

DUSKY HILL PLANTATION, OTAGO.

(Area, 845 acres; altitude, 400 ft. to 800 ft.; commenced operations, 1898.)

A comparison of the meteorological statistics between this and other local stations shows that, although the total rainfall for the year almost coincided, the precipitations were somewhat more frequent. The influence of the favourable season upon the larch is decidedly conspicuous, and, although perhaps tree-growth was not marked by any greater rapidity, a more healthful tone now certainly prevails over the *Larix europaea* blocks where two years ago unseasonable defoliation occurred. The partial discoloration of needles during the summer months is still apparent; but indications point to a gradual recovery from what appeared to be a fungus disease, and which is now attributed to the effects of the prolonged dryness experienced during the year 1909.

Allusions to Tree-growth.—In commenting upon the progress of different varieties of trees and their success in association, the undertaking of experimental work here for the benefit of the more recently created plantations cannot be lost sight of. Anticipations of prominent writers have not been borne out by the progress of the various trees used in mixture, and it is quite certain that knowledge of the local possibilities of each variety operated with must also be gained before even a partial success can be obtained in mixed planting.

Originally a compartment was formed of larch, Oregon pine, ash, and Norway spruce. The ultimate crop was to be Oregon pine and ash, and the functions of the larch were principally to nurse the more valuable trees. Contrary to expectations, however, most inconsistent headway has been made by the ash and Oregon pine, as only about 35 per cent. of the latter and 10 per cent. of the former trees have been able to keep apace with the rapidly progressing larch, and, strangely enough, the Norway spruce, a supposed shade-bearer, remains at thirteen years of age only about a foot taller than when planted, whilst the nurses have attained an average height of about 36 ft. Throughout this compartment exceedingly strong specimens of Oregon pine, measuring at breast-high about 25 in. in girth, are noticeable, clothed almost to the ground-surface with strong live branches, and clearly demonstrating the necessity of closer planting and the failure of the surrounding larch to sufficiently check the natural branching habit of the valuable evergreen. Each succeeding year the superiority of Japanese larch over the European species in uniformity of growth and healthfulness is proved. It is a somewhat slower grower here, but an examination of the interior discloses a greater evenness in pole development, with laterals of a more slender nature. After harbouring a belief for some years that all the *Picea excelsa* and *Picea sitchensis* would eventually respond to the conditions and make rapid headway, we are forced by their continued sluggish growth to admit that the spruces will not succeed on the very exposed sidelings, although where the soil is more fertile and partial shelter is available the prospects are excellent. A shelter-break of *Pinus radiata* bordering the Pomahaka River has been planted, and further experimental work in loosening the surface around each tree is in operation, so that it may yet be possible to report favourably on the spruce-plantations. An improvement in the growth of the hardwoods—*Fraxinus excelsior*, *Fraxinus americana*, *Quercus pedunculata*, and *Acer pseudo-platanus*—is due to the abundance of moisture; but the susceptibility to injury from early frosts was again shown by the walnuts and chestnuts and any belief that either of these trees can be satisfactorily grown for timber purposes locally should now be discarded. The *Pinus Laricio* and *Pinus austriaca* are justifying their inclusion here by healthy and speedy development. Of the two pines, the Corsican species, by a regular annual growth of about 16 in., promises to surpass the Austrian, which, however, is probably hampered slightly by the presence of the white aphid, whose influence temporarily lessens the yearly growth by from 2 in. to 4 in. During the past two seasons exceedingly good results in the pure *Populus deltoides* stand is noticeable; but, as may be seen from the photograph herewith, the branching habit requires controlling by closer planting. The cuttings were planted fourteen years ago at from 6 ft. to 7 ft. over a swampy area, and the trees have now attained a height of from 36 ft. to 40 ft.

Red Deer.—The presence of the red deer is decidedly irritating, and the animals continue to injure the young hardwoods. It is safe to assert that some hundreds of valuable ash-trees, ranging from 3 ft. to 10 ft. high, have been destroyed by this agency, although not irretrievably, as by judicious pruning it is possible to foster a new robust leader when the root system is in a healthy state. A suitable rifle being procured during the year, a stalking expedition was arranged occasionally, and it is gratifying to be able to say that four trespassing animals were thus destroyed, although the density of the plantation renders the complete eradication of the pest a tedious matter.

General Maintenance.—Rather more labour was devoted to tree-pruning than usual, and the item "Removal of coarse growth from around trees" helped to increase the expenditure under this heading to £122 16s. 6d.

Realizing that the removal of decayed lateral branches of larch requires to be undertaken as soon as possible, the trial cutting over some acres was continued, and proved somewhat more costly than we anticipated. One man was able to cut and remove the small branches from 400 to 500 trees per day, so that such labour could not be carried on over an acre under the present conditions for less than £2.

Some 11,500 trees, principally *Pinus Laricio*, were received from Tapanui Nursery, and used for replanting purposes, and arrangements are now well in hand to continue this season's policy begun of replanting small blocks containing bark-bound hardwoods.

All fire-breaks were put into an effective state somewhat earlier than usual; but little anxiety from fires was felt here, as rarely was the vegetation sufficiently dry to permit of firing.

A useful shed of small dimensions was erected for the storage of tools, and minor improvements were effected to gates and buildings.

An expenditure of £346 10s. 10d. was incurred during the year, which advances the total expenditure to £13,185 8s.