

APPENDIX A.

NURSERY AND PLANTATION WORK IN THE ROTORUA DISTRICT.

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The annual reports of the work done by the State Forests Branch during the twelve years of its existence have from time to time given much information relating to the success or otherwise of the various species of trees tried, the extent of work done, and the expenditure incurred. For the benefit of farmers and others who find it necessary to grow trees, it is now proposed to amplify this information somewhat by giving a brief account of the methods used in propagating the trees and forming the plantations in this district. Many useful publications dealing exhaustively with the propagation of trees are easily obtainable, so that in this article it is not intended to detail every known system, but rather to describe only the methods which have been adopted here, and which have been found to give the best results in every respect.

The Rotorua Nursery, where trees are grown for supplying the Whakarewarewa and Waitapu Plantations, was established in 1898. It is excellently situated about two miles from Rotorua Post-office, and has a north-western aspect, while on the southern side a range of hills affords protection from the early morning sun and cold southerly winds. The largest portion of the property is level, or nearly so, the gradient in the parts under cultivation in no place exceeding 1 in 20. The soil is similar to the general run of land in this district, being of a light pumiceous nature, easily worked, and requiring no artificial draining. Generally such land in a virgin state carries a strong growth of bracken on the slopes, while on the lower-lying parts either manuka-scrub or tussock is usually found. For forest-tree-nursery purposes the soil is perhaps equal to any in the Dominion. It is fairly rich in mineral matter, has a not inconsiderable amount of humus, and a wonderful capacity for holding moisture without becoming waterlogged. This last fact is very apparent in grass paddocks which have been established for some time, and where the land has become consolidated by stock. Through a dry summer the grass will retain a greenness that is absent in most other districts. Continuous tilling such as is necessary in a nursery causes the humus to deteriorate very quickly, and it is absolutely essential that this should be replaced by green manuring, hence an area that is sufficient to permit of change of crops is necessary. Of the manures, lime was applied on all new land broken up for the first time. Bonedust and superphosphate are also used for many crops, but on the seed-beds, which carry dense crops of young trees, stable manure is largely employed. The nursery-area has been laid out into "breaks" 3 chains wide, divided by 20 ft. roads. These breaks are further divided by cross-roads at convenient distances, and by hedges for shelter purposes. Water-pipes are laid throughout the entire area, with standpipes at convenient points for watering the seedlings and puddling the trees.

RAISING TREES FROM SEED.

With few exceptions, all the trees produced in this nursery have been raised from seed. The chief sources from which supplies of seed are procured are as yet necessarily in the Northern Hemisphere, the seed of those species indigenous to North America being procured in North America, while European species are procured in England or Europe. Seeds of a few species are now saved in New Zealand, *Pinus insignis*, *Pinus muricata*, blue-gum, oak, ash, and birch being the principal ones, and these are usually of a high germinative quality. Much of the germinative power of imported seeds is lost by the time we are ready to sow them, but nevertheless the cost of seed for a thousand trees is reasonably low, as will be seen by the following table:—

Table comparing the Germinative Quality of Several Species of Tree-seeds; Cost of Seed for 1,000 Trees; also Amount of Seed usually sown per Square Yard.

Name of Tree.	Average Number raised per Pound of Seed.	Percentage of Germination.	Cost of Seed per 1,000 Trees.	Amount of Seed sown per Square Yard.	Remarks.
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European larch ..	3,500	4.0	0 9	2	European seed.
Corsican pine ..	5,500	8.0	0 8	1	" "
Heavy or bull pine ..	3,200	25.0	3 4	1 $\frac{3}{4}$	American seed.
Weymouth pine ..	2,000	0.23	6 1	1 $\frac{1}{2}$	" "
Douglas fir ..	5,400	13.5	2 6	1 $\frac{1}{4}$	" "
<i>Pinus insignis</i> ..	11,000	10.0	0 4	1	New Zealand seed.
Redwood ..	1,200	1.22	12 7	1	American seed.
Eucalypti ..	22,000	Not known	0 3	0 $\frac{1}{4}$	Australian seed.

As a rule, seed-sowing in this district commences in October, and continues well into November, until the work is completed, the method being as follows: The land, which has been top-dressed with well-rotted stable manure, and ploughed during the early part of the previous winter, is formed into beds 6 ft. wide, with an alleyway of 2 ft. between each bed. The beds are then top-dressed with bonedust and superphosphate, and raked level. On one edge a wire line is strained tight, and secured in several places with iron pins. A heavy hardwood roller (see plate No. 1) is then slowly drawn over the bed, care being taken to keep the edge of the roller against the wire to insure straightness. The dimensions of the roller are: Length, 6 ft.; diameter at the widest parts 12 in., and 11 in. at the narrow parts; the wide divisions are 13 in. across and the narrow ones 4 in. When the roller passes over the