

## The Treatment of Slash in Chir Pine Forests in the North-west Himalaya.

THAT fire is more dangerous to the well-being of coniferous than broad-leaved forests, and more especially in the young crops, is beyond dispute. Climatic factors and topographical features may, however, add very considerably to the danger. Hot, dry periods of the year, steep declivities, and the species of conifer comprising the crop, have all an important bearing on the question. To take a European example, the maritime pine forests of the Landes in France are exceedingly inflammable during the hot summer months, and their protection from fire entails considerable work and a heavy responsibility on the forest staff. The tree is tapped for resin, a factor adding greatly to the inflammable character of the forest, as is the case in the resin-tapped forests in America. In the Landes, however, the terrain is mostly approximately flat.

Perhaps one of the most inflammable types of forest in India is the Chir pine (*Pinus longifolia*) forests on the lower slopes of the north-western Himalaya. This long-leaved pine, as its name implies, has long needles, which often collect in thick, undecomposed deposits on the soil. The forest not uncommonly occupies undulating hilly ground with steep slopes and declivities, and is exposed every year for two or three months to a hot sun accompanied by hot winds. As in the case of the Landes and American forests, this pine is also tapped for resin. Serious fires have from time to time devastated the areas covered by the chir pine in Kumaon in the United Provinces, fires which may be said to have culminated with the insensate incendiarism of 1921, during which large areas of established young growth, established by the arduous work of the forest staff, were swept away. Such calamities necessitate a heavy expenditure, since the areas so affected, in the absence of all seed trees, can only be reclothed by artificial means, as the result of much careful work.

Mr. J. E. C. Turner, a Deputy Conservator of Forests, has had great experience of this type of forest in Kumaon and of the excessive harm resulting from fire. As a result of his study of the question he has drawn up a monograph entitled "Slash in Chir Pine Forests", which is published as Part VII. of Vol. 13 of the *Indian Forest Records* (Silviculture Series, 1928). To this monograph the Commissioner of Kumaon, Mr. N. C. Stiffe, has contributed a foreword, thereby emphasising the importance of the matter in this type of forest and his recognition of the difficulties experienced by the forest staff in protecting it from the acts of a population by no means enamoured of forest protection—for of true forest conservation they know little or nothing. "The subject", writes the Commissioner, "is really too technical for the amateur, but its importance cannot be missed by any one who has traversed any considerable area of the Kumaon forests."

It will be remembered that a notice was given in NATURE of April 14, 1928, under the title "Injury by Fire and Bark-beetle Attack", to two small monographs published in the United States dealing with the relation of fire injury to insect attacks in coniferous forests (Western yellow pine), and such attacks in connexion with the slash left over after exploitation has been carried out. Although Mr. Turner is not primarily concerned with insects, the investigation work treated of in the American monographs merits consideration, when read in conjunction with the paper now under notice.

The author comprehensively defines slash as in-

cluding all debris resulting from operations involving the felling and utilisation of chir trees, and also from the destruction of this species by such agencies as wind, snow, fire, lightning, floods, landslips, insects, and fungi. In addition to the above, he says, there will be present in chir forests, especially in the higher parts of the chir zone, slash resulting from broad-leaved species such as *Quercus incana*, *Rhododendron arboreum*, *Pieris ovalifolia*, and other associates of less importance. He rightly insists—a point not usually given sufficient attention—that the treatment of slash is an integral part of the practice of silviculture, and more especially is this the case in forests susceptible to severe damage by fire.

"There is abundant evidence to show that the subject of slash disposal has not received sufficient attention in the past, and that its silvicultural importance has not been adequately appreciated. . . . It is necessary to realise that the prompt treatment of slash is a preparatory and essential measure towards the successful and rapid natural regeneration of areas allotted to the first periodic block; and that it clearly behoves us in future to consider slash disposal in a systematic and generous manner, so that the operation shall automatically and quickly follow exploitation."

Briefly, the author's aim is to lay down definite and constructive suggestions in order to attain so far as possible the complete natural regeneration of given areas in a given time; and to indicate how the fire danger in the intermediate and last periodic blocks can be reduced to a minimum, and thereafter maintained in that condition.

The main factors governing the quality and size of slash on an area depend upon the extent of utilisation of the material (that is, the trees) and on local conditions. Mr. Turner treats of the former in great detail; the second, the local conditions, is complicated in Kumaon by the necessity of making provision for right-holders amongst the villagers. When the village population is dense, and the right-holders' demand for firewood consequently large, slash is removed in a relatively short time. If, however, a locality is sparsely populated, the slash, unless removed by departmental action, will lie on the forest floor for a considerable period, which may extend to five years or more. The precise influence of local conditions on slash removal demands a close study on the part of the local forest officers. A knowledge of such conditions will dictate the extent to which departmental action is necessary, and will suggest the least amount of expenditure with which the work can be efficiently accomplished.

These remarks apply to artificially formed slash, the debris from felled trees. Natural causes such as wind, snow, avalanches, etc., may be responsible for heavy amounts of slash, which may include numbers of whole trees. When slash cannot be sold or absorbed by right-holders, for whom provision must be made in the Almora region, within a reasonable time, various methods of burning are resorted to, a difficult business requiring the greatest care. Limitations of space make it impossible to follow Mr. Turner in his discussion on the technique of burning and other points dealt with. The monograph, which is excellently illustrated, merits a close study by the forest officer, and it may be recommended, amongst others, to those responsible for the protection and management of the large areas of coniferous and other inflammable types of forest in Canada, the United States, and Australia, in all of which countries fire damage is so terribly prevalent.