

spaced—now 20ft. or more—mixture of Lawson's cypress with European larch; this probably was the original mixture. Many larch have died out, but the remainder have made good growth and this now forms one of the most satisfactory mixtures on the holding. The cypress has made good height growth of about 60ft., with a good, straight bole, now partially cleaned up, and appears to be still adding to its diameter. One tree which had been down for about 4 years appeared to have perfectly-sound timber, and this will be sawn up for trial.

In 1913 Lawson's cypress was planted in mixture with *Pinus rigida*, but the pine failed to establish itself when the cypress crop was over 10 years old and it was interplanted with Oregon pine. This mixture so far has formed a good combination, and the Lawson's cypress has put on unusually-good height growth, but the 2 species are now competing for light and space and probably the mixture has been successful here only because the Lawson's cypress had 10 years' start and thus could hold its own in competition with the Oregon pine.

Key to Management

Much of the planting at Puketiti which is now producing good specimens of various timber trees has been formed by the unsystematic establishment of a general mixture of species of broad-leaved trees, including native species, and conifers. These areas have received no thinning and show the results of competitive survival. In that respect they form a key to the most suitable trees for the locality, but the rate of growth of the best specimens cannot be taken as a criterion of their possible growth under plantation conditions.

On such areas the mixture of conifer and broad-leaved species has produced in its 40 years of growth a thickness of 2 to 3in. of true humus cover, which is now forming a forest soil in which regeneration of both introduced and native species is prolific.

TREE SPECIES ON HILL COUNTRY



Natural regeneration of *Eucalyptus sieberiana* on a dry, rocky north-west face.

This holding thus demonstrates the possibility of re-establishing tree growth on vulnerable areas of this east coast country. It shows also the first steps necessary in employing tree planting as a routine item in station management for the immediate stabilisation and rehabilitation of slopes which are of more value under forest than when cleared for pasture and forming a potential focus for extensive erosion.

Timber Use

The tree crops now growing on Puketiti station collectively provide a valuable demonstration of the possibilities of growing many tree species, both exotic and native, under the conditions on that area. Plantations there show results from both good and bad silvicultural methods of growing trees, and samples are now available showing the growth of nearly 40 species of timber trees of ages between 20 and

40 years. However, little information is available about the quality of the timbers grown, and the owner has been more concerned with the possibilities and methods of growing the trees than with the utilisation of the timbers produced.

These plantations contain material which could furnish a vast amount of much-needed information about the growing and the utilisation value of many of the species now grown in New Zealand. Much information of this nature is available also from similar areas of trial plantings throughout the Dominion, and these at present form the important sources of knowledge on which to base any judgment of the behaviour of introduced species under New Zealand's varied climatic conditions, and especially of the potentialities of many eucalyptus timber species.

To be of most value all such information should be collected on an agreed systematic basis so that it can be analysed and correlated at a central clearing station, such as the State Forest Service experimental station. Such a Dominion survey, based on material now approaching maturity, would provide a knowledge of the quality and uses of available introduced timbers which is required urgently in this period of general timber shortage.

The rather random trials made to date at Puketiti give the following indications of timber use values:—

Cupressus macrocarpa: Strainers and posts cut from 40-year-old trees and air seasoned have given a life of 14 years and are still sound in the ground. Mr. Williams prefers to use timber from clean trees grown in close plantation rather than material split from rough, branchy, basal logs.

Pinus radiata, split for battens and preserved, has been used extensively on the station and shows an effective life of 14 years. Two types of preservation have been used—soaking the battens for a month in spent arsenical sheepdip, or immersing them in a mixture of equal parts of coal tar and used motor oil, boiling them for 1 to 2 hours, then draining them. The



A stockyard built with posts of home-grown *Robinia pseudacacia* and rails of *Eucalyptus obliqua*.