

and a flood preventative, while the artist will look at them mainly from an æsthetic point of view, as making or marring the landscape, according to their presence or absence and thereby contributing to the sum total of human happiness.

Many land surveyors, I have no doubt, frequently have occasion to regard a forest as an unmitigated nuisance, especially when it is composed of *Ilex verticillata*, or black alder, and lies in the line of march. As an official of the Government, interested in maintaining the provincial revenues from sources remote from direct taxation, I have to admit that my own point of view is largely a utilitarian one, that regards the forest as a source of wealth to the province and to the people, but I fully recognize the importance of the other, and what I shall call the incidental benefits, benefits so great and so important to the general welfare of the community as to make it desirable that forestry should be an affair of the State rather than of individuals, with whom present financial necessities may cause a sacrifice of future profits and result the detriment of climatic conditions.

Before going into the matter of the incidental benefits of forest growth, allow me briefly to refer to what I consider the main question from the standpoint of provincial revenue, and the maintenance of the extensive industries dependent upon forest products. The provincial revenue received last year from woods and forests by way of ground rent and timber dues was over \$981,000. This represents the production of a large amount of timber, and if we add to this the large quantity of firewood, railway ties, pulpwood and about 375,000,000 feet of timber cut yearly on lands not controlled by the Crown, it will be seen what a very important part in the industrial life of this province is played by our forests and their products. The number of men employed in the woods, on the streams and in the saw-mills, apart altogether from those engaged in other industries dependent in part or wholly upon the forest, runs into the thousands, while the capital employed represents many millions.

It is not necessary for me to go into the many reasons why permanent forest industries must be dependent largely upon State control, that is I think pretty well understood by everybody now-a-days, but I desire to point out what the present forestry policy of the Government means to the future revenue, and the industrial life of the province. The Forest Reserves Act of 1897-8 proposes to set apart areas of non-agricultural lands to be withdrawn from settlement and kept permanently the property of the Crown for the purpose of growing successive crops of timber. If these areas had to be cultivated and planted to young trees, at an expense of about \$15 an acre, the amount of money required would be very great, and if the amount thus expended, with interest, were added to the annual cost of care and protection of the young trees, it is doubtful if the resultant crop would show a very large profit on the transaction. True, the crop would be larger than in a forest grown under natural conditions, as was the one we are now harvesting, and a shorter time would be required to enable it to reach a state when it would be profitable to cut it. At the same time the initial expense and annual charges would be so great as to render the project of doubtful financial success on any large scale in this country, where only the more valuable products of the forest have a market value:

Fortunately for us, however, this is not necessary to provide future crops of trees and of the sorts experience has proved to be the most valuable. To do this will

require the expenditure of very little money, but more time. I hesitate to make any remarks as to how we are fixed in the former commodity—it is more or less a political subject, on which doctors differ—but we are rich in the latter. How much money we can invest in reforestation without borrowing I will not attempt to say, but we have plenty of time. The nation never dies, or hardly ever, and we are a young nation, with millions of acres of land valuable for growing trees, of little value for any other purpose, so we can afford to wait to allow nature to restore the magnificent forest removed by axe and fire from these lands. And nature is already doing the work, not as evenly as we could wish, nor with a crop of pure white pine, our most valuable tree, but she is doing the work just the same. I had occasion this past summer to examine a tract of several thousand acres that had been lumbered over, and burned over several times. Over this tract I found a vigorous growth of poplar, birch, white pine, red pine, tamarack, cedar, maples and other trees. In some places there was very little pine, but over most of it there is a crop of pine numbering from 200 to 700 trees to the acre and growing very fast. Much of it is now 6 to 9 inches in diameter, and I estimate that in 50 years there will be a very heavy crop of pine ready to cut, not less than 50,000 feet B.M. to the acre. I do not mean that it would be wise to cut that much at that time, but it could be cut.

On much of the abandoned farm lands in New England 50,000 feet to the acre is now standing, and two years ago the Rathbun Co. cut 100,000 feet to the acre over quite a tract in Grinsthorpe. I mention this to show that my estimate is not excessive. The stumpage value of that pine 50 years from now will be worth not less than \$4 per M, and is likely to be worth more. At this figure the pine timber on much of this land fifty years from now, if protected and cared for, will be worth \$200 per acre, which represents a present cash value at 3 per cent. compound, of \$45.62 an acre, and this land is generally considered of no value.

The main benefit to be expected from these reserves consists in the provincial revenue, and the maintenance of industries dependent on them, but in addition to this the incidental advantages from the presence of these masses of trees are of vast importance to the people of this country. Concerning these factors in forest value there is room for considerable diversity of opinion, and this diversity exists. It is claimed by some forestry advocates that forests materially affect the rainfall, while on the other hand, it is claimed that it is not so, but that the rainfall affects the forests. While there can be no doubt of rainfall affecting the forests, it is not equally certain that the presence of forests influences the amount of rainfall. It is a case of not proven, although to my mind the evidence mainly goes to show that if the total rainfall is not influenced by tree growth its distribution is. We know that trees take up immense quantities of water from the soil and transpire most of it through the leaves. The moisture thus transpired from a large hardwood forest is very large, though difficult to estimate accurately, as the amount varies with the thickness and number of the leaves, amount of water in the soil and other conditions. A conservative estimate is made by F. B. Hohnel, a German scientist, of a fifty or sixty-year old beech forest for the season of growth at 1,972,000 lbs. or 986 tons of water per acre. Some authorities make the amount much larger than this, but in any event there is sufficient to lead one to believe that the atmosphere immediately above a forest must be so charged with moisture as to hasten precipita-