as will cleanly cut the roots near the extremity. By a gentle leverage on the spade-handles the soil containing plants is slightly raised, and on withdrawing the tools the crevices formed on each side are closed by tramping. This operation is usually conducted in the early autumn, so that sufficient time is given plants to recuperate; and transplantation is facilitated by the consequent formation of numerous fibrous rootlets in place of straight tap-roots.

Lifting and Lining-out Seedlings.

As the nurseries at Tapanui, Ranfurly, and Hanmer Springs transfer an approximate 3,750,000 seedlings annually from beds to nursery-lines, it will be readily understood that the handling of this large number during the months of September and October by thirty-six employees requires to be conducted with as little delay as possible. Through the winter and early spring months the lifting of young plants is steadily carried out, and if it is possible to complete this labour during the dormant season of vegetation, so much the better, as the roots of plants invariably suffer when exposed to air after the sap has become active.

Various rudimentary principles are generally acknowledged in dealing with the different kinds of trees raised, but the precise method chosen is regulated according to the vigour of seedlings. Such trees as larch, Oregon pine, oak, sycamore, walnut, chestnut, alder, ash, and some of the quick-growing pines—*Pinus insignis*, *Pinus muricata*, *Pinus Torreyana*, *Pinus Benthamiana*—are usually transplanted into lines when one year old, whilst it is customary to allow the less speedy growers—*Pinus Laricio*, *P. strobus*, *P. austriaca*, *Picea excelsa*, *P. sitchensis*—an additional year's development in beds before lifting.

Assuming that we are about to deal with a bed of larch: Ordinary digging-forks are used to loosen the trees, which are subsequently pulled up evenly, deposited carefully into shallow boxes, and conveyed to the sizing-shed—a building fitted up with benches, puddle-tubs, &c., for the convenient handling of trees. The classification or sizing-work is now undertaken, and each workman is able to sort out and arrange in two or three sizes between 20,000 and 30,000 plants daily. This treatment is followed by a light root-trimming with ordinary sheep-shears, and the young trees are then immersed in a liquid composition of soil, cow-manure, and water of the consistency of thin paste, which affords protection to rootlets against wind and sun. Although the puddling-process is exceedingly simple, faulty uneven work is always revealed by the speedy withering of seedlings. The uniformity generally of pine-beds renders the sizing of these conifer seedlings more simple, and in many cases it is advantageous to lift, trim, and puddle them direct from the germinating-ground without any classifying.

Success in lining-out operations cannot reasonably be anticipated unless every precaution is taken to protect the plant-roots from the drying influence of sun and wind; and on completion of the sizing-work, all seedlings are placed thickly in small trenches, care being taken to cover the roots thoroughly with fine soil, which is then lightly tramped. By this "heeling-in" process the seedlings not only retain a well-preserved state until required for transplanting, but are more easily handled by planters.

Having indicated the methods adopted in dealing with the young plants up to the "lining-out" stage, it is desirable now to briefly describe the manner in which the transplanting is conducted.

In a well-regulated system of tree-raising, provision should not only be made for the rotation of crops, but transplanting-compartments should be permitted to lie fallow periodically—say, once in every three or four years—and occasionally receive a dressing of lime or other suitable fertilizer. The cultivating of an oat or clover crop up to a certain stage and then ploughing under is also an effective way of restoring soil-fertility; but of late years the increased number of grass-grubs in the ground immediately after a green crop has been turned under made it imperative to dispense with this custom.

Before commencing "lining-out" operations, it is a wise policy to test the working-depth of ground, which should be in a perfectly free state for at least 12 in. or 14 in. below the surface.

Assuming that we are about to plant an area 3 chains long by 2½ chains wide (an averaged-sized "break"), the first point of importance is the digging of two spade trenches from end to end, on the extreme outer edges of the "break." A Wiard hillside plough, drawn by two horses, is then introduced, and being fitted with a swinging reversible mould-board is able to work backwards and forwards along the one side, stirring the soil to a double depth of about 12 in., until a sufficient width has been ploughed.

The workmen whose duties consist of levelling the ground then come along the plough-furrow, and, by brisk movements to and fro with light potato-drags, quickly form a fine uniform surface. The ploughman and levellers now move to the other side of the "break," and similarly prepare the ground, whilst each planter (who is supplied with a bricklayer's trowel and canvas bag for holding trees) takes his allotted place along the line in readiness for planting. A light No. 12 gauge wire is now stretched over the prepared surface from end to end, and, on being tightened by a specially designed straining-machine, is sighted by the leading planter. It is often necessary for one of the experienced workers to "spring" the wire before perfect straightness is attained, after which each planter pegs down the line with the iron pin provided, and proceeds to plant.

The distance between seedlings in nursery lines varies slightly according to the age and strength of the plants, although, after much experimenting, we find that not only is the tending of the lined-out trees facilitated by medium planting of 10 in. between the lines, with plants about 2½ in. apart, but sturdier trees, possessing good leaders and protecting lateral branches, are produced.

It will thus be seen that we are able to transplant about 246,000 seedlings on an acre of ground, after due allowances for borders and centre alleyway are made.

Amongst the varieties that develop sufficiently for transference to plantations when two years old may be mentioned larch, Oregon pine, oak, ash, sycamore, birch, alder, acacia, *Pinus radiata*, *P. muricata*; whilst an additional year's growth in nursery is usually allowed the slower-growing spruce fir, Sitka spruce, *Pinus Laricio*, *P. austriaca*, *P. strobus*, *P. ponderosa*. The adoption of a general planting rule is not rigidly adhered to in connection with the latter-mentioned trees, for at