

3 per cent. ; *P. patula*, 84.4 per cent. ; *Cupressus macrocarpa*, 10.5 per cent. ; *C. Lawsoniana*, 5.3 per cent. ; *Pseudotsuga Douglasii*, 0 per cent. ; *Cryptomeria japonica*, 7.5 per cent. ; *Cunninghamia sinensis*, 25 per cent.

The adaptability of the various species to the climatic conditions of the district is demonstrated from such plots, which are consequently of the utmost value to intending planters residing in their vicinity.

Fire-pumps.

A Pacific fire-pump er has been added to the plantation fire equipment at one South Island station, and trials under various conditions have proved its efficiency for use where a local water-supply is available. A one-man portable fire-pump designed by an officer of this Service has been used in several regions, and has proved its practical utility.



INSIGNIS PINE (*Pinus radiata*) ESTABLISHED BY DIRECT SEEDING, NOVEMBER, 1921, KAINGAROA PLANTATION (NEAR ROTORUA).

6. FOREST ECONOMY.

Forest Products Investigation.

Wood waste is a forest problem in the same class with timber-growing ; whereas trees grow slowly, lessening wood waste gives immediate results, and a tree saved is a tree grown overnight. It is, therefore, not sufficient to create State forests and plantations for timber-production and to assist private owners to keep their forests and plantations productive. It is equally necessary to build up a practical science of wood-use—to determine the right use for each and every wood, to make one house do the work of two by prolonging its life, and to lessen waste in forest and sawmill. As the Government's contribution to these problems, the Forest Service is seeking to materially expand its attack on timber waste. Demonstration by means of a well-equipped laboratory is the only effective means of securing sustained progress in manufacturing, seasoning, wood-preservation, and utilization technique, and a forest-products laboratory is urgently required to centralize and extend the work now carried out in the Universities and other co-operating institutions.

The wide range of forest-products studies carried out in the past year permits mention only of a few typical results. The completion of strength tests on green or air-dry material of eight species of native and exotic woods, including matai, miro, white-pine, rimu, kauri, hard beech, insignis pine, and Douglas fir, has advanced the testing programme of the Forest Service to such a point that a manual of mechanical and physical properties, together with recommended working-stresses and structural grading rules, will shortly be made available. By adopting international testing methods it has been possible to correlate the results of the local studies with similar investigations in the United States of America, Canada, and India, and to confirm the laws first established by the Madison Forest-products Laboratory of the U.S. Forest Service, relating specific gravity to the various mechanical properties. It is now possible, as a result of this work, to predict within close limits the mechanical and physical properties of woods based upon determinations of their specific gravity and structural composition.

Strength tests of full-sized telephone-poles were extended to include larch (*Larix europea*), drooping-gum (*Eucalyptus Risdoni*) and white stringy-bark (*E. obliqua*).