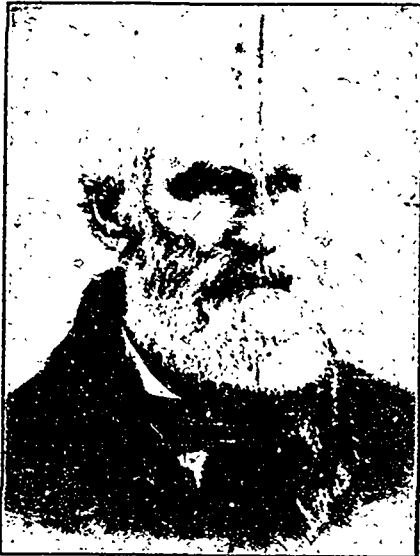


grandeur greater than those of any other country or continent in the world. The reason is supposed to be connected with the condition of the earth before the glacial period. It is supposed that the polar regions had a climate fitted for most of our northern trees. After the disappearance of the glacier the trees have been working their way northward again. Some of the limits already reached are the extreme possible limits, others are not. The trees whose seeds are scattered by the wind, such as the poplar and coniferous trees, will spread more quickly, while others, such as those that have their seeds in the form of nuts, will travel more slowly, the seeds being few in number and being more slowly distributed. A single poplar might distribute seed over a whole country in a single year.

The verge of the forest is at present moving southward, both in America and on the continent of Europe, but still a number of trees have not yet had time to reach their northern limit. An example of this is the black walnut, which is abundant in western Ontario, but only occurs in isolated cases at Ottawa and Quebec. This is one of the trees with which our chairman, Sir Henry Joly, has been making experiments in Quebec.

The number of species of trees in North America is larger than in any similar area. There are 340 species between our northern limit and the Gulf of Mexico. The British islands have only fourteen species, and over the whole continent of Europe there are only twenty-five to



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thirty species. In Canada there are about 120 species, 95 being east of the Rocky Mountains and 25 west of that line. As the continent diminishes rapidly to the south we must necessarily have a large number of species in the south, so in the north we have large forests with a small number of species and in the south small forests with a large number of species.

The chief factors in causing a flourishing growth of trees are the climate and a sufficiency of moisture. The variations of the climate in North America admit of a great variety of growth from the conifers in the north to the tropical trees of the Gulf of Mexico in the south.

The northern forests of Canada stretch from Labrador to Alaska, some four thousand miles, and have a breadth of fully 600 miles.

Western Canada is not wooded in the plain and prairie country. In the eastern, or prairie country, there are clumps and bluffs of poplar, but on the plains only a few trees in the deep valleys of the rivers. This region is triangular in shape, being about 600 miles in width and 600 miles on each side. It is wooded principally with poplar, birch, etc., and in the north there are considerable areas of coniferous trees.

In the area of our northern forests we have about thirty times the area of England. The area of England is about 59,000 square miles. From Ottawa to James Bay is about 600 miles, and it is about 600 miles farther to the northern limit of forests. In Labrador we have an area 1,000 miles wide by 1000 miles from north to south, equal to the whole of Europe, and covered by timber on the east side of Hudson's Bay to latitude 57 north. On the west side of Hudson's Bay the range is to latitude 59 north, and continuing west in the Mackenzie basin it reaches latitude 68 north, beyond the Arctic Circle.

This sketch of our great forest wealth will show the

necessity of some steps being taken to protect and preserve the forests, as well as to ensure the deriving of a proper revenue from them, and shows the necessity for the organization of an association such as the one formed here to-day.

As a result of the climatic conditions the timber lines run in almost parallel lines, although not in all cases. The mean temperature of the year does not cover the extremes of heat and cold, proximity to the sea or the prairie region, former geological conditions, etc., all of which affect the distribution of the trees.

The white cedar is one of the most peculiar in regard to its limits. The reason why it does not extend further west than the eastern part of Manitoba is probably due to the dryness of the climate. There is, however, a patch on the west side of Lake Winnipeg, near Grand Rapids, which was probably started from seed carried by the Indians. They are fond of decorating their canoes with branches of cedar, and the seed may have been carried on branches taken in this way from the eastern side of the lake. Isolated colonies of other species are probably due to the fact that these specimens are in advance of the main body. The white cedar is at its perfection in Gaspé and New Brunswick, occurs but little in Nova Scotia, while there is none in Cape Breton or Newfoundland. There is no trace of it on the outside of the Labrador coast, owing to the biting sea air. In the north the direction of its line of growth is due to the coldness and dryness. There is not much barren land, except in Labrador and west of Hudson's Bay, practically all of the Dominion being well wooded.

In Ontario and Quebec the limits of the trees are a pretty good indication of climate, but in the west other factors, such as soil and moisture, affect the problem, because the same species does not always grow under the same conditions. For example, in the south some species will seek the coolest situations, and in the north the warmest. The white cedar, balsam, pine, tamarack, white spruce and white birch choose the coolest places in the southern parts of Ontario, while farther north they seek the warmest.

The white pine is comparatively southerly in its distribution, being found only in Ontario and Quebec about to the divide between James Bay and the southern slope. North of Lake Superior it has been destroyed by fire and has not had time to reproduce itself. It occurs in Newfoundland, but not in very extensive forests.

A bird's eye view of the country in which the spruce grows would show a patchy appearance, due to the fact that different areas have been burnt over at different times. The spruce forest attains its full growth in 150 years, and there will be patches of this tree of all sizes and ages up to 100 years.

The origin of forest fires in accessible parts is usually due to travellers, explorers, miners or settlers handling fire carelessly. Vast amounts of valuable timber have been destroyed in the past in this way, and a great deal is still destroyed by Indians and others leaving fire. But I think that the greatest cause of forest fires in the north is lightning, though there may be other causes. One of the most curious of which I have heard is told of in a tradition of the Indians in regard to a fire in the Lake Temagami district. They ascribe it to a shooting star, quite a possible reason. Other causes may be the spontaneous combustion of pyrites, etc. One of the principal causes in the accessible parts of the country is the facility of getting matches. Eddy's matches are probably responsible for a great number of the fires. If people had to employ flint and steel the fires would probably not be so numerous.

I have calculated that about one-third of the country may be considered as brule, that is, under second growth up to about ten years of age; one-third as intermediate, including trees between ten years of age and upwards, and one-third including trees assuming the character of trees up to those of one hundred years of age. These make up an area thirty times as great as that of England. Any of the one-thirtieth parts will produce wood enough to supply the ordinary demands of the ordinary population of Canada, that is, five million people could get what is required for mining, fuel, etc., by taking the timber from a space the size of England, and would be able to allow the twenty-nine other parts to grow up to be ready later on.

Spruce trees grow much more rapidly for the first thirty years than they do afterwards. Very little is made between thirty and one hundred years.

If any proof is wanting of forest fires having occurred in remote time, it is supplied by the post-tertiary of where we find the charred remains of trees. Scarborough heights near Toronto trees have been two or three hundred feet below the surface, and



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have also been found elsewhere. We have another in the habits of trees, such as the Banksian pine, requires fire to facilitate, if not to continue its reproduction. The cones are exceedingly numerous, curve inward and adhere to the branch closely, grow in bunches of three or four and will remain on a tree till it falls away with old age. Though it be true that this is not the only way, the seeds come from the cones by the aid of fire. The cones open



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the heat and the wind blows the seeds everywhere. The habit may have been developed like other habits proposed to be accounted for by the Darwinian hypothesis.

Since I have published this statement other observers have noticed that cones were opened without fires, but I think it was due to the sickly condition of trees and especially to the trees being young and immature cones opened by some untoward cause. Cones on large thrifty trees are closed until second fire. Any tree which has its limits north extends to the south except the Banksian pine, which is almost