

even the branches are removed and made use of, and no waste wood is seen anywhere.

The woods were mostly spruce and Scotch pine, with a fair proportion of Weymouth pine and some Douglas fir.

The administrative staff at Isen consisted of a forest-master, two assessors and seven foresters, all highly specialized in their respective duties; and, I understand, all have to pass through one of the schools of forestry.

### **Forest Nurseries.**

We visited two nurseries situated in the forest itself. A brief account of the methods employed for raising seedlings may be of interest.

The seed is sown in rows a metre long; between the rows laths about two inches wide are laid on the ground, to keep the weeds down and to keep the soil damp.

The number of seedlings raised by this method, in a small space, is prodigious. The nurseries are, consequently, small in area: the beds are carefully prepared beforehand, and lupins or some other soil-improving crop is first grown to enrich the ground.

The seedlings are generally left in the seed beds for two years, and are then planted out in the nursery three inches apart, where they are left for another two years, after which they are ready for transplanting into the forest. Although these details may appear trivial, they are exceedingly important as, unless the young plants are given just the right space for forming both roots and heads, they will not be in the best condition for moving. We saw young trees which had been badly started in the nursery and were, consequently, useless for moving out.

Each variety of forest tree has been studied and has been found to require different treatment in the nursery. Thus, the oak and ash seedlings are planted out in the nursery twelve inches apart and the Wey-

mouth pine six inches apart; the young spruce, as stated above, are planted three inches apart.

The transplanting is done both in the autumn and in the spring.

The Germans have, with the greatest care, designed tools for their forestry work. I saw a most useful auger for taking up the two to four year seedlings, with a ball of earth. They have also a very ingenious arrangement for making the holes for the two-year-old seedlings, when first moved.

These devices economize labour and secure uniformity.

The cost of planting an acre of forest, under normal conditions, is only about ten dollars. Unfortunately we were not in Bavaria at the right season for seeing the planting operations.

I understand that, for a forest of the size of Isen, (15,000 acres) about 200 acres are replanted every year, the trees being planted in rows at intervals of four feet each way.

In Germany, where forestry has been developed to a great pitch of perfection, all possible care is taken to secure the best seed obtainable.

Forest trees produce full crops of seed at comparatively long intervals, from ten to twelve years; and some years are much better seed years than others. Seed is collected from carefully selected trees; but, on this question, I was unable to collect much information. I believe the seed is often sent from one part of the country to another. I was informed at Isen, however, that in future they would collect their own seed.

### **Natural Reproduction.**

The third and last forest that we visited was at Kelheim, about six hours' journey by train, from Munich. Kelheim is a very important forestry centre, and would be well worth an extended visit; it is particularly interesting because natural regeneration is practiced here on a large scale. We were unable to do more than drive along some of the