

## TREE PLANTING ON EAST COAST HILL COUNTRY



Plantations of eucalypts on Te Wake plantation. The central portion is held by spaced planting of willow and poplar.

with an average total height of 137ft. and an average diameter of 18in. One big tree which was measured had a total height of 166ft. and a diameter of 24.3in.

No timber has been cut and tested at Puketiti, but it is possible that this species may be usable for poles if impregnated. Tests of its durability elsewhere have been made only recently and give no final results.

Prolific regeneration of this species, about 5 years old, has established itself on a thin soil cover on a rocky northerly face, which indicates a probable ease of establishment.

### Other Eucalypts

Other species of eucalyptus making satisfactory growth on this area are *E. botryoides*, *E. acervilla (ovata)*, and *E. globulus*. A species deemed unsuccessful on this station is *E. hemiphloia*, which made only straggling growth and was cut out.

### Silvicultural Mixtures of Species

#### Oregon Pine and Californian Redwood

In 1922 a block of land with a north-easterly aspect on a slope of 45 degrees was planted in Oregon pine and redwood spaced at 7 to 8ft. with trees of alternating species in each line. The surviving marginal trees are now chiefly Oregon pine, but throughout the plantation the greatest number of thriving trees are redwoods. The crop has not been thinned and has selected itself naturally in the ratios of 1 Oregon pine survived to 6 suppressed and 9 redwoods survived to 1 suppressed. In the total crop the average stocking of live trees is now 55 per cent. redwood and 45 per cent. Oregon pine, but most of the pines are suppressed and dying trees while the redwoods are growing vigorously, an average tree measured having a total height of 64ft. and diameter at breast height of 14.3in.

In general, these 2 species have the same requirements of soil, aspect, and

climate, but early growth of Oregon pine is usually more rapid. In this case, evidently, optimum conditions have been provided for the redwood, which has overtaken the Oregon pine, which being more light demanding has gradually become suppressed as the height and lateral growth of redwood have overtopped its stems, shutting off light.

This block has also shown that this spacing of 7ft. by 7 or 8ft. between lines is too close for both species on this site. Spaced much more widely this mixture might be successful on this area, but the general conclusion is that both species should rather be grown in pure plantations.

#### Oregon Pine with Eucalyptus Species

In the old plantation a block of Oregon pine was planted at 9ft. with the object of making this the permanent crop, but with the aim of obtaining early, clean timber fast-growing eucalypts were planted between the pines. It was planned to remove these after some years when they were no longer required to clean the conifers, but after about 30 years the eucalypts have made such heavy growth that it is now found impossible to remove the trees without risk of damage to the still-immature Oregon pines.

It is concluded from this trial that though the theory was correct it failed in practice in this mixture for several reasons. In this instance the exceptionally-suitable local conditions for the growth of eucalypt species produced unforeseen and excessive growth of the secondary crop and these eucalypts were left too long in the mixture. It would have been better to have sacrificed the trees by cutting them out when crowding first began, but removal became increasingly difficult, accentuated by the excessively-close original planting of the crop (4½ft.).

Such a mixture might be successful with much wider spacing—say, 12ft. between the Oregon pines with inter-

spersed eucalypts—and if the eucalypt species used were one which had a slightly-slower height growth rate than that of the pines and were one which could be utilised and removed gradually in the first 20 years. However, with the rate of growth of Oregon pine shown on this holding it is thought that pure crops planted at suitable spacing would be preferable.

#### *Cupressus macrocarpa* with Broad-leaved Species or Conifers

Groups of various mixed species with *Cupressus macrocarpa* are scattered through the older plantations. In most cases the mixture has been formed by the blanking up of failures rather than as planned crops.

The formed mixture in the sheep-yard plantation of *Cupressus macrocarpa* with *Pinus ponderosa* at 5 to 6ft. spacing is not satisfactory. It favours the growth of the cypress without cleaning it, while the pine tends to be overshadowed and retarded.

In another group the mixture was *Eucalyptus botryoides*, *Cupressus macrocarpa*, and *Pinus ponderosa*. The resulting crop after 20 years has become a struggle between the eucalyptus, which is now generally dominant, and the cypress, which has asserted itself in uneven groups.

A mixture of *Cupressus macrocarpa* with oak spaced irregularly but at an average distance of 8 to 10ft. appears to give promise as a satisfactory mixture on this area. The growth rate of oak is good where it is not exposed, and in this combination it may provide the necessary secondary cleaning crop to produce clean macrocarpa timber without being itself suppressed by the cypress, while the broad-leaved trees add appreciably to humus formation in the soil.

#### Lawson's Cypress with Other Conifer Species

The oldest Lawson's cypress group has developed partially into a widely-