of a stage through which many of the kauri stands will now pass—namely, removal of the first permissible cut under the selection system. The appearance of the stand is quite satisfactory so far as poles and trees are concerned, and the progress of natural regeneration will be kept under close observation. Intensive assistance to natural regeneration was attempted by removing in part the scrub vegetation from around the base of four kauri seed-trees in Compartment 1, Omahuta Forest, which carries in the main a stocking of podocarps. Germination, if any eventuates, should come next spring. This compartment carries excellent podocarp regeneration, but, naturally, it is one of the objects of management to extend kauri stocking by all possible measures. General observations made during the year point towards kauri regeneration being adequate for full restocking of felled areas.

During the year several fairly extensive areas of land bearing established kauri regeneration were inspected. Unfortunately, only the smallest of these are in existing State forests, and the other larger areas should be acquired for the purpose of evening up the distribution of kauri age-classes, thus enabling kauri-forest management in perpetuity under sustained timber yield.

At Whirinaki podocarp-forest-worked-over areas germinated freely to kahikatea, matai, and rimu.

Natural regeneration in clear-felled *Pinus radiata* stands in Rotorua Conservancy more than held its own against mortality in seedlings caused by frost, insolation, or the pine-bark beetle *Hylastes ater*. On study plots under observation the average net seedling increase was from 1,928 to 2,736 per acre, which, if not reduced next year, will be satisfactory. New regeneration was particularly noticeable on subsidiary extraction tracks throughout the felled area in Whakarewarewa Forest. If, as now promised, natural regeneration is successful after clear felling, the management of this species will be much simplified.

35. *Interplanting Indigenous Forests.*—Gaps made by felling and extracting merchantable trees were filled by interplanting shade-bearing exotics such as *Thuja plicata* and *Cryptomeria japonica*. Five hundred and sixteen acres were interplanted in exotics and, in addition, 7 acres were interplanted with the indigenous *Podocarpus totara*. Twenty-one acres were blanked up.

36. *Afforestation.*—Three thousand three hundred and ninety-nine acres of land carrying fern or scrub were afforested. Formation of mixed tree crops was carried out over 872 acres. Clear-felled, wind-thrown, burned, or otherwise damaged or unthrifty areas were replanted over 122 acres, and trees that had died in recent plantings were blanked up over 3,399 acres. Statistics of exotic establishment and silviculture are presented in Appendix II. Including 27 lb of indigenous seed, 1,746 lb. of tree-seeds were collected and extracted.

37. *Nursery Operations.*—A total of 1,386 lb. of tree-seed were sown, yielding 5,281,000 seedlings as at 15th March, 1942; 33½ lb. of indigenous seed are included. Trees lifted for planting, transfer, &c., totalled 5,939,000, while 6,593,000 seedlings were lined out. Tree stocks in all nurseries at the close of the year amounted to 20,500,000.

38. *Tending of Indigenous Forests.*—The only ameliorative treatment of indigenous trees was the liberation of kauri saplings and seedlings from overtopping shrubs, and this was done by the normal maintenance personnel. Thus in Warawara Forest the forest caretaker and his part-time assistant released 2,450 well-spaced kauris covering an area of 20 acres.

Liberation of interplanted exotic trees from suppressing shrub-growth was effected over 71 acres, and double-leaders pruned off over 29 acres.

39. *Tending of Exotic Forests.*—On 560 acres tree-plants were liberated from invading fern and other weeds. Three thousand three hundred and twelve acres were low-pruned up to 4 ft. to 8 ft. from the base, and final crop trees were high-pruned over 1,576 acres. Seven hundred and twenty acres were lightly thinned, and 766 acres received a medium to heavy thinning. One hundred and sixty-seven acres were clear-felled.

40. *Silvicultural Investigations.*—In Southland Conservancy a trial direct-sowing was carried out in an attempt to reforest at low cost an area of 20 acres of burned cut-over land. Both broadcasting and spot sowing were tried, and under these methods the best results were obtained with eucalypts and insignis pine respectively. As usual, birds destroyed many seed and seedlings.

In Auckland Conservancy a special inspection and report were made on the growth of pines of the Southern States of the United States of America under planted forest conditions in North Auckland and Coromandel localities.

In Rotorua Conservancy 26 acres were ploughed and disked preparatory to a trial planting of Californian redwood in an effort to improve the early development of this valuable species when planted out on open ground.

41. *Experimental Plots and Statistical.*—A stock-taking was made of all experimental plots that have been established in the State forests. This is an activity that must be centralized under the Silvicultural Branch, and as a result of the stock-taking quite naturally numbers of old plots are being abandoned or overhauled due to excessive duplication, inadequate controls, or data proving consistently negative.

42. *Forest Botany.*—Collection of records on dates of phenological phenomena relating to main exotic and indigenous tree species was continued by field officers under control plan. Additional investigations commenced under control plans were connected with the effect of seed storage upon seed viability; the quality of insignis-pine seed collected from cones of different ages; needle-fusion in insignis pine; regular observation of progress of natural regeneration on clear-felled exotic forest areas, with special reference to mortality caused by pine-bark beetle; recording of seed-crops according to an arbitrary scale denoting degree of abundance, &c.

Organized collection and testing of tree-seeds which was commenced last year is being continued. Seed of various species of kauri (*Agathis*) from other countries has been received and seedlings raised at Waipoua for planting out in an arboretum at this station. Several species of *Nothofagus* have also been received from South America and will form the nucleus of an arboretum to be established in the South Island, which in time will contain all known *Nothofagus* species.