

been carried out in previous years? The pine amongst hardwoods generally dominated the stand, but when it was cut out the hardwoods held the ground. Their shade prevented germination of the pine seed or the development of the tree, if the seed did germinate. The result was that the forest became a hardwood forest and there is no evidence left of the existence of the pine except the old stumps or an occasional young pine that has happened to have special circumstances in its favour in a particular spot. In some pine forests the understory was of spruce and fir, both of which germinate and grow better under shade than does the pine, and when the pine was cut out the understory became the forest and the pine had no opportunity for reproducing itself in such adverse circumstances. In many cases these results may have been satisfactory to the interested parties but in a study of the possibilities of the natural regeneration of white pine the cases are significant. They show that the problem is not a simple one for even if the pine had not been taken out in the circumstances indicated and was left to produce and scatter seed it would in time have been vanquished by the understory unless a fire or hurricane had come and opened up a space to light where the seeds could germinate and the seedlings grow.

The pine is firm rooted and can therefore stand isolation without danger of windfall better than some other species and while it requires light its demands in this respect may be considered as moderate. It would therefore lend itself to a system which would permit of the opening up of the stand of timber to a considerable extent.

Systems of Cutting

There are several main systems on which cutting is carried out. One is the clear cutting system in which all the pine is taken off the ground. This system might be followed where the stand of pine is mature and fairly even-aged, but in order to secure the reproduction of pine several things are necessary. There

must be a stand of young pine on the ground ready to take the place of the old or provision must be made for a supply of seed before the old trees are all taken out. If the cutting is carried out after a good seed year there may be sufficient of a supply of seed fallen which, germinating in the light and warmth of the uncovered ground, may furnish a satisfactory stand for establishing a new forest. If not then some of the pine must be left to furnish seed. But these must be left with reference to prevailing winds and the distance to which seed will carry. The pine seed furnished with a light wing and borne high in the tree in the long pendant cones will carry for long distances, but the proper distance within which a sufficient seed supply will fall must be determined by observation in different districts. If, however, the ground is covered thickly with pine needles when the seed falls it may never reach the soil and get a chance to germinate and grow. With the too full opening of the ground, the grass may get a chance to grow and in a struggle with grass the pine has not much chance. If, however, the new growth is light, shrubs and such trees as poplar and white birch, the pine may be expected to hold its own and to overtop the others in time, and it may do this with the heavier shaded hardwoods if they get away to anything like an even start.

If, however, when the pine is removed, the ground is shaded by a dense covering of hardwoods or of spruce and fir, the chances for the germination and growth of the pine are almost nil, and to ensure pine reproduction they would require to be removed at the same time as the pine.

Local Conditions Mean Much

The system most discussed in Canada, however, and the one supposed to be indicated by the diameter limits for cutting set by the several governments is the selection system, the system by which a selected number of trees are taken out and the remainder are left to increase in size and to furnish a seed supply. But this system, even though carefully