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LEDMORE NURSERY

(The following notes were prepared by the staff of the East Conservancy, Scotland, for a visit by the Society of Foresters on 20th September 1956.)

The farm of Ledmore, 196 acres in extent, was acquired by the Forestry Commission in November, 1949, with the object of forming a second large nursery in the southern part of the East Conservancy, its northern counterpart being at Newton, near Elgin. When acquired, the farm was badly run-down and heavily infested with weeds.

In the spring of 1950 some twenty acres were ploughed, cleaned and green cropped. By 1951, however, the ground was still considered too dirty for large scale lining-out and it was not until the following year that this nursery was brought into production. In that year seven million seedlings were lined out. This year the numbers lined out are six million seedlings and in addition 4,275 lb. of hardwood seed and 56 lb. of conifer seed have been sown.

At the present time fifty-six acres are under nursery. As the need arises, this area can be progressively extended to some seventy-five acres. Approximately twenty acres are being worked as a Seed Orchard of Scots pine and Douglas fir by the Genetics Section, and the balance of the land has been transferred to Strathord Forest or is to be retained under agriculture for the time being.

The nursery is in charge of a Forester and an Assistant Forester. The number of workers employed varies with the seasons, being highest during the spring and summer when lining-out and weeding make heavy demands on labour. At these times about thirty workers, mostly women and boys, are on the payroll. During the autumn and winter months the staff drops to about twenty workers.

Shortage of labour has had a marked influence on our working at Ledmore. It has led to the intensive and extensive mechanisation for which this nursery has now achieved something of a reputation.

Layout of the Nursery

When Ledmore was acquired, careful consideration was given to the layout so that machines could be operated efficiently and economically. As a result, nearly every nursery operation is now mechanised either fully or in part.

Sections

These extend to not more than two acres. 360 feet has been found to be the most convenient length especially for mechanical lining-out. Odd corners and the margins of irregular shape have been utilised for the growing of hardwoods, poplar stool beds, ornamental and Christmas trees.

Roads

The roads through the nursery are 13 feet wide to facilitate turning of the tractors, other accessory roads being 10 feet. Only one permanent metal road has been laid. From the main entrance to the nursery buildings which are centrally disposed. All earth roads through the nursery are kept free of weeds by periodical runs with disc harrows.

Hedges

Only shelter belts and hedges against the prevailing wind have been planted. Cross hedges through the nursery would constitute an obstruction to machines and have been avoided.

Mechanical Equipment

The Mounted Lining-out Plough.

This has been developed from the Talbot Lining-out Plough although in its present form it bears little resemblance to the original version. The main disadvantages of the older prototype plough in nurseries not laid out for mechanisation were its overall length and the fact that it was an old-fashioned "drag" plough. By shortening it and fitting a three-point linkage for the "hydraulic lift" of a Ferguson tractor the turning circle has been greatly reduced and it can now be employed in any nursery where a Ferguson tractor can be worked. The plough has also been modified to carry a fertiliser hopper with a chute which places the fertiliser where it can be mixed with the fine soil which goes against the seedling's roots.

This plough can cope with large consignments of seedlings at short notice, with the result that is has been possible to discontinue lining-out in the autumn and confine it to the spring. With the help of two of these ploughs and by careful organisation of the available labour, mainly women and boys, 250,000 seedlings can be Lined out per day at Ledmore for an average cost of under 4/- per thousand.

The strip method of lining-out is used at Ledmore. With lines 9 inches apart every sixth line is missed. This gives 36 inch wide beds with 18 inch alleyways. This method slightly increases the cost of lining-out but is well worth the extra expenditure, since better quality transplants are produced and output is increased, due to the elimination of damage by weeding. Weeding and other operations may be carried out from the alleyways in wet weather when conditions would not permit this in normal lines of transplants. The strip method also allows the follow through of other tractor-drawn implements such as the inter-row cultivator, the undercutter and the plant lifter.

The "Ledmore" Six-Drill Seed Sowing Machine and Grit Distributor

One of the lines which is being followed at Ledmore is the development of a plant suitable for the forest without the expense and losses of lining-out. It is believed that such a plant may result from undercutting one-year conifer seedlings, so producing what is termed a "one undercut one[1]' or "1 u 1" plant.

It was with this in mind that the six-drill seed sowing machine was designed. This machine can sow seed thinly in drills so that, after undercutting, the conditions for growth are not dissimilar to those in transplant lines. The grit distributor is similar to those in general use but it has been modified to confine the grit covering to the drills. It can also he adapted to sow hardwood seed, such as acorns, instead of grit in the drills.

The "Ledmore" Undercutter

This twin-bladed undercutter has been designed to meet the conditions prevailing at Ledmore but is of general application. It is fitted with two discs which travel on either side of the beds and two pneumatic depth-control wheels. Control of depth is a most important factor if the undercutting is to be properly done. Vertical blades are also fitted to side cut the seedlings at a later operation.

The "Gunn" Plant Lifter

The mechanical loosening of seedlings with this tool before lifting is now common practice in many forest nurseries. At Ledmore, however, it has been modified to lift transplants or drill-sown seedlings by fitting half-moon tines to the blade of the lifter. The tines travel between the lines of plants and break up the mat of roots, thereby reducing stripping to a minimum. Depth-control wheels have also been fitted to this machine,

The "Ledmore" Inter-row and Alley Cultivator

This is basically a Ferguson toolbar which has been fitted with a variety of agricultural attachments. Introduced to do interline weeding and cultivation, it straddles the beds and covers both bed and alleyways in one operation. It is also fitted with depth-control wheels

In addition to these specially designed or modified implements, the following types of agricultural equipment are used:

The Ferguson Single Furrow Reversible Plough

This is ideal for nursery work. It allows the sections to he ploughed both ways from start to finish leaving the surface level It also saves fuel and oil since there is no running light when turning at either end of the sections.

The Oliver Single Furrow Plough with Sub-soiler

When breaking in new nursery ground which has previously been under agriculture, this is a useful, if not essential, implement. It breaks up the plough pan, penetrates into the cold subsoil without bringing this to the surface, assists both drainage and moisture retention and builds up the soil texture desirable for nursery working,

Ferguson Ridgers

Used for ridging seedbeds in the autumn, these ridgers allow of early seedbed preparation, cultivation and sowing in the following spring. Without ridging, these operations would be unduly delayed on this heavy soil.

General Notes

Maintenance of Fertility

Good husbandry and management are given first consideration at Ledmore. The history of each individual section is recorded in book form, giving for each Forest Year the soil analysis data and manurial prescriptions, the manure actually applied and the crops raised so that chemical and physical irregularities may he observed and corrected. Strict rotational greencropping is adhered to and normally one-third of the total nursery area is reserved each year for this purpose. After growing two successive crops of plants, organic and inorganic manures are applied according to prescription. Oats and tares are then sown and ploughed in while still succulent in late July or early August. Once decompostion has taken place, the sections arc ploughed back lightly in September or October to ensure a high concentration of humus in the top layers of the soil where it is needed. This method of cultivation also reduces the weed population by weathering, although actually there is no fallow ground. It is essential to make good the high degree of soil exhaustion (both physical and chemical) caused by the growing and removal of successive Tree crops.

Weeding

Only in a rich, sweet, healthy soil can we grow good crops which in turn produce shade and reduce competition from weeds. Special attention is paid to reducing the weed population, it is hoped that, with the planting of shelter belts and hedges and enclosure by the surrounding plantations, the nursery will eventually become protected from weed seeds blowing in from outside. Ledmore is presently remarkably clean of weeds and this has been achieved in under five years solely by mechanical weeding supplemented by hand picking in the actual rows of plants. Costs have been low and is considered that, in this nursery at least, there is no case for control of weeds by chemical sprays.