

a clear surface has been attained by cutting and burning, the probability of the tender tree-leaders becoming interfered with by strong surrounding vegetation is more remote, although in sheltered gullies fern re-establishes itself with amazing rapidity. Much discretion requires to be exercised in firing tussock country, and this work is usually conducted when a full emergency gang is available. In sheltered gullies, where vegetation is generally most luxuriant, burning is preceded by mowing with short stout scythes or sickles.

Draining to any considerable extent has not, up to the present, been undertaken in any of the plantations, simply because of the limited amount of swampy ground available, together with the measure of success that has attended the introduction of such trees as alder and poplars to wet low-lying situations. It has been found imperative, however, to occasionally form ditches to carry off excessive surface water; but, with the establishment of trees, the functions of these ditches become disorganized by roots and fallen leaves.

Much benefit is sometimes derived from judiciously formed open side drains on steep hillsides that are partially destitute of vegetation, as such a precaution greatly relieves the consequent erosion when planting operations are in progress.

PITTING FOR TREE-PLANTING.

Much diversity of opinion exists as to which method of preparing pits for the reception of trees combines the desired economy with successful results. It would, however, be purely speculative to say that any one particular system could be advantageously adopted under any conditions whatever; and we accordingly endeavour to direct the pitting-work by whichever method may be most suitably applied to the surface-conditions of ground being operated upon.

The following four distinct processes of ground-preparation are recognized, each one meriting its adoption as circumstances demand: (1) Spade-pitting, (2) grubber-pitting, (3) scuffling ground (or "spotting"), (4) hole-boring.

The first method is generally employed where the ground is easily worked, and either a No. 2 or No. 3 Black's spade may be used. All vegetation is cleared over a surface of 12 in. to 14 in. square, and the hole, measuring 8 in. square and 10 in. deep, with the front side sloped in such a manner as to reduce the bottom space of pit, is prepared in the centre. Where the soil is light it is customary to merely reverse the sod in the pit; but, when dealing with ground of a more argillaceous composition, the contents of the hole are placed on the front edge of the pit, where the action of rain and frosts reduces it to a pulverized and otherwise favourable state for placing against the tree-roots. In the early stages of our afforestation-work slightly more than £1 10s. per thousand was paid for pit-making; but we are now able to carry on precisely similar work at 50-per-cent. cheaper rate.

In the second method a grubber-pick is used. A surface-clearing is made, as before mentioned, by a well-directed blow or two with the tool, after which a space of 12 in. by 9 in. is worked up roughly to a depth of about 10 in., and allowed to remain in this state until the planting season arrives. Such pronounced success has attended repeated trials of this mode of pitting that it is now being almost exclusively adopted at the South Island plantations. No difficulty is experienced in getting employees to undertake the grubber-pitting at 12s. 6d. per 1,000, and at this rate an average wage of about 8s. per day is earned individually.

In operating on light, porous, or gravelly soils with small plants, scuffling ground (or "spotting") is frequently resorted to with fair results. This work consists of clearing a small space 12 in. square, either with a spade or mattock, and is carried on by day-labour at 8s. 6d. per thousand. As the "spotting" is inseparable from slit or bar-planting, much discretion must be exercised in selecting only the most favoured situations for this mode of pitting, and even then equal success with the previously explained system cannot rationally be anticipated, as no matter how carefully a plant is inserted in the crevice formed by the planting-bar or spade, the roots invariably assume a cramped, unnatural position.

During the past year the successful manipulation in Germany and Austria of an ingeniously contrived hole-boring machine for tree-planting induced the Department to import one, and although we have not yet worked the Rohrwieser Hollow Borer to any great extent, our operators should, on becoming more familiar with the use of the machine, be able to prepare a thousand holes per day on suitable ground. The borer, which is purely a slit cylindrical auger, enters the ground by means of a rotary cutting motion, and by the application of a steady revolving pressure is forced to a desired depth. On withdrawing the machine a reversible twist of the handle-attachment enables the operator to deposit the soil near the plant-hole, which has a diameter of almost 4 in. Planting by this system is scarcely practicable where coarse vegetation exists; but a season's experimenting should enable officers to state with every degree of certainty the desirability of introducing the machine into the plantations generally.

Absolute straightness in lines of trees is not at all essential, although general uniformity is aimed at. Of the two methods at present employed for keeping lines of pits straight, perhaps sighting by means of poles possesses most advantages. A sighting-rod, which is usually about 5 ft. long, and painted black and white alternately, is set up at each end of the planting "break," and between these rods, directly in line, another sighter or two are placed. Facing the poles from the lowest end of the line the workman keeps at least two sighters before him, and on completion of each pit advances 4 ft., and again places his spade in line with the poles. This order continues until the required length is pitted. On fairly level ground it is possible to run the lines absolutely parallel by using a square at each end, but when operating on rough undulating country such accurate pitting is not attainable. On completion of the first line of pits, the rods are shifted over 8 ft., sighted again, and holes prepared immediately opposite those in the first line. We are now able to mark out the intervening line along which the pits are made, half-way between those in the first and third lines. An employee quickly becomes adept in sighting and spacing, and although a measuring-stick is sometimes carried, the pit-