

*Explanatory Memorandum of Plates II. and III.—Vertical Saw Mill worked by Water Power.*

This is effected in the following manner (see transverse and longitudinal sections):—

Water is led along the shoot *M* on to the breast wheel *I*, acting on it partly by weight and partly by impulse, and escaping under the wheel. The wheel, in revolving, communicates motion to the crank *G*, which is attached to the driving rod *F*. This rod is secured to the bottom cross-head *C, D*, of the saw frame *A, B, C, D*. This frame works in guides, and it will be seen that the revolutions of the water wheel communicate vertical motion to the saw *E*, which is firmly secured to the cross-heads of the frame.

The beam to be sawn travels on a carriage *K*, to which slow motion is communicated by means of the rods *E* and *L*, the roller *H*, the toothed wheel *D*, and the cord *N*. This is so apparent from an inspection of the figure, that no detailed description is necessary.

The ratchet *O* falls into its place in the circumference of the toothed wheel *D* at each stroke of the saw, and thus keeps the wheel in its place.

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THE EARL OF MANSFIELD'S WOODS, &C., AT SCONE, PERTHSHIRE, N.B.

These woods extend over about 10,000 acres, and are under the management of Mr. McCorquodale, one of the most experienced of wood managers in this country, who has held the post for upwards of thirty years. He is aided by nine district foresters, and a considerable staff of permanently-employed woodmen.

This country differs greatly from Strathspey, and even Blair Athol, as it is highly cultivated, and there are no extensive moorlands or pasture farms.

The plantations are therefore small in comparison, and in many cases extend over only a few acres, being surrounded by land under the plough.

This involves great expenditure in the formation and maintenance of the fences.

Mr. McCorquodale informs me that he has no less than 600 miles of fencing to keep up, which of course includes the farm fences maintained by the proprietor. The soil being much richer than that of Strathspey, the growth of trees is more luxuriant. Mixed hard-wood plantations were formerly extensively formed on the property, and the oak was looked upon as the standard and most valuable tree to grow; but this is now changed, and the conifers are receiving most attention, and appear likely to be the best paying crop, besides being the most useful for general estate purposes.

*Nurseries.*—There are two nurseries, one situated at Scone (about one acre), and another (two acres) at Logie Almond.

They are arranged in the manner already described, and appear in excellent order, containing seedlings and transplanted trees of the several descriptions of hard-wood and *coniferæ*. Amongst the former I was struck with the oaks and sycamores, some beds of which average fully eight feet in height, being retained in the nurseries for avenue planting, which I saw being carried on in the neighbourhood of Logie Almond.

Mr. McCorquodale tells me they have no difficulty and few losses in planting out such large trees, which are two-years seedlings thrice transplanted, *i.e.*, five years old before being put out,—as the roots are rendered very healthy and fibrous by the frequent transplanting, and soon shoot out in the pits, which are 40 inches square.

Another noteworthy feature in the nurseries is the fine stock of *P. douglasii* of all ages. Mr. McCorquodale has given this tree much attention, and speaks very highly of it, both for ornamental purposes and planting to profit. At Logie Almond there are a few *Abies nordmaniana* seedlings, which promise well as ornamental trees for the policy grounds.

Mr. McCorquodale showed me a bed which had been sown with Indian (Himalayan) tree seeds, sent to him by Dr. Cleghorn. They comprised *Pinus excelsa*, *Cedrus deodara*, *Abies smithiana*, and *Picea webbiana*. The *Pinus excelsa* had germinated fairly, but of the other descriptions few have come up at all. Greater care would appear to be necessary in selecting and packing the seed.

Mr. McCorquodale is very willing to experiment with all descriptions of Indian tree seeds, and great attention is paid to the sowing and transplanting, so as to insure success, if possible.

*Plantations.*—I visited nine plantations or places where planting operations had been or were being carried on.

The oldest trees which I include under this head are, in this case, 25 years old, and average from 35 to 40 feet in height. A small plantation (22 acres) of Scotch fir of this age was visited by Dr. Brandis five or six years ago. Dr. Brandis then considered it too thin, but since then it has been twice thinned, and, according to the system pursued in this county, does not appear too thin now.

Mr. McCorquodale lays it down as a rule, that the average distance between trees in a plantation should be one-third their height. Thus, if trees average 30 feet high they should stand at 10 feet apart, and so on. He showed me a very simple method of estimating the height of trees by the eye, which I think will be useful in India in making forest valuation surveys, &c.

The second plantation which I visited was a pinetum with larch nurses, being a portion of a 55-acre enclosure. The trees are about 20 years old, and comprise *menziesii*, *laricio*, *austriaca*, *nobilis*, and *excelsa*. The *menziesii* shows by far the finest growth, the next best being the *Laricio*, which shoots up rapidly, but presents a bare appearance. The black *austriaca* are very robust, but coarse in their habit.

There is a considerable quantity of *P. montana*, a dwarf species planted for underwood as cover for game.

Mr. McCorquodale intends gradually removing all the larch, and leaving the pine plantation as an experiment, using the thinnings for posts, &c., on the property, to test the value of the several descriptions.

Near this is a 13-acre plantation of the Douglas pine, planted out 10 years ago, as two years' seedlings twice transplanted. They are planted in pits 15 feet apart, 15 inches square, and 10 inches deep, with larch and Scotch fir nurses at about 4 feet apart. The Douglas pines are doing very well, and