

38. *Tending of Indigenous Forests.*—In conjunction with forest patrolling, kauri saplings were released from competing scrub as far as was possible.

39. *Tending of Exotic Forests.*—Trees were released from fern, &c., on 1,195 acres; low pruning to about 8 ft. high covered 3,888 acres, and high pruning 505 acres. The total area thinned was 782 acres, and 145 acres were clear-felled.

40. *Silvicultural Investigations.*—Further small experimental plantings were made on areas acquired for afforestation during the post-war rehabilitation period, and these trials will be extended in the coming year with a view to ascertaining, so far as is possible from strike and early development, what exotic species are most suited to the various localities. Interplanting of worked podocarp forest has been confined, in past routine operations over extensive areas, to the use of shade-tolerant exotic conifers, but a trial use of exotic hardwoods was made three years ago. Of these, two South American beeches now show splendid height and development, as also does the red-alder, while the indigenous red and silver beeches are not far behind.

41. *Experimental Plots and Statistical.*—A plot established a few years ago to study the effect upon kauri regeneration of removing all but the herbaceous undergrowth in a mature kauri stand was re-examined, and, while kauri-grass has reappeared very slightly, the miniature tree-fern was found to have reinvaded almost the whole of the plot. Its suppression of kauri seedlings was so severe as to indicate that where it is present in abundance its removal from kauri-regeneration blocks will be necessary.

In Rotorua Conservancy, Monterey cypress planted five years ago under a light canopy of *Eucalyptus ovata* showed a height development of 9.6 ft., while that planted under a dense *E. tasmanica* canopy grew only 2.7 ft. in the same period.

In Wellington Conservancy a series of plots was formed at time of planting in the year 1929 for studying suitability for site and development of certain exotic trees in worked podocarp forest that had been burned over prior to planting. As a result of a recent examination the main purpose of the plots has been changed to a study of the incidence of the common shoe-string fungus which seriously affects some exotic species interplanted in worked podocarp stands, whether burned over or not. The following species are susceptible to the fungus attack in the order shown, mortality being particularly high in the first three mentioned: American eastern white-pine, prickly-cone pine, Lawson's cypress, ponderosa pine, Corsican pine, lodgepole pine. Douglas fir and western red-cedar are not attacked.

Observations made in plots of exotic conifers planted during 1927–29 at high altitudes in Karioi Forest, on the central North Island plateau, revealed that lodgepole and ponderosa pines are the most thrifty species, then Austrian, Scots, and jack pines, and next in order northern pitch pine and American eastern white-pine. Other species, including insignis pine, gave poor results. As might be expected at such altitudes, extending from 2,200 ft. to 3,800 ft. above sea-level and under exposed conditions, trees of all species are heavily branched and of poor timber form, while the risk of snow and windbreak is always present. The study provides a good indication of the most suitable tree species for use in the extension of upland protection forests.

Many of the plots under observation in compartment 22/2, Whakarewarewa Forest, for the study of regeneration of insignis pine after clear-felling have fulfilled their purpose and have been thinned to a reasonably small stocking per acre. The fourteen plots that were recounted three times during the year at approximately four-monthly intervals revealed a successive stocking per acre of 2,666, 2,881, and 3,071. Trees killed by *Hylastes ater* during the same periods numbered 38, 20, and 1 per acre under the respective successive recounts. Only two plots showed the necessity of supplementary stocking by artificial planting, and they were located on logging-tracks and log-assembly areas. Plots on areas experimentally burned in June, 1942, produced very few seedlings and have been artificially planted up.

Six new plots were established for studying the following silvicultural problems: (1) development of western red-cedar mixed with European larch in a thirty-four-year-old stand (larch is being suppressed); (2) development of a thirty-five-year stand of lodgepole pine stand-cleaned at twenty-three years; (3) behaviour of an insignis-pine stand thinned at twenty-three years to 164 crop trees per acre; (4) increment in a Corsican-pine stand thinned from 1,258 to 430 trees per acre at thirty-three years; (5) regeneration of insignis pine clear-felled at nineteen years (3,040 well-distributed seedlings per acre were counted one year after felling, losses from *Hylastes ater* being only $\frac{1}{4}$ per cent.).

42. *Forest Botany.*—Projects instituted two years ago for the organized collection and recording of phenological data relating to the main exotic tree species were continued and extended to embrace the main indigenous species, and projects relating to collection and testing of tree seeds and to seed storage were continued. The 1943–44 season, like its predecessor, proved on the whole a poor seed year. Many years' observation will be required before the full value of the phenological studies can be realized. A few seed samples were sent abroad under exchange for exotic seeds.

CHAPTER VI.—FOREST PROTECTION

43. *Fire Protection.*—The summer of 1943–44 was very dry; even on the west coast the fire hazard was unusually high. The total number of fires reported from the lookouts in State forests was 2,541, but only 40 of these fires were in State forests, involving an area of 1,447 acres, most of which was scrub or fern country.

The most serious fire was in the Taupo-Wairakei locality, 38,400 acres being burnt over. Although only 70 acres of exotic forests were destroyed and the balance scrub and fern, the scenic amenities of this popular tourist area have been ruined for many years owing