

chiefly to form wind-breaks at Waiotapu, and succeeds well in that climate. Care is required in transplanting, and the young trees may suffer from frost till they are properly established. In the past this pine has been little esteemed as a timber-tree, having been grown almost entirely for shelter; but when grown in crowded woods it will produce much cleaner timber, and, having recently been found suitable for butter-boxes, should be more cultivated in future, since on account of its rapid growth it will yield a profitable crop even if sold at low prices. It is a native of California, but experience has proved it capable of thriving in the most varied climatic conditions of this country.

*Loblolly Pine (Pinus taeda).*—A small experimental planting of this pine in Waipa Valley has been remarkably successful. Growth has been very even, and averages about 3 ft. per annum. This is one of the species producing the timber exported from the United States to Europe under the name of "pitch-pine," which is reported as a "splendid architectural wood—resembles the best larch wood in durability," and is used for railway-carriage and ship building. If a further trial on a larger scale should give equally satisfactory results, it should prove one of the best pines for this district. Its rapid growth would indicate the possibility of successful mixture with larch, but it is apparently highly light-demanding, so such a mixture will only be desirable if the occurrence of disease prevents larch being grown pure. Loblolly pine is a native of the south-east of the United States of America, and does not appear to have been used for planting in other districts to any great extent.

*Norway Spruce (Picea excelsa).*—This is classed as a fast-growing species, but grows slowly up to an age of ten or fifteen years, and therefore entails much expense in keeping clear where there is a rank growth of fern. So far as can be judged from the growth of specimen trees in Rotorua Nursery, the species will thrive well in this locality, but the surface of the soil must be kept moist by a growth of underscrub, as it has failed where planted on comparatively bare soil at Waiotapu; being shallow-rooted, it is unable to draw upon the supplies of the subsoil. The timber is soft, light, and easily worked, but not durable in contact with the soil. It is used for inside buildings, common furniture, packing-cases, and other purposes where durability is not necessary, and forms the principal source of supply of wood-pulp for papermaking in Europe. Though the slow growth of this species in early life, and the consequent expense in keeping young trees clear of fern, may preclude its use at present, it will probably prove useful for underplanting, as it bears shade well, and the possibility of utilizing for paper-pulp the small timber that must be removed in thinnings will be a strong point in its favour. Norway spruce is found growing naturally all over the Continent of Europe from the Alps to Lapland, and has been very largely used in artificial forests.

*Sitka Spruce (Picea sitchensis).*—The description of Norway spruce applies to this species, both as regards growth and quality of timber. In suitability for afforestation work there is apparently very little difference between the two. It is a native of north-west America, but is rarely found more than fifty miles inland.

*Douglas Fir (Pseudo-tsuga Douglasii).*—Owing to the variations in growth this species has only been a partial success in the plantations, but appears suitable for the climate. A circular of the United States Forest Service states, "In various parts of its range it [Douglas fir] produces forms of growth sufficiently diverse, in the opinion of some foresters, to be called varieties or even species. Whatever its botanical status, it is certain that in its silvicultural characteristics and requirements Douglas fir presents two well-marked forms"; and instances are quoted of variations in the rate of growth in trees grown together—seventeen years old, from 26 ft. to 7 ft. 6 in.; seven years old, from 15 ft. 6 in. to 8 ft. 10 in. The variations in growth of the species on the plantations suggest the seed of the two forms must be mixed by the suppliers, and it is evident that the species cannot be grown satisfactorily till pure seed can be obtained. The fast-growing type is a most desirable and valuable species for afforestation work. Dr. Schlich considers it "the most valuable timber-tree of North America, owing to its rapid growth, great dimensions, and the excellence of its timber." The timber is imported to New Zealand as "Oregon pine"; is hard, strong, and durable, and is used for bridge-building, ship-building, and general construction. Douglas fir is a native of north-west America, the quick-growing forms being found in Washington, Oregon, and British Columbia, and the slower on the Rocky Mountains, the type changing gradually on the intervening country. This species has been introduced in Great Britain and the Continent of Europe, and is mentioned with enthusiasm by several writers. It is recommended for underplanting larch when the latter is fifteen to thirty years old. Forbes quotes an example where it has produced as good effect when so used as beech, which is generally recognized as the best species for the purpose.

*Redwood (Sequoia sempervirens).*—This species has been very disappointing: specimen trees have made better growth than any other conifer (about 4 ft. per annum), but the only successful planting has been on a small area at the Green Lake. The timber is soft and very durable, and is used for sleepers, posts, and building purposes. Redwood is a native of California and Oregon, and does not appear to have been introduced to any great extent elsewhere, probably because seed is expensive and of variable quality; but the species is peculiar among conifers in that it possesses the power of reproduction by shoots from the roots, so that regeneration will be easily effected when the tree has been established. It may be possible to introduce this species by underplanting in situations where it has failed at first.

*Apple-scented Gum (Eucalyptus Stuartiana).*—This has proved the best-adapted eucalyptus for afforestation work in Rotorua district. Its quick growth in the seed-beds rendering transplanting necessary at an early age, before a strong root-system has developed, it suffers considerably if dry or frosty weather is experienced after planting; but it possesses great recuperative powers, plants that appear quite dead often springing into fresh life under favourable climatic conditions. The rate of growth varies considerably with the situation—about 3 ft. per annum is probably an average. The timber is heavy, strong, and durable, and is used for sleepers, posts, and firewood, also in making wheels and for other purposes where strength is required. This gum is a native of Tasmania, Victoria, and