

and subdivision of the forest tract placed under his charge, and instructions for its management down to the minutest detail, the quantity to be felled annually, the extent planted, the state in which the forest should be found 10, 20, or even 100 years after the plans were drawn up; all these are calculated and laid down so that any change in the executive in no way interferes with the progress of operations, for all that the *Oberforster* has to do is to carry out the instructions given him, a margin being of course allowed for his discretion, and every allowance made for deviations from the working plan on account of natural and unforeseen causes, such as failure of seed, occurrence of storms by which thousands of trees are sometimes levelled to the ground, and the routine or systematic management interfered with for years, as the establishments are employed in working up and removing the fallen trees.

Duties of Forstmeisters and Oberforsters.

The *Forstmeisters* have no executive work, their duties being confined to the supervision and control of from four to six *Oberforstereien* or *Reviere* (*vide* Note, page 25); in fact, they may be considered as occupying a position analogous to our deputy conservators, whilst the *Oberforsters* may be classed as assistants.

Our deputies and assistants in India have often been employed on exactly similar duties, but such is never the case here, where the control, and even, as we have seen, the demarcation, valuation surveys, and preparation of working plans are kept perfectly distinct from the local executive, whose business it is to carry out the carefully digested plans and orders received from the controlling branch. Other systems have been tried but none have been found to work so well as this, which combines the advantages of efficient administration and supervision by officers who have themselves gone through the executive grade and who are individually and collectively qualified to organize and supervise the work of others, with the concentration of the energies of the local officer on his own charge with the object of carrying out to the best of his ability the orders he receives, without troubling him or diverting his attention by making him responsible for the general plan of operations, which forms part of that which is considered most applicable and beneficial for the whole nation or province.

The *Forstmeisters* make frequent inspections of the several districts in their division (*Bezirk*) and thoroughly supervise the work of the *Oberforsters* and their subordinates both in the forest and office work, reporting on the same to the *Direktor*. The *Oberforsters* submit annual reports comparing operations actually carried on with those prescribed in the working plans, and giving reasons for any material divergence from them. They spend the greater portion of their time in the forest supervising the felling, planting, sowing, thinning, carting, and selling of timber. The laying down of roads is generally intrusted to one or more forest officers with special qualifications or aptitude for that work, but the actual work is carried out by the local officer. He has also a considerable amount of office work, issuing licenses for grazing, &c., and preparation of reports, returns, and accounts; but his duties may be considered as mainly out of door in comparison with those of the *Forstmeister*, who has more office work, comparing the result of operations and the rates in the several districts, collecting information and statistics for future guidance, settling disputes and affording advice and assistance to his subordinates, and, as a member of the forest commission or committee, considering and revising working plans submitted from the "Einrichtungsbureau."

The aim of scientific forestry.

The main object aimed at in any system of scientific forestry is, in the first instance, the conversion of any tract or tracts of natural forest, which generally contain trees of all ages and descriptions, young and old, good and bad, growing too thickly in one place, and too thinly in another, into what is termed a "*geschlossener Bestand*" (closed or compact forest), consisting of trees of the better descriptions, and of the same age or period, divided into blocks, and capable of being worked—*i.e.*, thinned out, felled, and reproduced or replanted—in rotation, a block or part of a block being taken in hand each year. In settling and carrying out such a system, important considerations and complications present themselves, such as the relation of the particular block, district, or division to the whole forest system of the province; the requirements of the people, not only as regards timber and firewood, but straw, litter, and leaves for manure, and pasturage; the geological and chemical formations and properties of the soil; and the situation as regards the prevailing winds, on which the felling must always depend, in order to decrease the chances of damage to a minimum; measures of precaution against fires, the ravages of destructive insects, trespass, damage, or theft by men and cattle; all these must be taken into consideration, and borne in mind at each successive stage.

Nor must it be supposed that when once an indigenous forest has been mapped, valued, and working plans prepared, the necessity for attending to all such considerations is at an end. On the contrary, it is found necessary to have a revision of the working plan every ten or twenty years, when new maps are prepared showing the progress made towards the objects laid down in the original scheme; and although it is marvellous how generally the plan of operations is found to have answered and been adhered to on the whole, still the necessity of modifications and alterations of system do more or less present themselves. It may be found advisable to change the crop as in agriculture, to convert a hard wood into a coniferous forest or *vice versa*, to replace oak by beech, or to plant up (*unterbau*) the former with spruce or beech to cover the ground and keep down the growth of grass. All these and a hundred other details are constantly presenting themselves for consideration and settlement, and the local officer should be ever on the alert to detect the necessity of any change and bring it to notice, no less than the controlling branch should be prepared to suggest what is best to be done, and conversant with what had been done, and with what results, under similar circumstances in other districts and provinces.

Districts visited.

Having thus given a general outline of the duties of the forest employés, and how the forest is first "taken up," divided, mapped, valued, and plans laid down for its future management, I shall state briefly what I saw of the practical working, and how the actual forest operations are carried on. I visited twelve districts or reviers with Director Burckhardt, or one of the forest officers, and went thoroughly into the details of management, the various methods of planting and sowing (artificial and natural), treatment of young trees in the nursery, thinning, removal of undergrowth, "*unterbau*" or planting up, felling, conversion of timber trees into logs or billets, removal from the forest, piling or stacking, and sales by auction; and whilst thus engaged in seeing operations in progress, endeavoured to master the details of the system and general plan of operations by the study of books on forestry,