

Though in France the regeneration of existing forests is as a rule effected by self-sown seedlings or coppice shoots, natural reproduction is aided whenever necessary by planting and sowing, and plantations on a most extensive scale have been made and are in course of progress in order to clothe shifting sands or barren hills with forest. I do not know of any more instructive case of planting on a large scale than the forests of *Pinus pinaster* which now cover, with few breaks, the Dunes, on the coast of the Atlantic, between Bayonne and the mouth of the Gironde, a length of nearly 150 and a breadth of from two to six miles. The destructive progress of the shifting white sands of these Dunes inland is well known; fields, villages, and churches were covered by them, and all attempts to fix and to clothe them permanently with vegetation remained fruitless until 1787, when Brémontier, an engineer, succeeded in devising means to protect the sowings against the drifting sand.* The method must be studied on the spot, and no forester from India who has the privilege of completing his professional studies in France should neglect the opportunity of seeing this splendid work of arboriculture. Apart from the Dunes, a visit to the country about Dax and Mont-de-Marsan will prove instructive in many respects. The vast communal lands of the Département des Landes, formerly nothing but poor grazing grounds, swampy and uninhabitable during great part of the year, and to a great extent impassable except on stilts, have now been made productive by draining and extensive sowings of the *Pinus pinaster*. Then there is the collection of resin, the manufacture from it of oil of turpentine and other products, and near Dax, the well-stocked forests of *Quercus pedunculata* on the rich alluvial soil along the Adour River.

Planting of the
Dunes.

Much has of late years been done for the planting of barren mountain sides in the Alps, the Pyrenees, the Cevennes, the Auvergne, and other mountains of Central France. The object of these plantations has been twofold; one was to improve the productiveness of these mountain lands, the other object was to prevent the formation of torrents and ravines, to fix the loose soil on steep slopes, and thus gradually to diminish the mass of sand and stones which otherwise is carried down annually into the valleys, causing the wholesale destruction of fields and pastures. By clothing barren hill-sides with wood, both the superficial drainage of the country, and the infiltration and underground drainage, are better regulated, and hopes, which seem well grounded, are entertained that these plantations will not only prevent the further deterioration of pastures and other lands on the slopes and in the valleys, but will eventually, to a certain extent, diminish the damage done by inundations, which have always been exceedingly destructive in the basins of the Loire and Rhone. These objects could not have been attained had the forest administration limited its operations to lands at the disposal of the State; legislation therefore became necessary, to enable them to operate, where needful, in the same manner on communal and private lands. This led to the passing of two important enactments, the "Loi sur le reboisement des montagnes," of July 1860, and the "Loi sur le gazonnement des montagnes," of June, 1864. The provisions of these laws, the experience gained in carrying them into effect, the attempts which have since been made to modify them in a retrograde manner, and the discussions regarding the practical advantage of these measures, which are far from being closed, all this will be found highly instructive. Official reports concerning the progress of these operations have been published from time to time. With the guidance of these reports, and of the advice of the Director and Professors of the Forest School at Nancy, it will not be difficult to frame a plan to visit some of the most instructive of these fields of operations. The system of barriers or embankments (barrages) across the ramifications of mountain torrents, which has been adopted with great success in the Alpine regions of France (*Département des Hautes-Alpes et des Basses-Alpes*) in connection with planting and sowing, deserves special attention. Embrun, Gap, and Digne are perhaps the best starting-points for excursions to see what has been done in this respect. An excellent work on the formation and prevention of mountain torrents is "A. Surell, Etude sur les Torrents des Hautes Alpes," 1844.

Replanting of
barren hill
sides.

In the State forests, and as a rule also in the communal, and even in many private forests in France, the timber is sold standing, the trees to be felled or to be reserved being marked by the forest officer or the agent of the proprietor, and the purchaser, upon whom the entire working devolves, is bound by stringent conditions of sale and under severe penalties to fell nothing but what has been sold to him, and to protect the reserve trees and the young growth from injury. Large periodical auction sales are held at the chief towns, when the standing produce of the next year's cuttings in the State and communal forests of the district is sold to the highest approved bidder. These sales are generally held in autumn, and I would advise all forest officers who may be studying in France to make a point of being present at one of these sales. The conditions of sale (*Cahier des charges* and *clauses spéciales*) should be studied, as well as the detailed list of lots to be sold, which states the number and description of trees, the area of the coppice, the limits of the cuttings, the lines of export, and the outlay for the repair of roads, planting, pruning, and other improvements that will have to be borne by the purchaser. This system of selling the produce of entire cuttings standing, I am inclined to consider as one of the most remarkable features of the forest management in France. A large class of timber merchants, who understand their business, and are generally men of substance, is the result of this system, which is in accordance with old custom, but has been steadily improved and developed. As far as my experience goes, the conditions of sale are strictly enforced, and the regeneration of the forests is not materially impaired by this mode of working them. Those who have served in the Forest Department of Burma will at once see the analogy which exists between the permit system under which a portion of the Government forests in that province have for some time past been worked, and the system of timber sales in France; and to them it will be instructive to learn that it is possible so to frame conditions of sale as to secure the conservancy and improvement of the forests, though the working may be in the hands of the purchaser.

Timber sales.

The "Code Forestier" of May 1827, the history of the forest legislation which preceded it, and the additions subsequently made, deserve careful study. Forest officers studying in France will do well to make themselves acquainted with the practical working of French forest laws, which I have no hesitation in saying are logical, efficient, and at the same time in a high degree considerate. I desire to draw special attention to the provisions of sections 3 to 6, which relate to the sales of forest produce,

The French
forest law.

* The legislation on this subject should also be consulted. ("Code des Dunes," 1801, 1810, 1817, 1862.)