

3. By the advent of spring, through its lengthened exposure to air, moisture, and frosts, the up-turned soils should be in a state of pulverization, although it is customary to again stir the whole thoroughly with a Planet Jr. cultivator, after which a few strokes with the harrows should complete the initial process of preparation.

#### SEED-SOWING.

*Coniferae*.—Undoubtedly the most important and interesting item of labour connected with the nursery-work is the propagation by seed of the various species of *Coniferae*, which includes larch, pines, and spruces. This operation is generally carried out during the month of October, when sap is most active; but as the actual sowing of small seeds can only be performed successfully in comparatively calm weather, frequent intermissions are not unusual.

The arrangement of seed-beds requires some little forethought. Although a casual observer is inclined to discredit the necessity of keeping lines of trees and beds straight and parallel, more intimate acquaintance with the work shows that the little extra labour thus entailed not only improves the appearance of the tree-raising station, but also promotes economy in the working of small blocks of ground. The seed-bed area having been measured at each end, iron pegs are driven in the exact width of beds, which vary according to the size of frames being used. Between each seed-bed, which may be either 27 in., 34 in., 42 in., or 72 in. wide, an alleyway or path, for convenience in weeding, &c., is marked off, measuring from 21 in. to 27 in. in width. Three or four light wire lines are then stretched across the block, and attached to corresponding pegs, after which the building of the beds is commenced.

Experience has shown that the rougher the nature of the soil being operated upon the greater the necessity in the first place of elevating the seed-beds, and as the soil for this purpose is taken from the alleyways, a hollow remains, into which all lumps are drawn when raking is in progress. A light dressing of bonedust or superphosphate, according to fertility and soil-requirements, is then applied to the beds in their rough state and thoroughly incorporated with the soil by the agency of small six-toothed potato-drags, which also take the place of rakes in drawing off the larger stones and lumps of clay.

A perfectly fine and uniform surface is lastly prepared by the most skilled workers, who, after pushing and drawing the toothed side of the rakes across the bed, and extracting any small pea-like lumps, reverse the tool, and conduct what is termed the final "back-raking." The bed should now be nearly an inch higher than the adjoining alleyways, and in readiness for sowing.

To direct the roller, the line is again connected at each end of the bed, and a wooden cylinder is drawn by two men (as shown in illustration). Four surface impressions, about 12 in. in width, are thus regularly formed. Several smaller sizes of similarly constructed contrivances are used, and are manipulated in precisely the same manner.

Immediately the rolling-process has extended to the end of the "break" seed-sowing is commenced, and on the return journey the sowers precede the roller, which firmly presses the seed to the required depth.

It may here be mentioned that the ground should not be in an absolutely dry condition, as in this state it is impossible to imbed the seed with the desired firmness. A certain amount of dampness is essential to insure success, although on no account should the work be attempted when the soil is in so moist a condition as to adhere to the working-tools.

The firmly pressed seeds may now be covered with a composition of finely sifted soil, sand, and ashes, to which is added during the mixing-process a light dusting of bonedust.

The correct depth for sowing varies according to the size of the seed, so that English birch (which is usually sown broadcast) receives merely sufficient top-dusting to keep it in its place, whilst the heavier seed of, say, *Pinus Benthiana* would require to be under the surface to a depth of about  $\frac{1}{2}$  in. Generally speaking, we adhere as nearly as possible to the recognized formula, and endeavour to effect a uniform covering which will, on examination, disclose the seeds at a depth of about one and a half times their own diameter.

Density of sowing calls for a few special remarks, although no attempt can be made here to introduce technical detail at any length. To regulate the desired crop, sowers must bear in mind at the outset the germinating-capacity of the seed being operated with; and this information is obtained by testing as previously mentioned. The larch-seeds when subjected to a test give most inconsistent results; one season perhaps 18 per cent. germinating, whilst in the ensuing year probably only one-sixth of this percentage may be reckoned upon. This fact alone will amply demonstrate how impossible it is to conform to any fixed rules regarding thickness in sowing. Included in the table apportioned hereto will be found an estimated average number of seeds required for sowing over 1 square inch of ground.

The young seedlings are protected from birds and wind by covering the beds with frames 18 ft. long, and of various widths, the most convenient size being 6 ft. wide. The sides are made of 6 in. by 1 $\frac{1}{2}$  in. black-pine or totara, and are secured by four cross-pieces of  $\frac{1}{2}$  in. piping, which are then affixed to the sides by means of bored flanges. To give further rigidity to the frame, a piece of angle iron, 1 $\frac{1}{2}$  in. by  $\frac{1}{4}$  in., is screwed to each end, and finally small  $\frac{1}{2}$ -in.-mesh netting is stapled over the top.

It was generally conceded during the early stages of tree-raising in the southern nurseries that additional shelter would not be conducive to the health of seedlings, and would probably accelerate "damping off"—the common fungus disorder which develops under moist and close atmospheres, crowding, and indifferent watering. Of recent years, however, all seed-frames have been covered with No. 0 scrim, 6 ft. wide (which may be purchased at a wholesale rate of about 2 $\frac{1}{2}$ d. per yard), without influencing the "damping off" to any extent. After the young plants have become well established, this covering is removed, and the gradual tilting of frames harden off seedlings sufficiently to permit of their being taken off a few weeks later.