

cent, are too cold or too high or too dry to produce trees of sufficient size to interest lumbermen. Around 100,000 square miles should be deducted for agricultural lands outside the grasslands of the West, they having been included in the above. Even with these deductions, we have enormous areas covered by forests, some 1,900,000 square miles, (over a billion acres), and again having their utilization value in mind, let us ask: What kind of forests; what kind of trees? On at least 500,000 square miles climatic conditions are such as to produce only trees of pulpwood size, practically no trees of sawlog size, that is, 12 inches and above in diameter, except in the immediate river valleys.

Destruction of our forests by fire has been incomprehensibly great. The amount of saw timber thus destroyed has been much greater than the amount removed by logging or farming operations since the settlement of the country began, in fact probably greater than all that has been cut in the past plus all that could be cut today. There is little doubt that from one half to two thirds of the forested area of Canada, or in other words around one million square miles (640,000,000 acres) have been burned within the past 75 years and because of such fires do not today contain forests of sawlog size. This reduces the areas containing trees of sawlog size to about one quarter of the total forested area, that is around 500,000 square miles, or approximately 12 per cent of the land area of the country. If we had the population of the European countries or of the United States, this percentage would be far on the wrong side of the factor of safety. In fact, our supply of sawlogs would last the United States at their present rate of cutting not over fifteen years.

Effects of Forest Fires

Just a little more about forest fires and their effect: Much of this million square miles has been burned not once only, but two, three or even half dozen times. These repeated fires on the same area make abortive nature's attempt to reclothe the old burns with commercially valuable trees. Whole townships that once supported magnificent forests of pine or spruce are now because of repeated burnings covered with worthless brush or with trees of no market value. It is reported that in Quebec there have been about two thirds of a million acres burned so severely that they are not producing the kinds of trees now being used for lumber or pulpwood. Such areas in Ontario are still larger



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according to reports. Bear in mind that these are merely estimates. They are not based on actual surveys, although surveys of the burned-over areas are being carried on in both provinces. I fear, however, we shall be simply appalled when the results of such surveys are made public. It is a matter of public record in Ontario, being disclosed by recent investigations, of which you may have heard, that certain pulp and paper mills are finding it difficult to replenish from crown lands their waning supplies of spruce. And the reason is—repeated forest fires. This forest devastation by fire is not a thing of the past: It still continues practically unabated, except in wet seasons, in some of the most valuable forest regions of the country. Over a million and a half acres of forest fell prey to the flames in Eastern Canada last summer, but it was an exceptionally dry season.

Even on the areas which have been lumbered and have escaped burning inferior trees usually take possession after the removal of the valuable pine and spruce, especially where they were mixed with hardwoods. I could show you areas both in Quebec and Ontario where old white pine stumps occur abundantly beneath the present stand of hardwoods or of mixed forest with practically no young pine trees to be found. The pine could not maintain itself after the logging operations. The conditions are considerably better where spruce has been removed, but not nearly as good as they should be

in order to produce a succession of future crops. You will see at once that in order to harvest a crop of trees on the same area, let us say at intervals of ten years, a sufficient number of trees must be ready at each interval to pay the lumberman for cutting them. When he cuts the 12-inch trees, for example, enough 11-inch trees should be left to refurbish the next crop, enough 10-inch trees to yield a profitable crop at the third cutting, and so on down through the diameter classes, but with an increasingly larger number of trees in each diameter class downwards because the highest death rate is among the smaller trees. This is what foresters call the proper gradation of diameter classes and it is the basis of successive yields on the same area. Now, investigations have demonstrated that such proper gradation of diameter classes, especially in the smaller diameter classes, is lacking in the cut-over pulpwood forests of the mixed type (hardwoods and softwoods mixed) in Ontario, Quebec and New Brunswick as revealed by intensive study of small representative areas. The trees that remain after the first, second and even third cutting belong to the virgin forest. They might be called the virgin surplus. When the lumberman cuts over an area ten years after his first cut, he thinks he is cutting the growth that has accumulated in the meantime, but he is not; he is simply cutting the virgin surplus, a part of the virgin forest that he did not take the first