

CONICAL HILLS PLANTATION, OTAGO.

(Area, 3,672 acres; altitude, 400 ft. to 1,050 ft.; commenced operations, 1903.)

Instruments for registering meteorological data were acquired for this station, and being placed at an elevation of about 1,000 ft., the comparative value of such records with those kept on the lower altitudes has more than compensated for the small expenditure thus incurred. During the year 38.55 in. of rain fell on 164 days. The maximum shade temperature was 86° in February and the lowest 22° on several occasions in July and August. Freezing-point was reached on seventy-two nights, and, as might be anticipated, the five frosts occurring late in October proved somewhat detrimental to the leaders of the less hardy varieties of trees. Although we do not possess the appliances for ascertaining details of wind-pressure, it is indeed doubtful if in any previous year since operations began here the south-westerns have been either so persistent or of such force, and under these conditions it is not surprising to find youthful trees occupying exposed situations acquiring a decided tendency to lean to the leeward side.

In this brief review of the year's work it is encouraging to be able to allude to the satisfactory results achieved. Much headway has been made by the well-established trees, and the issue from the season's planting has been equally encouraging, probably only 5 per cent. of deaths accruing from the 1,088,720 trees operated with. Notwithstanding the prevalence of an unhealthy appearance throughout the *Larix europea* blocks, it is questionable if over any similar period more vigorous headway has been made by the larch, whose height has been increased from 15 in. to 24 in. With each succeeding year the meritorious growing qualities of *Pinus laricio* is made evident, and its progress has so far been checked neither by climatic influences nor pests of any kind, and a steady increase annually of from 15 in. to 20 in. has been maintained since the second year after planting. Under similar conditions *Pinus austriaca* are thriving; but the species has contracted, though only in a mild form, the disease known as pine aphid (*Chermes laricis*), which, according to personal observation in older plantations, seriously interferes with the pine in its youth, but appears to lose its influence with the tree's advancing age. Again *Pinus ponderosa* has demonstrated the various conditions under which it may be successfully planted, whether on semi-fertile flats or exposed rocky ledges; where the surface soil is not over abundant this yellow-pine succeeds with a consistent annual progress of from 9 in. to 13 in. Although the *Picea excelsa* have for years remained almost stationary (with the exception of those growing in the more favoured positions), it is not unreasonable, in view of their present healthy state and sturdy growth, to forecast the continuation of the past season's headway and subsequent development into commercially valuable timber, although it is not the present desire of the Department to extend the Norway deal compartments. As hitherto recorded, the Oregon pine (*Pseudo-tsuga taxifolia*) flourishes on low altitudes, where the soil is of at least fair fertility and shelter abounds. An annually recurring trouble in the Oregon compartments, which contain 87,325 trees, is, however, the injury to leaders by heavy winds; but should a wind-barrier be provided prior to operating with this valuable tree, no reason can be advanced why complete success should not be the outcome. On the low-lying areas both *Alnus glutinosa* and *Populus deltoides* are showing their partiality for the conditions. Of the two varieties, alder maintains more consistent growth, with an average annual headway of about 18 in., or 2 in. in excess of the poplar. In accordance with a projected scheme for covering the hilltops with *Pinus radiata* and effecting the double purpose of shelter and dense forest, some 18,250 pines of this species were planted, but only with a fair measure of success, owing to heavy gales interfering with their root-hold at a critical period. Where established, both *Pinus radiata* and *Pinus muricata* yearly make from 30 in. to 48 in. of vertical headway, and are both reliable shelter-producers. Experience gained here clearly shows the fallacy of attempting to grow any of the hardwoods on exposed hillsides. Shelter and a soil of medium fertility is essential, and under such conditions ash and oak are readily responding. A small experimental lot of *Pinus rigida* promises well, but *Pinus strobus* are evidently occupying an uncongenial position.

Pitting and Tree-planting.—In carrying out the usual yearly replanting-work some 58,085 trees were utilized, which reduces the number available for extension purposes to 1,030,635. In view of the mutual benefit arising from contract planting, a similar arrangement to that of the previous year was adopted, and employees were able to earn a reasonable wage by planting at 12s. 6d. per thousand. The preparation of 1,288,060 grubber pits was also undertaken at the same rate, and every satisfaction given. Our requirements being slightly exceeded owing to an unexpected decreased output of trees, the surplus pits will be availed of during the current year, when less expenditure will be necessary to carry on operations generally.

Fire-breaks.—The fact of having ploughed, disced, and harrowed some 93 acres of fire-break on this station alone this year should impress persons who are repeatedly referring to our lack of attention in providing barriers to any fire that might arise either from outside or within the forest reserve that this phase of afforestation receives full consideration. There will always be danger from conflagrations, particularly when plantations are surrounded by holdings where tussock growth is abundant; but such danger is reduced to a minimum whilst the gang of men are in the vicinity of the outbreak. Great uneasiness would be felt, however, in the event of any outbreak at such a time when firefighters were unprocurable, and, although our external fringing fire-breaks might check the progress of the fire unaided notwithstanding the prevalence of a high wind, there is always the danger of burning debris being blown from a considerable distance and defeating the object of our cultivated breaks. To renew his pasture, an owner of adjoining property fired the tussocks; but a strong wind springing up made the position somewhat serious until the Department's employees came on the scene and assisted in the timely suppression of the "burn." In pursuance of a scheme outlined in last report, an experiment having