

of forest land is not allowed to remove the forest cover entirely if it is likely to be inimical to the general interest. Repugnant as this control would be to the democratic sentiments of the people of this country, it would be no more arbitrary legislation than the law by which a man is prevented from polluting a stream passing through his lands which waters the lands of his neighbors.

Various suggestions have been made as to the encouragement of tree planting in our settled areas, and they are for the most part in the form of government assistance, either by remission of taxes on woodlands, by supplying seedling trees at the public expense, or by a cash bonus. Just what form this governmental interference should take is still an open question, but in my opinion such action, coupled with the education of public opinion on the matter, will be found necessary to restore that proportion of wooded to cleared land which experience has taught us to be necessary to national prosperity.

The other and vaster phase of the forestry problem in Ontario requires different treatment, and becomes easier of solution as we learn more of the condition of the country and the habit of growth of our more important commercial timber trees. As remarked before, the forest is very persistent and will perpetuate itself if given a chance. Time and protection of the land from fire would restore in all its primeval glory the magnificent forest growth that once covered this country. In a country where all the land is arable, where grain can be raised profitably, it is difficult to prevent the forest from being removed to make way for crops of grain or grass. Fortunately, I think, this is not the case in Ontario. While we have a very large extent of arable land along the great lakes and the St. Lawrence river, south of the elevated plateau we call the height of land, and north of it, on the slope towards the Hudson Bay, there is a strip of land, generally speaking from east to west across the province, not suited for general agriculture, but well adapted for forests. It is impossible even approximately to estimate the amount of valuable white pine that has been cut and burned off this height of land, and we are still cutting and burning further west on the me ridge. It was eminently right that we should cut this timber as fast as the demands of commerce warranted. The forests were old and much of the timber past its prime. Through the Algonquin Park country the lumbermen now operating there report that much of the pine timber is defective from over age.

Two principal causes have acted against the practice of scientific forestry in this country. In the first place, our wondrous wealth in forests tended to the belief that they were practically inexhaustible, and that careful or provident methods in their exploitation were not necessary. Fortunately for the revenues of the province, however, both in the past and for the future, our legislators had a due regard for the welfare of the province in a financial sense, and these forests were not given away, nor was the land in which they grew placed in the hands of speculators, but held by the Crown for the use of bona fide settlers.

In marked contrast to the policy pursued by the people of the United States, in selling to large lumbering firms or other speculators great areas of timbered land at a merely nominal price per acre, Ontario has sold her timber by auction to the highest bidder, subject to a small stumpage tax when cut, and has held the land for the use of settlers. This policy has not been without its opponents. Men from purely selfish motives have sometimes urged a different course. As long ago as 1862 the late John Langton, M. A., in a paper read before the Historical Society of Quebec, pointed out the danger of too rapid extinction of our forests. He took the position that with a proper system of administration of the forests a comparatively small area would grow successive crops of timber sufficient for our demands for local use and for export at the then rate of cutting, but that with the wasteful methods then in vogue there was danger that our revenues from that source would soon be exhausted. As a preventative measure Mr. Langton advocated the selling of many blocks of timber land outright to lumbermen, who would be interested in their protection and in the perpetuation of the timber crops. Mr. Langton saw that by dividing up the land into small holdings for settlers it was likely to produce the results that now are seen in our border countries, but his remedy, in the light of subsequent history in the United States, would not have cured the evil. It has been very fortunate for us that the large areas on which grow our finest forests were not sold to lumbermen, but remained the property of the whole people, leaving us now in a position to grow another crop in place of the one removed, without having to buy back the land to do so. Our timber policy has consisted in realizing as much as possible for the public revenue from the use of the vast timber wealth with which we are endowed. So far it has not included any provision for replacing the crop destroyed, and this has been the case largely because of the other factor I have referred to, which consisted of a very general belief that this could be done except by an expensive system of sowing or planting.

Our great timber tree of commerce is the white or Weymouth pine, a tree that has no successful rival in any country, and in any scheme of reforestation for commercial purposes this tree must be the main feature of the forest growth. Under our system of lumbering the tops and branches of the trees are left on the ground where the trees are felled. In coniferous forests this refuse is extremely inflammable, and in consequence, when the lumberman has gone through a pinery, fire invariably follows him and sweeps away what he has left not the refuse

only, but the young trees not large enough to cut. If it should happen that this forest fire does not entirely destroy the growing timber, there is apt to be another one to complete the work. This succession of fires after logging operations has come to be looked upon quite as a matter of course, though I venture to express the opinion that the enormous waste of wealth occasioned thereby is not at all necessary, and could be materially checked by some slight change in the method of lumbering and by the expenditure of some money in forest protection, an expenditure that would be a good investment by reason of the increased revenue from the timber lands of the Crown.

However, we must consider the situation as we find it. Forest fires occur, and the cut over pine lands are completely stripped, not only of the young trees that would make the future forest, but the seeds on the ground are destroyed, and occasionally the soil that has been centuries in forming is burned away as well. When any soil is left the pine forest burned away is generally first succeeded by a growth of less valuable trees, such as poplar, birch, fire cherry, etc., and from this fact has been drawn the conclusion that when once pine forests are cut away we need never hope for other pine forests to take their place unless we replant them. Experienced woodmen have repeatedly given this as their settled conviction, and it has almost come to be regarded as an axiom that nature provides a sort of rotation of crops of trees, by which white pine is succeeded by some other tree and it in turn replaced by others till the circle is complete. As an evidence of this it is alleged that there are trees that will not reproduce till their seeds are subjected to the action of fire. One of these trees is our own Jack or Banksian pine. Concerning this tree a very distinguished authority, in a paper read before one of the sessions of the American Forestry Congress, states:—

"Referring to the evidence afforded by the trees themselves that forest fires are natural phenomena, I shall mention the case of the Banksian pine. The cones of this tree are hard and remain closed as long as the tree lives. The older ones become weathered and covered with lichen, often indicating great age, still adhering firmly to the branch. The tree may fall down and rot and the cones drop from the decayed branches, yet they will not open. But should the tree become scorched by a forest fire, they will immediately gape open, and the healthy seeds will become scattered far and wide by the wind."

If this position be correct, and we cannot reap successive crops of our most valuable timber trees on the same land without artificial sowing or planting, then our hope of successful reforestation of the cut and burned-over areas on the Crown lands must needs be very faint. With all due deference to the views of these experienced men, and in spite of the general consensus of opinion to the contrary, I am convinced that white pine will succeed white pine even after a forest fire if any pine trees capable of bearing seed are left in the vicinity, and even if the new growth is largely deciduous trees it will be found, on close inspection, that there are many young pines among them that will in a short time overtop and subdue the less valuable trees. Even in the case of Jack pine referred to above, some investigations undertaken by Mr. E. C. Jeffrey last summer go to prove conclusively that it will reproduce itself in just the same manner as other trees, and that it does not require the assistance of a forest fire to do so.

All over the province where lumbering operations have been carried on and the land has not been cultivated, young pines in varying numbers may be seen growing thickly until some tourist or prospector or settler causes it to be burned over. In the original pine region, wherever fire has been kept out for a few years, pine is now growing among the other trees, and there are large areas of unproductive land on which, if properly protected, there will be a valuable forest in twenty-five years from now. Fifty years is a short time in the life of a nation, but in that time we could begin cutting timber in the Ottawa valley again and get from it a greater revenue for the province than was obtained from the original forest. The land is still ours; it will inevitably be tree-covered if protected, and it will not require a heavy expenditure to protect it. The forest problem in the Crown lands seems to me to require for its solution simply the setting aside of the now tillable areas throughout the height of land or the water shed of the province as permanent timber reserves not open for settlement. Keep out fire and allow the forest to grow till the trees are a merchantable size. When this period is reached these forest areas should be worked on correct forestry principles, and the lumbermen allowed to cut only as directed by the government foresters, and not indiscriminately as at present. The time required to grow this new forest would be less than is commonly supposed. There are now, over large tracts of country suitable for forest reserves and useful for little else, quantities of young pine growing of various ages that, if protected, and more particularly if thinned out, would be suitable for timber in from ten to forty or fifty years. The growth of pine per year has been variously estimated. In any computation it must be remembered that pine is not found growing alone, but always with other trees; hence when we compute the amount of pine on an acre we should not lose sight of the value of the other trees, many of them of commercial value, such as oak, maple, elm, birch, spruce and others, and this value is increasing yearly.

Sir Henry Joly, referring to some calculations in the last report of the Ontario Bureau of Forestry, states that he has from personal measurements through several years concluded that "It takes about ten years to add

two inches to the diameter of a tree. At this rate of growth I find that a white spruce twelve inches in diameter will gain in ten years eight cubic feet, which would give four-fifths of a cubic foot every year, and if you allow 75 spruce trees to the acre it will give you 60 cubic feet for the yearly growth. Continuing, Sir Henry says: "Perhaps there are not many acres on which will be found 75 good sized spruce, but on moderately well timbered land the equivalent in bulk of the timber represented by 75 spruce trees of say, 14 inches at the stump, will be found in other trees, and it can be ascertained by comparing the yearly rings of the white spruce with those of the black walnut, butternut, pine, oak, ash, poplar, elm and some others, that the growth of the white spruce is slower than that of the above mentioned trees, so that I feel justified, like Mr. Southworth, in adopting the United States figures of 50½ cubic feet, the more so that we have the statement of eminent authorities in England who estimate the annual growth of one acre of Scotch pines at 100 to 120 cubic feet, nearly double the rate allowed by Mr. Southworth."

Our present annual cut of timber on the Crown lands of the province aggregates over 60 million feet cubic, and it will require a great many years at this rate of cutting to go over the uncultivated and unexplored regions of pine land in the Crown domain even with the assistance of occasional fires. Taking the figures of 60 cubic feet as the annual growth per acre under ordinary forest conditions without culture, it would only require a million acres of land to grow the amount of timber annually cut on the Crown lands, and we have more than that area in Algonquin Park alone. It is impossible at present to more than guess at the extent of the areas that could be set aside as forest preserves without encroaching on our agricultural lands, but it will reach many millions of acres. It is but fair to add that to the amount of timber annually cut on the Crown lands may be added fully as much more cut by settlers. I have not yet the complete figures, but am safe in saying it will be found to be fully that much, and this must be taken into account as well, because the woodlands of the farmers are being dejected to make it up. Throughout these areas of cut-over land that might be utilized for forest preserves there are scattered settlers wherever there is soil fit for agriculture, and in some places where there is none. In any scheme of protection of these young forests the services of these settlers could be used, thus lessening the cost to the country and helping these settlers to make a living.

As to the profits on the investment, we have only to look at the example of Germany to see. Their Crown forests have been cut over again and again, yet their 6,050,445 acres of Crown forests return a net yearly revenue to the state of \$8,000,000, and this despite the fact that their forestry system is a semi-military and expensive one and the expenditure includes yearly purchases of land and the maintenance of an expensive system of forest schools.

Aside from the question of provincial revenue derived from our timber we must not lose sight of the fact that the extinction of our forests means the decay of our lumbering interests. It has been customary in many quarters to denounce the ruthless and reckless course of the lumbermen, but they have been a very important element in our industrial development and now represent the largest industry, aside from agriculture, in the province, employing a very large number of men, with a heavy capital investment. Lumbering operations provide a paying market for the produce of the pioneer farmers, many of whom are employed in the woods during the winter. It would be a national calamity if this industry were to die out, and if it does it will be our own fault. Another happy circumstance in connection with the proposed forest preserves lies in the fact that the land most suited for an extensive system of forestry because of its inutility for general agriculture is that section of country where the existence of forest cover is demanded for the protection of our main water courses flowing both north and south.

PUBLICATIONS.

The annual supplementary editions of the Winnipeg Commercial have become a fixture. The number just to hand surpasses all previous issues.

The contrast in the condition of the country between the time of Lincoln's first inauguration and that of President-elect McKinley is said to be vividly portrayed in an article by Stephen Fiske, for the March Ladies' Home Journal.

The twenty-second annual special issue of the Timber Trades Journal, of London, England, is devoted largely to a description of the lumbering industries of Canada, particularly the eastern provinces. For this purpose a director of the journal visited Canada last fall, and the result of his labors is the publication of a volume of information which should be of great interest to importers in foreign countries. The journal is freely illustrated and altogether a creditable number.

One of the most complete publications which has yet come under our notice is a special edition of The Paper Mill and Wood Pulp News, of New York. The many interesting illustrations of mills and prominent persons connected with the paper trade are printed on first-class paper, in such a manner as to produce the best results, and the success with which the publishers have met in their efforts to produce a journal second to none should be gratifying in the extreme. The advertisements as arranged constitute an important feature of the number.