

Management of
middle forests.

In the Solling Hills I had also frequent opportunities of seeing the management of middle forests, being coppice under standards. This mode of growing is here principally adopted by villagers and other communities, who, by means of the short rotation of the coppice, keep themselves supplied with firewood, whilst the high timber trees have to furnish the wood required for building and other purposes.

Middle forest demands good and deep soil, rich mineral soils being specially suitable for the improvement, though the wood growing on it is limited, on account of the short rotation at which the underwood is grown, and the comparatively small number of older trees.

Kinds suitable
for high timber
trees in the
middle forest.

The kinds most suitable for high timber trees are those which give the least shade and keep off as little of the dew and rain from the underwood as possible, whilst at the same time they are regulated by the requirements of those who own them. Generally the better kinds of timber trees are chosen; conifers are not excluded, although of no use as coppice wood. The kinds used in most cases are oak, hornbeam, maple, ash, birch, and an occasional beech.

Kinds suitable
for coppice
wood in the
middle forest.

As coppice wood, those kinds are most suited which shoot out again easily from the root stock and stand the shade from above best, as for instance, the hornbeam, maple, beech, oak, birch, and so forth. The rotation of the latter is generally 30 years, but varies according to soil and locality. Since underwood and timber trees have to be felled at the same time, the rotation of the latter has to correspond with that of the former, and is either three, four, or five times that of the coppice, so that the timber trees are felled at 90, 120, or even 150 years, or some at each.

Reproduction of
middle forest.

At each felling a number of young saplings are saved to replace those timber trees which are being felled, and as a rule, only seedlings are chosen, so that there are timber trees of 30, 60, 90, and 120 years after each felling, if it is intended to grow as large timber as requires 150 years to grow. Foresters distinguish them by different names, according to their age. The greater the number of timber trees kept, the less can be expected from the coppice wood, and *vice versa*, so that the desired crop has to regulate the proportion to each other. Since, every time the coppice is cleared away, the ground is laid open to a great extent to the sun and the weather, and but few dry leaves are added for the improvement of the soil, the latter deteriorates very rapidly, if not rich; and it was noticed that foresters, as a rule, kept rather more timber trees in these forests than the theory admitted, and even in many places endeavoured to induce the communities to take to high forests altogether, which, although perhaps not so convenient, still gives a larger return, and keeps the soil in better condition.

The natural reproduction takes place by the shedding of seed from the old trees, and there is usually no lack of seed in such forests, since, by the free access of air and light, the bearing of the trees is much facilitated. By these seedlings, those stocks which die out get replaced as well.

Where natural reproduction fails, sowing and planting is resorted to, and is safer in good-sized clumps than singly; and where branches cover the lower part of the timber trees they are trimmed off, so as not to interfere with the underwood.

It had been the rule in the communal forests, in former times, that any oak which might grow should belong to the State, in consequence of which, oaks had become scarce in these forests.

Importance of
roads.

The forests on the Solling Hills had greatly increased in importance and value in late years, by the construction of roads, rendering them more accessible. Where the wood had to be carted up hill, a gradient of 8 feet in 100 was not exceeded.

Timber
transport.

Timber transport, especially that of heavy logs, was managed by means of pulleys, which might with great advantage be brought into more general use in India.

A remarkable
privilege.

A remarkable instance of privileges enjoyed by villagers having almost overgrown the quantity produced by the forests, came here to my notice. The potters of Fredelsloh, a village on the Solling Hills, had made the Duke of Grubenhagen, when in camp with his men near their village during winter, very comfortable, by taking all the stoves they had in store up to the camp, and putting them up. The Duke, in return, felt grateful, and promised a supply of wood from his forests for burning their tiles and pots, &c., free of charge. As time went on, these potters prospered and multiplied, until at last the forest, although very extensive, could hardly supply what they asked for, when their claims had to be defined as to the number of families entitled to receive wood, and the quantity for each. Since this settlement the forest is beginning to recover.

Planting with
an iron spade.

Of the various methods of planting employed here, there is one which does not seem very judicious at first sight, but has been so remarkably successful that it is worth describing. The planting is done with a small spade of solid iron, about 18 or 20 pounds in weight, the handle of which is 3 in. to 4 in. in length, and strongest immediately above the blade, which latter, slightly wedge-shaped, is 13½ in. long and 6¾ in. across at its broadest and 4¾ in. at its narrowest part. (Fig. 2.)

Fig. 2,
facing page 45.

This spade is driven into the ground on the spot where the plant is to stand, and not quite perpendicular. The hole thus made with this spade is slightly widened by bending the spade a little to all sides, after which it is drawn out.

The plant, three to four years old, of beech, spruce, oak, &c., is dipped, with its roots, into a thin mixture of loam and water, which adheres easily. In this state it is pushed with its roots into the hole as far as possible, and with continual shaking, by which the roots get straight down into the hole, drawn up to the level at which the plant is to stand. Here it is held firmly by one man, whilst another drives in the spade a second time, about three inches from the first hole and parallel with it, and first presses with its point towards the first hole, and afterwards with the broader portion of the blade, by which process the plant gets very firmly pressed into the soil. If necessary, the spade is driven in a third time, to close up the second hole slightly. After this the soil is beaten firm all round with a wooden mallet towards the plant, but these blows should not be dealt closer than three inches from the plant.

This planting was carried out without previous clearing or preparing of the soil, and even answers well in stony and rocky soil, as the spade penetrates easily on account of its weight.

Spruce forests
on the Harz
Mountains.

On the Harz Mountains I acquired chiefly a knowledge in the management of spruce forests at the following localities in succession:—Westerhof, Grund, Osterode, Riefensbeek, Herzberg, Lauterberg, Ilfeld.