

## TREE PLANTING ON HILL COUNTRY

latter method has been used mainly for old and already air-seasoned battens, and the opinion is expressed that with the use of oil alone these hardened battens will not hold staples.

**Oregon pine:** Suppressed trees removed as thinnings and air seasoned are used for rails and are sound after 15 to 20 years. Small trees split into halves make excellent battens, apparently of exceptionally-long life.

**Robinia pseudacacia:** Timbers cut from trees 20 to 30 years old are used in the round as posts for fencing and in construction of stockyards. They show no deterioration in at least 10 years.

**Puriri** strainers cut from bush timber on the station and in use for 25 to 30 years show surface shrinkage but sound heart condition above and below ground. Indications are given that posts cut from trees grown for 20 to 25 years on the area probably will prove suitable for lasting use.

**Lawson's cypress:** 2in. x 1in. timber cut from probably the upper portion of a tree about 20 years old which fell in the plantation was used in a station gate after air seasoning for an unknown period, and it has remained sound for 9 years with 1 coat of paint.

**Willow**, split for battens, is soaked in spent dip and used extensively in farm fencing. No differentiation is made between the species of *Salix*.

**Eucalyptus acervilla (ovata):** Timber split from 20- to 30-year-old trees and air seasoned is used for gate posts. They give promise of being durable, but have not been tested for a definite period. Air seasoned, the timber is used for battens.

**Eucalyptus obliqua:** Battens and rails split from 40-year-old trees are being tested on fences. Rails in the round have been used in stockyard construction.

**Eucalyptus corynocalyx:** Scattered trees have been felled for trial. The timber is extremely hard and appears to be durable when used as posts without preservative treatment, and these trees are considered to give the best post timber of all the eucalyptus species grown so far. It may be a promising species for this purpose under Puketiti conditions if grown in close formation. The growth reached in about 30 years gives suitable dimensions for small pole timber, and a trial of this as a farm telephone pole has been put in hand.

### Planting Methods

Measures to combat land movement include 3 phases: First, fencing an area against stock and thus spelling it from grazing for several years while trees are established; that enables the land to become stable, and on a large holding the loss of use of the land is not as important as stabilisation. Second, the establishment of widely-spaced planting as a preventive measure, to fix and stop the land movement, or to hold the fixed area. Third, the formation of closely-planted areas to hold and stabilise the moving land; apparently this is of permanent effect when the correct species are used.

For widely-spaced planting poplars are preferable to willows, as they last longer and retain their regular shape, while the willows form heavy, branching tops, which die off much sooner and fall, leaving dead, troublesome snags on the land, which must be replanted. Probably more general use



A grove of puriri planted about 1915. Their average height is 30 to 40ft. and their average diameter 14 $\frac{1}{2}$ in.

of osier willow (*Salix vitellina*) would produce a more uniform low cover, and when the area was opened to grazing its propensity to spread indiscriminately would be controlled by stock. The trial of *S. purpurea* (Chinese willow) is promising, and though stock do not appear to touch it it is apparently slow in spreading.

In the formation of plantations the method used at Puketiti, where ground could be ploughed, of sowing tree seed in strip nurseries and using this area temporarily to produce tree stocks, part of which are left as the permanent crop, is suited to the type of planting which should be more widely practised on east coast high country. There planting operations must be undertaken as other station work allows, and with such a method the farmer does not depend on bought-in nursery stock with its delay in delivery and the danger of deterioration between the time the trees are taken from the nursery and the time when they are replanted.

In the remoter areas some local system of co-operative raising of planting stock by farmer groups might be evolved. Acclimatised stock would then be available without excessive transport delays.

### Mixed and Pure Crops

In the choice of the type of planting most suitable for the hill country these facts emerge:—

**Mixed crops**, if they include broad-leaved species, are of more value in forest soil formation and to provide conditions for natural regeneration of tree species. Mixtures of conifer crops have not proved satisfactory except in the case of Lawson's cypress and larch. The *Cupressus macrocarpa*—*Pinus ponderosa* combination indicates that a similar mixture at suitable spacing may produce a better macrocarpa crop.

**Pure crops** of 1 species with the rapid rates of growth produced under Puketiti conditions are more suitable for timber production. Mixtures formed by group planting have given good timber production, but are difficult to work in utilisation operations.

More information is required about the most suitable spacing in plantations for the main species. Wider spacing is indicated than has been general at Puketiti—probably 7 to 10ft., according to species.

### Successful Species

The following species are established as successful on this area: Oregon pine, redwood, *Cupressus macrocarpa*, *Pinus radiata*, Lawson's cypress, totara, puriri, *Robinia pseudacacia*, *Eucalyptus regnans*, *Eucalyptus obliqua*, *Eucalyptus gigantea*, *Eucalyptus corynocalyx*, *Eucalyptus sieberiana*, and *Acacia melanoxylon*.

Species of doubtful growth value are *Eucalyptus viminalis*, *Eucalyptus saligna*, and *Pinus ponderosa*.

Species unsuccessful are *Eucalyptus hemiphloia* and *Pinus rigida*.

Local production of farm timber supplies will be necessary on the east coast and has been shown to be possible, but more knowledge is required of the utilisation value of species now being grown and further trials of other likely species are necessary. So far little guidance is available as to the best management of formed plantations for utilisation for farm purposes, and a survey and technical timber-use test would be of great value to farmers in the next decade. In this period also information may be available to enable an assessment of the financial returns of timber growing in combination with hill-country farming.