

be made. Experiments will also be made in the restoration of worked-out milling-forest by means of natural regeneration; but at present the officers with sufficient training to undertake these experiments are already fully occupied with other work.

#### GENERAL.

##### *Research.*

During the year there was considerable controversy as to the rate of growth of indigenous trees as compared with that of exotic trees. Excepting in the cases of *Pinus radiata* and the eucalypts, there is no reliable information as to the rate of growth to a millable size of exotics in this country when planted in large areas. Many persons have quoted the increments made by certain exotics grown as single trees or in rows as wind-breaks on good land as conclusive proof that such trees should be grown for timber in plantations on open lands in preference to any attempt to regenerate indigenous forests. Such a conclusion is, however, not warranted from such evidence, as the growth of single trees of a particular species is no criterion of the average growth of that species when it is growing in a dense stand on poor land—which, it may here be said, is the only land on which forestry should as a rule be practised on a commercial scale. As an instance of the truth of this may be given an eleven-year-old plantation of the quick-growing *Pinus radiata* at Hanmer, in which the trees were planted 4 ft. by 4 ft. apart; the average diameter (at breast-height and under bark) of the interior trees was only  $3\frac{3}{4}$  in., with a height of approximately 40 ft., whilst the same trees grown in single rows might be as much as 11 in. in diameter at the same age.

As regards the rate of growth of indigenous trees in the natural forest, very few observations have been made by competent observers. Mr. T. F. Cheeseman, F.L.S., has done some valuable work in connection with the kauri, and has shown that the diameter-growth (including trees up to 705 years old) is 4.8 years to 1 in. From measurements I have made on three kauri-trees and a number of boards the average diameter-increment obtained was 1 in. in 4.6 years, whilst one board 8 in. wide showed an increment at the rate of 1 in. of diameter in 3.6 years. One of the quickest-growing trees observed by Mr. Cheeseman was 11 ft. in diameter, and it had reached this at an *average* rate of growth of 1 in. in 3.6 years, which is probably not surpassed, if equalled, by any of the first-class conifers in natural forests in any part of the world. In the case of the kauri, when compared with trees in planted forests, it must be borne in mind that it has to contend with the unchecked competition of other trees surrounding it, whereas trees in a cultivated forest are for the whole of their growing period under the management of skilled foresters. Little has yet been done to obtain the true diameter-increment of other native trees. Measurements made by myself, however, indicate that the beeches and tanekaha (celery-pine) are fairly fast; that rimu and totara, though in early life slow, quicken as their crowns get to the light; that white-pine is slow; and that matai, silver-pine, and mountain-cedar are all very slow. Some matai and silver-pine specimens I observed had taken over fifty years to produce 1 in. of diameter. It can, however, be reasonably assumed that the rate of growth of all indigenous trees in the forest can be accelerated by the application of silvicultural treatment. It is of course absurd to condemn the regeneration of indigenous forests because some of the biggest kauri-trees are over 1,000 years old. It is of little consequence in forestry if a tree 12 ft. in diameter has taken five hundred or a thousand years to grow, but it is of great consequence how long a tree takes to reach the smallest diameter at which it can be profitably milled. The Californian redwood is a very quick-growing tree, and one that it is undoubtedly profitable to regenerate, yet it one is of the oldest trees in the world, some specimens having been found by American scientists to be over four thousand years old.

A research officer is shortly to be appointed to the staff, and one of his first duties will be to make a comprehensive investigation of the diameter, height, and volume increment of our chief trees throughout the whole of the Dominion. Mr. T. L. Lancaster, M.Sc., of Auckland University College, has already kindly started an investigation of this nature with regard to the kauri.

Instructions have been issued to district officers to obtain large samples of our indigenous beeches and other timbers in order that they may be sent to England to be tested for pulping purposes at the Imperial Institute. Samples of *Pinus radiata* are also being sent, and if the tests prove that this rapid-growing tree is suitable for the manufacture of wood-pulp there will be little doubt that it will be profitable to grow it on a large scale in this country for that purpose.

##### *Mr. D. E. Hutchins's Report on the Waipoua Kauri Forest.*

An exhaustive and valuable report by Mr. D. E. Hutchins (formerly of the Indian Forest Service) on the demarcation and future management of the Waipoua Kauri Forest was published during the summer. Mr. Hutchins strongly maintains that with proper management a continuous production of timber can be secured from a kauri forest, and that such production is cheaper than the production of timber from trees grown in plantations. He is satisfied that a very great mistake has been made in this country in allowing the clear-felling of kauri and the subsequent utilization for farming of the poor land on which it grew. Mr. Hutchins has a world-wide reputation as a forester, and his views and advice must receive most serious attention.

##### *State Sawmilling.*

But for the conditions resulting from the war, sawmilling by the Department would have been started in one of the forests of the North. The Railway Department has agreed to transfer to this Department its interest in the Puketi Forest, between the Bay of Islands and Hokianga Harbour.