

a cost of £3,750. The wheel drives one large rough-toothed saw (vertical) for quartering large beams, and eight vertical frame saws for planing. The system adopted is to debit the mill with all timber handed over to the manager at fixed rates, whilst he takes credit for the amount of sales to merchants. The balance and value of work performed by the mill is thus clearly shown, and the accounts of the executive officer remain clear and uncomplicated. I was informed that the results were generally favourable, but the department do not now have many mills in their own hands, and purpose selling this one, as competition has sprung up, and it is better if such operations as working up of timber can be carried on efficiently by private enterprise. All departmental officers with whom I conversed concur, however, in stating that the saw-mills, of which the State had formerly a large number, were a necessity, and have contributed greatly to the financial success of the department. I think we may gather a lesson from this for our guidance in India, where we cannot as yet expect private enterprise to erect and work saw-mills when and where required. We must set the example, and show the natives how to do it, saving at the same time a great deal of the waste of timber which now goes on, and must be felt sooner or later, only abandoning the mills and allowing them to pass into private hands, when we see that private enterprise and competition is sufficient to guarantee the carrying on the work in an efficient manner, and so as to supply the people with what they require without the evils of a monopoly.

## Servitudes.

The Lauterberg Revier, and many of those bordering, so to speak, on the cultivated area in the plains, are much burdened with servitudes, which reduce the actual cash profits to a very small sum. These rights or servitudes are all clearly defined and registered; and when, as is the case for the most part, they consist of timber for the erection of houses or firewood, it is the duty of the executive forest officer to supply the privileged parties with the quantities to which they are entitled at the time and place laid down. Should he, however, find or imagine that the demand from this source exceeds the supply or annual yield, or that the forest is being worked actually at a loss, it is his duty to bring the circumstances at once to the notice of the Forstmeister, with a statement of the reasons which induce him to do so. The matter would then receive attention, and, if necessary, a complete revision and revaluing or stock-taking would be made. Should the local officer's view be found to be correct, the rights of the villagers would be curtailed, or even suspended altogether for a term of years, the conservancy of the forest for the general good being considered paramount to all individual or class interests or privileges, even when the latter are of long standing. Of course this rarely happens, but instances have been known owing to bad or injudicious management, failure of natural reproduction, damage by storms and insects, &c., &c.

A trip to the "*Kloster*" forests at Ilfeld with the Forstmeister brought our stay in the Harz to a close. These have for the most part been treated as *Mittelwald*, but a considerable portion is now in process of transformation into *Hochwald*. It struck me, both here and in the *Mittelwald* at Rothenberg Revier, that too many standard trees were as a rule left over, and that the coppice was in consequence poor, and rarely attained any size. The proportion of trees to be left over in this description of forest is laid down as 12 *Bäume*, or trees of the oldest class; 18 *Oberstänber*, trees of medium age; and 30 *Lasreidel*, or saplings left from the last clearing—60 trees in all, equivalent to 80 to our English acre, in addition to the coppice. The length of rotation varies from 20 to 30 years, and the coppice is estimated to produce 20 cubic feet per morgen per annum, whilst the standard trees as above should, under favourable circumstances, exhibit an annual increase of from 30 to 35 cubic feet per morgen.

## Oak coppice.

The oak coppices which I subsequently visited with the Forst-Direktor appeared very well managed, and yield a large profit. The young oaks are "schooled" for two years, then cut over and planted out, after which they are coppiced for the bark every 16 years; the young wood of other sorts, such as birch, ash, hazel, &c., which may have sprung up, having previously been cleared out, along with any oak shoots of no value for barking, and sold as firewood.

## Excursions.

The last ten days of my stay in Hanover were devoted to the study and making extracts of working plans and short expeditions to reviers in the neighbourhood with the Forst-Direktor and some of our forest students then in Hanover.

During these trips we tested and put in practice the various methods prescribed for estimating and valuing the quantity of timber on a measured area, the various instruments for measuring height and girth and ascertaining the annual rate of growth.

The most accurate information has been collected and statistical tables compiled by Herr Burckhardt with regard to the rate of growth, effects of thinning, comparative value of hardwood and coniferous plantations, methods of computing cubical contents of standing timber, annual increase, and many other kindred subjects. It would be impossible to give here even a very abridged statement of the results arrived at, and the same would not of course apply to India or even to England; still a study of the method in which the inquiries have been pursued and results deduced from the data acquired is very instructive, and should serve as a guide for similar researches in India, where they are much needed.

In the neighbourhood of Celle I had an opportunity of witnessing the method adopted for planting the fir successfully in moorpan or iron-band, extensive tracts of which have lain waste for centuries, and defied all the efforts of the forester. They are now gradually being covered with fine forests. The plan adopted is to plough, or when necessary trench with the spade, to a depth of two feet or more, turning up the "iron-band" to the surface where in the course of one or two years it decomposes, and becomes a most excellent and congenial soil for the growth of the Scotch fir.

The fine Communal forest of *Eilenried* was also visited and its management explained. This forest may be said to environ the town of Hanover, and contains some of the finest oak trees which I saw in Germany. It affords a most charming public recreation ground, whilst at the same time producing a good revenue. Director Burckhardt also took us to a revier where the so-called *Plänterbetrieb* or *Wirtschaft* was still to be seen. This method of treatment approximates to what we are doing or have been trying to do in our Madras forests, and I believe in India generally—*i.e.*, merely to fell trees of the better descriptions as they arrive at maturity. It is generally condemned throughout Germany, as, unless most carefully managed, with numerous and well-considered restrictions, it must lead sooner or later to a paucity of mature trees to produce seed, and hence to a deterioration in

## Plänterbetrieb.