

into which little or no light could penetrate, and am inclined to think that our moist sea climate has as much to do with it as the greater distance from tree to tree and the absence of "*Unterbau*." There is no doubt that the droppings from some descriptions of trees, particularly the larch, are very favourable to the growth of grass both before and after the trees are felled, as they produce a rich and fertile humus; and although I am inclined to agree with the Germans that but little or no grass or herbage should be found in plantations in Europe, its presence in our Indian plantations does little or no harm to the trees, as it tends to keep the soil moist and shelter it from the fierce rays of the sun, and that in any case the immense advantage of increasing the supply of green fodder by having the grass cut during the first few years and cattle admitted after the trees are past harm's way, more than counterbalances any negative damage to the trees or sacrifice in annual growth. In short, the presence of grass is no evil in itself; and the forester must never lose sight of the necessity of getting the ground in his plantations under cover in order to keep the soil loose, and enable the atmospheric air to penetrate to the roots. This appears all-important. Of course, in mature or nearly mature forests, whether planted or indigenous, little or no grass should ever be found.

Unterbau.

With regard to the *Unterbau* or planting up and rearing of two crops at the same time, the general opinion of English forest officers is antagonistic, and I myself thought it impossible without more or less detriment to both, and great damage to the young growth in removing the old crop; but I am now convinced, from what I have seen, that it is not only practicable and easily carried out by the exercise of a little ordinary care, but is, as a rule, highly beneficial and deserving of being introduced, at least in a tentative manner, in England, and certainly in India, where we have, as in Germany, to provide a supply of firewood as well as building timber. I am convinced that if we can find the proper trees to grow under shade, a great step will be made in our Indian forestry, and our plantations prove much more healthy and remunerative than hitherto. In this I am sure all our officers who have seen and studied the German system will agree, and where the undergrowth is for firewood and not to be reared as timber, the difficulty, small as it is, of removing the old crop is obviated by the *Unterbau* being removed first; in fact, it is probably cleared four or five times before the timber crop matures. As regards England, there is the difficulty that there would be little or no demand for the beech as firewood, and it is of little value for any other purpose; but I am inclined to think that such a demand will arise if the price of coal continues to increase, and that even if the planting up of oak woods can be made to pay its expenses a great point will be gained in the improvement in quality and more rapid growth of the oak; for it must be borne in mind that the main object of beech or spruce under oaks or Scotch firs, &c., is to cover the ground, to the importance of which I have just alluded, and not to produce firewood.

Planting out of
hard wood.

During my stay at Springe I saw also a good deal of planting out of hard-wood trees from the nurseries, and in this respect also there is a good deal of difference from what is usual in England. In Hanover the seedlings are transferred at the age of from two to four years from the seed-beds into the "*Schule*" or nursery, where they are trained, pruned, and transplanted as often as required until finally planted out, which is sometimes not done till they are twelve or even fourteen years old. So far the treatment does not vary much from that adopted in our nurseries in England, save that I think trees are rarely with us planted out so late, excepting for ornamental purposes, avenues, or other quite exceptional cases. Here we find the planting out of ten to twelve and even fourteen year old trees (called *Heisters*) the rule, and they are almost invariably put out without any nurses, although these may be and generally are added a few years later, in the shape of coniferæ of four or five years old planted between the rows or beech *Unterbau*. I do not mean that young hard woods are never planted out at five or six years of age, but it is exceptional; and in no case that I have seen or heard of were nurses planted with the trees as with us, still less before the hard woods, as in the New Forest.

The oak and beech *Heisters* after, say, ten years' schooling, are lifted, the branches carefully pruned into, as nearly as possible, a pyramidal form; the roots trimmed and shortened, the more woody parts being even sawn off, and only the fibrous rootlets left, and the trees then planted out in pits which are dug just large enough to receive them. The distance apart at which they are planted varies according to situation from 8 to 12 feet.

Planting out of such large trees is naturally rather expensive, but I was told it ought not to average more than 1½d. each, all expenses included, which seems very low, considering that two men cannot plant more than 100 a day (including, of course, the digging of the pits, and that the cart-hire from the nursery to the plantation site is expensive.

Absence of
nurses.

The absence of nurses struck me as very remarkable and deserving of attention, and I have since found it universal throughout Germany; in fact, the German foresters could not understand how we can manage with nurses (especially spruce, Scotch fir, or larch, which grow so rapidly at first) of the same age as the hard woods.

They often plant spruce some years subsequently, and point out that even then it generally overtakes the hard woods, and has to be cut down, which they do immediately its head shows above that of the oak or beech, and again and again if necessary before they (the spruces) are finally removed. I am not competent to express an opinion as to which system is correct, but both cannot be, and I must say I cannot recall an instance of damage done to hard woods in Germany by the absence of nurses, whilst I have seen them injuriously crowded and their growth impeded by their presence in England.

Communal for-
est.

I brought my stay at Springe to a close by an interesting visit to the Communal forest belonging to the town, and managed by a subordinate forest officer paid by the community, but who works entirely under the orders of the Government forest officers. One portion of the beech forest was particularly interesting, in which he was clearing and encouraging reproduction very gradually and carefully, as there was great danger, owing to the situation, of too much light being admitted, which, acting on a very rich soil, would result in a very rank growth of grass and weeds sufficient to choke the seedlings. The result appeared very good, and does credit to the intelligence of the *Revierforster*.

The timber from this forest is taken by the burghers, each of whom is entitled to a certain annual quantity, and it is the duty of the forest officer in charge to supply this quantity and still retain the forest in good state—no easy task. Beyond this, however, he has nothing to do with the burghers, who have no say in the management or working of the forest, nor can they alienate nor clear for culti-