

which interferes somewhat with the progress of trees, in the more moist localities the Austrian pine is making unrestricted headway, and promises to rival in vigour the recognized healthier Corsican species. The Oregon pines are showing their partiality for shelter, but winds play such havoc with the tender leaders that it is questionable if we shall be able to produce any quantity of this valuable timber. Although the *Larix europaea* are in places showing evidence of renewed activity, it seems unlikely that our earlier anticipations regarding the suitability of the larch for even the most ideal conditions in the south will be borne out. Frosts and winds have undoubtedly played an important part in stunting the growth; but to these factors solely cannot be attributed the continued premature needle-shedding. Perhaps it will be possible, after examining larch plantations on the Continent, to accurately determine the cause and probable outcome of the trouble.

CONTROL OF PESTS.

Grass-grubs.—In accordance with intentions outlined in last report, special provision was made to combat the destructive grass-grubs. The almost continuous wet condition of the surface, however, forbade our complete adherence to the proposed scheme, although through the efforts directed considerably less destruction amongst the seedlings has eventuated this year than in the previous one. At Tapanui the yearlings, which have hitherto given us the greatest cause for anxiety, almost escaped injury, although the lined-out trees have again suffered, but in a lesser degree. Soil-fumigation with apterite and vapourite was extensively carried out, over 5 cwt. of these compounds being used in the operation. In addition, 5 tons of gas lime and 2 tons of kainit were also applied to areas over which the larvæ were numerous; but blocks so treated require to remain fallow for at least from nine to twelve months, during which time the discs and cultivator should be freely used. The most difficult problem to face, then, in affected localities is the eradication of the pest over the lining-out areas, and, after conducting a series of experiments, no better means of accomplishing this end can be advanced than judiciously applying gas lime or apterite to render the soil obnoxious to the beetles, and subsequent frequent cultivation when the ground is in a sufficiently arid state that no consolidation of the surface will accrue from the necessary trampling by horses. Several tests with apterite, vapourite, permanganate of potash, &c., to demonstrate the possibility of killing outright the grubs, with the application of a reasonable quantity of the compounds, ended disappointingly, and, in my opinion, the asphyxiation of beetles or grubs cannot be accomplished with the mentioned fumigators at a price otherwise than prohibitive. According to the Biologist to the Department of Agriculture, three species of grass-grubs are in evidence at Tapanui—*Odontia zealandica*, *O. xanthosticta*, *O. sandageri*—and this fact explains the lengthened periods of flights by the beetles. An excellent dry summer has permitted the desired intense-cultivation work to be carried on, and the trouble from the pest will more than likely be lessened during the ensuing season.

Red Deer.—Although it has been necessary to obtain special warrants empowering officers at Conical Hills and Hanmer Springs Plantations to destroy trespassing deer, it is gratifying to be able to report that generally less damage to trees has been effected by the animals than in the preceding year. Arrangements are now in hand to heighten the northern boundary-fence at Hanmer Springs Plantation, and a similar scheme to check the ingress of the red deer at Dusky Hill will be initiated, should circumstances at any time warrant this expenditure. An occasional stalking expedition by officers resulted in several animals being shot.

PINUS RADIATA.

A few passing remarks concerning the increased activity in operating with *Pinus radiata* may not be out of place here. Until recently the timber of the Monterey pine was not regarded seriously by tree-planters generally as possessing such commercial qualities as a number of others of the same genus; but an awakening to the fact that *Pinus radiata* not only provides rapid shelter but produces marketable timber in less than twenty years has steadily gained ground, until now the excellent future of the fast-growing pine is acclaimed on all sides. Special provision was made last year by the Department to raise an unusually large number, and from 150 lb. of seed no less than 1,190,000 sturdy yearlings have resulted. The light seed-cost and simplicity of propagation of *Pinus radiata* renders comparatively cheap afforestation-work possible with this pine, which finds low-lying and elevated positions equally favourable for its progress. We are at present planting the species 6 ft. apart, a spacing distance that appears in older plantations to provide ample room for bole development up to a profitable thinning-out stage without unduly interfering with the well-known characteristics of the tree. In the most southern plantations, where the strong south-west winds and severe frosts influence our work so largely, only a moderate amount of success has hitherto attended our operating with seedling trees; but an experiment is now under way which should enhance the prospects of successfully dealing with yearlings on exposed sites. Some 90,000 Monterey pines, seven months old, have been carefully lifted and transplanted in lines, where they will remain until August, when transference to plantation for permanent planting will be undertaken.

HARDWOODS.

Much experimental work with hardwoods has already been conducted in the chief South Island plantations; but, generally, the outcome has not merited further perseverance with such varieties as *Quercus* and *Fraxinus*. It is true, where fertile sheltered valleys have been allocated to these hardwoods the progress has been consistently fine; but, as these conditions are not found to any extent on the areas now being afforested, the number of flourishing oak and ash trees is indeed small. Some