

nate that our young forests were not called upon to withstand the terrific gales experienced in parts of Canterbury during October, otherwise deplorable losses might have ensued. Irreparable injury was created to several of the large Selwyn plantations of *Pinus radiata* and *Eucalypti*, and wholesale removal of trees and subsequent replanting is now being resorted to in the endeavour to restore the useful purpose of the almost indispensable shelter-breaks. It is indeed surprising that such havoc should so suddenly be played with trees that have thriven for thirty years or more. We are thus opposed to a greater adversary in the wind-factor than was supposed, and must make still greater provision for the inclusion of pioneer wind-resisting trees on the northern and western quarters of exposed plantations.

BRIEF ALLUSIONS TO UNSUITABLE PRACTICES.

With the development of plantations the effects arising from the injudicious selection of trees for certain positions becomes more pronounced, and as knowledge regarding local conditions and behaviour of certain trees, when confined to uncongenial situations, is acquired, areas planted with unsuitable varieties are again being dealt with. Previous references have been made to the experimental nature of much of our tree-planting work. Although the results achieved by New Zealand's pioneer tree-planters demonstrated clearly what might be accomplished under a variety of conditions, the fact cannot be overlooked that the State in its earlier operations was confronted with sylvicultural problems the solving of which could only be determined by well-directed and sustained experiments. Although the necessity for somewhat extensive replanting-work is regrettable, New Zealand's experience in this direction is not unique, as personal observation during my recent tour disclosed the introduction of equally drastic measures, even where scientific forestry practices have been in evidence for generations. At each of our stations instances of what not to do are conspicuous, and it is only by the strict observance of the conduct of trees under varied influences that we can ever hope to make afforestation on second- or third-class lands a remunerative proposition. In the southern plantations the hardwoods—*Fraxinus excelsior*, *Quercus pedunculata*, and *Acer pseudo-platanus*—were not only originally used in admixture, but were allotted some of the most exposed positions, with the result that after about twelve years the trees would not average an annual vertical development of 4 in.; and, further, in nearly every case the shelter afforded by pines in the vicinity has had no appreciable effect upon the apparent barkbound hardwoods. Then, again, both Douglas fir and Sitka spruce have been intensely disappointing, owing to the susceptibility of their tender leaders to injury from high winds. Although a fair proportion of these trees are making good headway in the highly sheltered valleys, the progress of those placed at more elevated situations gives indication of their being in a constant state of interruption, and consequently even partial success cannot reasonably be anticipated from these varieties under the conditions outlined. In Central Otago larch and pines (both light-demanding trees, but of entirely different progressive habits) have been planted together, and after about the fifteenth year the former variety has completely outstripped and promises to quickly suppress its more valuable neighbour. At Hanmer Springs a fairly large area of ground is covered with *Picea excelsa*. We have shared the optimistic opinions entertained by sylviculturists generally regarding the probability of rapid headway on the spruces becoming quite established; but after some ten or twelve years' watchfulness there appears to be no other alternative than to replant the area with fast-growing pines, and assist any of the shade-bearers that may find the eventuating conditions congenial. Our operations with the sensitive larch have also not been completely successful, and over a very large area the probable results cannot yet be forecasted with any degree of certainty. It is certain, however, that where this variety of tree is subjected to such almost incessant boisterous winds as have been experienced in portions of South Otago during the past four seasons the production of straight boles for milling purposes is an impossibility; nor is the creation of efficient protective shelter-belts across fairly abrupt hill-faces with a westerly aspect practicable. Contrary to expectations, the larch are somewhat easily affected by winds, and the trees are assuming that decided leaning tendency which seriously interferes with the future conversion of such timber. There can be no doubt, then, that a very large proportion of ground earmarked for future operations in the South is only suitable for the production of pinewood, whilst hard woods should be lightly represented by the more sturdy species of *Eucalypti* in place of the overplanted English ash and oak.

PROMOTING ECONOMY BY INCREASING PLANTING-DISTANCES.

Although allusions to the above matter have been made in the special report appended, further explanatory references in support of the proposition will doubtless not be out of place here, particularly as our planting policy has already been affected by the adoption of the measures advocated. What must be considered as one of the most important alterations in the afforestation scheme originally devised is the decision to increase spacing-distances between trees. This idea has only matured after careful investigation into, and comparison with, methods adopted in other countries. In Europe the combined agencies of cheap labour and ready sale for even such waste as pine-needles (which are utilized for bedding stock) make close planting justifiable; but generally in New Zealand we are faced with reversed circumstances, and therefore aim at creating district forests that will meet the requirements of the locality. The increasing of our spacing for, say, *Pinus Laricio* from 4 ft. up to 4 ft. 6 in. and 5 ft., and *P. radiata* to even 8 ft. (according to circumstances), in the South Island will during the coming year effect a saving of at least £800 in actual planting-work alone, whilst the future maintenance and thinning operations will have an appreciable effect upon the economic issue. It will be readily understood that under the new spacing-scale afforestation areas will be more readily exhausted should the present output be continued, for in place of 1,000,000 trees occupying 368 acres as formerly, this number in equal division of *Pinus Laricio* and *P. radiata* will require an area of 600 acres.