THE TRIP TO MR. J. R. BOOTH'S LIMIT

MADAWASKA, ONTARIO

His Excellency and Lady Grey take a great interest in the proceedings

Mr. R. L. Borden and Mrs. Borden join the Foresters

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CANADIAN FORESTRY CONVENTION.

The first Canadian Forestry Convention held under the auspices of the Canadian Forestry Association, was opened in the Railway Committee Room of the House of Commons, Ottawa, at 10 a.m., on Wednesday, January 10th, 1906.

There was a large attendance of representative men from all parts of the Dominion, as well as a number of leading foresters from the United States.

The meeting was called to order by the right Honourable Sir Wilfrid Laurier, G.C.M.G., Prime Minister, who invited His Excellency the Governor General to open the Convention.

HIS EXCELLENCY THE GOVERNOR GENERAL—Sir Wilfrid Laurier, Ladies and Gentlemen, it is my privilege to open this Forestry Convention which has met in response to the invitation of the Prime Minister to consider, and before it is too late, questions of the highest importance to the future well being of the Dominion. I do not propose to anticipate with more than a very few remarks of my own the addresses of the distinguished gentlemen who have been requested to place the results of their experience and their counsels at the disposal of those who form the opinion and make the laws of the Dominion. I will only say that although my experience of Canada has been comparatively short, it has yet been sufficient to impress me with the urgent desirability of focussing the best brains of the Dominion on the immediate consideration of what shall be done with regard to our forests in order to protect the soil on which the maintenance of our agricultural prosperity depends.

I have myself seen in India, in Asia Minor, in Greece and in Italy, extensive tracts of territory once inhabited by a strenuous, prosperous, numerous population, and now reduced to the misery of a barren desolation by the unregulated deforestation of their lands by a blind and selfish generation which had no regard for

posterity, and no eyes for anything but their own immediate requirements.

Gentlemen, there are no more melancholy reflections than those suggested by the sight of a country, once rich and equipped with all the majesty and panoply of power, which has become a waste and a stony desert through the reckless improvidence of its own people.

It is the object of this Convention to fix the attention of the people of the Dominion on the warning which these and other countries hold out to us as to the practices we should carefully avoid, if we are in earnest in our hope that our beloved Canada may fulfil the high destiny which will be fulfilled if this generation is gifted with sufficient foresight and self-control to husband the resources so abundantly lavished upon it by a bountiful Providence.

It is because I hope that this Convention may be the means of averting from every part of Canada the sad fate of those countries to which I have referred that I have gladly accepted the request that has been made to me to open this Convention. I sincerely hope that the results which will flow from the Convention he has called will realize the hopes of Sir Wilfrid Laurier. I am glad to see so many here and I note with peculiar satisfaction the presence of the eminent gentlemen from the United States who have come here in a spirit of fraternal sympathy and co-operation to give us the great help of their assistance. I now, with great pleasure, declare this Convention open.

Sir Wilfrid Laurier—In the name of the Canadian Forestry Association which has conceived and planned this Conference and in the name of the Canadian Parliament, which has authorized and approved it, it is my privilege and my pleasure to extend to you all a most hearty greeting. Welcome to one; welcome to all. Especially should I welcome, even after the words of His Excellency the Governor General, the representatives of the American Republic who are present with us on this occasion, and who bring to us the benefit of their knowledge and experience. Welcome also to the representatives of the Provincial Governments, without whose aid and co-operation our efforts could never have the full fruition which we anticipate from them. Welcome also to the representatives of the great railway companies which are placed in a position to give, perhaps more than any other class of the community, the benefit of their experience and knowledge to us. Welcome also to the representatives of the great lumbering class, who, perhaps, are more interested than any other class of the community in the maintenance, preservation and protection of the forests. Welcome to the University men whom we see efore us, welcome to the traders, welcome to the sportsmen,

welcome to all classes who are present and who are ready to contribute of their time and of their money to the great object we have in view and which is an object of primary national importance. The large attendance which I see before me, I am most gratified to say, exceeds all the expectations that we had and this attendance, large as it is, is a manifest evidence that the Canadian people at last,—at long last realize the great importance of all problems connected with forestry.

A great deal of harm has already been done, harm, which, I am afraid, in many respects cannot be recalled, but it is not yet too late and the harm which we know has taken place is and ought to be an incentive to us to do our best in the endeavor to check it, and to give more attention to forestry problems. Our ancestors, when they came to this continent, found it an unbroken forest from the shores of the Atlantic Ocean to the Mississippi Valley. It was the home of a race of hunters who derived their existence chiefly from the chase and for whom therefore the forest was a natural element. It was the object of our ancestors to turn this land into a fit habitat for a race of agriculturists, for the white man whose civilization is based primarily upon agriculture. They had to clear their homes from the forest with care and tenderness, they looked upon it as an enemy to be got rid of with the axe, with fire, and with every mode of destruction. History tells us and our own experience tells us that they went at it most mercilessly. The forest had no friends whatever, because, to clear off a few acres of land they would set fire to miles upon miles of the noblest trees that ever lifted their lofty heads towards the heavens. This, at one time or other went on in every part of the continent and even at this very day it is going on in some part of the continent. These pioneers of former days, as the pioneers of these modern days, did not realize, did not appreciate that in the economy of nature forests are just as indispensable to the civilization of man as tilled fields. They did not appreciate that even from the point of view of agriculture unless tilled fields are furnished by forests with moisture and rainfall they decrease in their productiveness accordingly, and that the efforts of the agriculturist will suffer in proportion. We have assembled here in order to devise ways and means, if possible, first of all to check this evil and to make every class in the community realize the great importance of maintaining, preserving and protecting our forests. What I would like to call the attention of this Convention to, in the first place, would be the necessity of establishing, if it has not been done, and it has not yet been done, a preserve, a large forest domain. We must know now the experience of those nations to which His Excellency, in his address, has just alluded, teaches us that there are certain portions, certain sections of the earth's surface, which, in the wise economy of nature, must always

be maintained as forests and that our water-sheds must be kept in forest. All the hills, mountains and plateaus which are the sources of flowing streams or rivers should never be allowed for any consideration whatever to remain anything else than forest. No consideration whatever should allow these portions of the earth's surface to be denuded of their trees. We know the consequence and therefore it is needless for me to dwell upon that feature; it is a mere truism.

But, what I want to call your attention to is that if these portions of the earth's surface in our own country are to be maintained as forests it is essential, in my humble judgment at all events, that they should form part of the national domain, that they should belong to the state. In Canada by the State I mean the provincial governments, where the management of the public lands is left to the provincial governments, and the national government where the ownership of public lands is left to the national government. If it so happens, and I am afraid it has happened, that some portions of these watersheds have been alienated from the public domain and have been transferred to private ownership it should be the policy of the National Government, and it should be the policy of the provincial governments, to repurchase these lands and bring them back to the public domain.

The state of New York has inaugurated such a policy. The state of New York years ago made the mistake—I was going to say committed the folly, and perhaps that word would not be too strong—of alienating part of the watershed of the Adirondack mountains. We know the fatal consequences that have arisen from that policy in the droughts which have, more than once, been the bane of that beautiful state. And now, I understand, the legislature of the state of New York has passed laws authorizing the administration, as fast as possible, to re-acquire these lands and make them a part of the public domain. If, in any part of Canada, a similar mistake has been made, a policy such as that adopted by the state of New York should be adopted here, and the national or provincial governments whose business it is should make it their object to bring back to the public ownership the lands that have been alienated, and make these forests a part of the national domain, as is done in Germany, France and some other countries (Applause). On this point, I am sure, we all agree.

The next consideration for which I would ask the deliberation of this Convention is the reproduction of the forests. Our system of treating the forests is to lease them to the lumbermen for the purpose of taking off the merchantable timber. I do not know whether this policy is advisable or not. I believe that, on the whole, it is advisable. But no effort is

made to replace the timber that is taken away from what we call the limit under that policy. In Germany and France, I understand, it is the accepted policy, a policy that has been followed for generations, that, when a tree is removed in any way to replace it by the planting of another tree (applause). I am not prepared to say that such drastic conditions should be imposed upon the lumbermen,—though I am not prepared to say, on the other hand, that a plan of this kind should not be taken under advice. At all events, I submit to this Convention that we ought to do something more than we are doing at the present time (hear, hear). It is not fair to the country—it is not fair to us who are living and still less is it fair to the generations to come after us —that we should allow the destruction of the forest to go on year by year by the cutting down of the trees and make no effort whatever to replace what is thus taken away. The trees are a crop like any other growth. True, they are a crop of slow growth, but that is the only difference between trees and any other crop. In this, as in every case, when a crop is taken off, steps should be taken to replace it at once with another. I said a moment ago that I was not prepared to say that when the lumberman, in the course of his work takes away, say, 300,000 trees in a year he should at once plant 300,000 trees. But I do ask this Convention to consider what should be done in that matter. One thing might be asked, whether of the lumbermen or of the State that, where trees are taken away, trees should be seeded, so that we may have a crop coming on all the time. It is a fact which we face with some degree of sadness, even to mourning, that Canada, in a few years, will be devoid, absolutely devoid, of the beautiful pine forests which at one time were its pride. We can calculate the number of years—and the number is not very great, when there will not be another tree of the original forest to be cut upon the limits of the Canadian lumbermen. But, trees have grown and trees ought to grow again. There is an impression which I have heard expressed on more than one occasion, that it is useless to look for another crop of pine trees—that when you have removed the crop we found here, the growth of many years, the new crop of trees will be spreading and of no merchantable value. But I am told that there is a way whereby a new crop of trees can be grown. The growth should be started as soon as the original trees have been removed from the soil. A few years ago I was discussing this subject with a lumberman of great authority, a man known to some of you, the late John Bertram, a man most eminent in his profession and of the highest capabilities in many directions. He told me that, on his limits on Georgian Bay, he had a young crop of pine when he had started a few years before. The explanation he gave me was this—and I am glad to give here the information he imparted to me so as to gain the opinions of those

who have experience in these matters—he told me that, when the crop of pine was cut off, the new crop to spring up would consist largely of poplar, and poplars grew faster than the pine or hardwood trees. And he said:—If you take care to plant pine seeds underneath these poplars, the young pines will grow up shaded by the faster-growing trees. The pines, in their efforts to reach the sunlight will grow tall and without limbs. After a time, when they overtop the poplars, their life is assured. If this be the case, it seems to me we have here a method of reproducing our trees and of having, for all time, a constant supply (applause). It is a natural thought that we shall not live to see this young generation of trees at their full growth; but, as has been stated a moment ago by His Excellency the Governor General, we must not think alone for ourselves, we must think of the prosperity of Canada in the days when all of us shall be sleeping in our graves. This is the sentiment, I am sure, that actuates this entire assembly. (Loud applause.)

The next thing I would like the Convention to consider is the protection of the forest against its many enemies. For the forest, unfortunately has many enemies. Man is bad enough we all agree; but man is not so bad as the insects, and the ininsects are not so bad as fire. The fire is the great enemy of the forest. Nothing can be sadder for us to consider than that, during the summer months there are miles and miles of forest destroyed by fire. This goes on every year. Speaking of my own experience, it has been going on every since I can remember. It goes on, perhaps, not to so great an extent as in former years, but there is far too much of it yet. (Hear, hear.) I was talking, a few years ago, with one of the lumbermen of the city of Ottawa, and he made the statement to me that the enormous quantity of lumber taken to market out of the Ottawa valley does not represent more than ten per cent of the timber that has been destroyed by fire. If this is a true statement the fact is simply appalling. Last week, I met one of the lumber kings of the Ottawa valley, who asked me, "What are you going to do at this Forestry Convention?" I said, "We are going to compel the lumbermen to protect the forest against fire." He replied, "Why, the lumbermen are doing more in that direction now than all the rest of the community put together." I said, "I quite believe it. But that is not saying very much for the lumbermen—(applause and laughter)—because the rest of the community does absolutely nothing to protect the forest, and the lumbermen may well be doing more without doing enough." (Applause.)

What measures ought to be taken to protect the forests against the raging fires that every year consume such an appalling quantity of the best timber of the country. I know that some

effort has been made in this direction. I know that the lumbermen keep a patrol of the woods of the Ottawa valley. And that is a great improvement. But I submit, that this is not enough. I submit that something more ought to be done, if it be only to have more patrolmen. I believe that we should have the woods patrolled as they are in Germany and France, so that, as far as possible, every incipient fire should be prevented from spreading. Moreover we should impress every man in Canada—the lumbermen, the sportsmen, the man out of any class—with the belief that it is a crime, an absolute crime to throw a lighted match upon the ground—(applause)—, to scatter the ashes of a fire, or to leave a camp fire before it is absolutely extinguished (loud applause). All these things are crimes and I would go so far as to say that they should be made crimes under the law.

There is another mode of destruction to which I want to call the attention of the Convention and it is the destruction of the railway locomotive. The railway locomotive is a great blessing undoubtedly, and I am not here to say anything harsh of it, but if you take the train at Halifax to go to Vancouver, in every province of the Dominion, where there is timber, in Nova Scotia, in New Brunswick, in Quebec, in Ontario, in British Columbia, you will see miles and miles and miles of what was once beautiful forest and which is now nothing but parched and blackened timber, a monument to the destructive power of the railway locomotive. I know that the railway men have done a great deal to obviate this evil. They have used all possible ways of overcoming the difficulty inherent to the operation of the railway locomotive. They have put screens upon their stacks, they have devised different methods, but all these methods have been inadequate and I do not know that in that direction they can do more than they have done, but perhaps the railways ought to be compelled in the summer season, at all events, to have extra patrolmen on their tracks so as to prevent incipient fires, to follow sparks in their progress and to extinguish them before they have caused any damage. I think that is one question that ought to be carefully considered by this Convention and I believe that if it were to do nothing more than to prevent fires by railway locomotives this Convention would have done a great deal, but I think it will do more than that.

There is another subject to which I would also invite the attention of the Convention. That is tree planting. It is not sufficient that we should preserve our forests where we have forests. It is not sufficient that we should plant forests also to a great extent, but we should invite people generally to give more attention to tree planting at their homes and especially upon their farms. The Canadian Government, some eight years

ago, introduced into one of its departments a forestry branch. It has done a great deal of good in that respect and I hope that Mr. Stewart, who is the administrator of this branch, will give us some information as to the work which he has done. It has done a great deal already to my certain knowledge and to the knowledge of everyone who has been in the North-West. It was my privilege last September to visit the Province of Manitoba and the new provinces of Saskatchewan and Alberta. Fourteen years had elapsed since I had seen them before and of all things which struck me in this wonderful country the thing which perhaps gladdened my heart more than anything else, is the attention which is given to forestry. Fourteen years ago when I first visited the Province of Manitoba and the Territories of Alberta and Saskatchewan the farms were absolutely barren of trees; you could not see a tree around them. Now, I am glad to say that around most of the farms of Manitoba and many in Saskatchewan and Alberta you can see groves of trees. The City of Winnipeg in that respect is an example to the cities of the east. The City of Winnipeg has done marvels in the way of tree planting. The streets of Winnipeg to-day are a credit to that city and would be a credit to even an older city than it is. But, there is a great deal to be done in the east and in that respect perhaps my own province of Quebec is the greatest sinner. My own countryman, the French-Canadian, is the man with the axe. There is no better man in that respect than he. He goes into the forest and there is no man who can equal him in forest work, but, in the meantime, he has not been as careful as he should have been in preserving the trees in his midst. I should like to impress upon every Canadian farmer the necessity of covering with trees every rocky hill and the bank of every running stream. It is very easily done. He has only to scatter the seeds on the ground, fence it and nature will do the rest. These are some of the questions which I hope will be taken into consideration by yourselves. I do not intend to limit the number of questions which shall be taken into consideration but these are some to which, with others, I invite the serious attention of this Convention. I have much pleasure in calling upon Mr. R. L. Borden, the leader of the Opposition in the House of Commons.

Mr. R. L. Borden.—I welcome the opportunity of being present at this Convention and of expressing my appreciation of the importance of our forest resources. To men familiar as you are with the subject all that I can say must seem trite and commonplace ; but I venture a few remarks merely for the purpose of indicating my interest in this great question.

Canada is remarkable not only for the extent and variety of her resources but for the diversified nature of the country

and for its remarkable beauty. In the east we have Quebec and the Maritime Provinces with their magnificent coast lines, their forests, their agriculture and their mineral wealth. Thence there extends inland through Quebec and through the sister Province of Ontario the greatest inland waterway in the world connecting the ocean with the broad prairies of the west. Great rivers reach down from the forests of the north. On the western coast we have another great maritime province abounding in forest and mineral wealth.

Of all our wonderful natural resources none are more important than the forests. Their conservation is undoubtedly more vital to our future than is generally realized. "How foolish," says a great authority, "how foolish does man appear in destroying the mountain forests for thereby he deprives himself of wood, water and soil at the same time."

We are apt to regard our forests as limitless and our forest wealth as unbounded; but public attention has already been directed to certain dangers and to some of the more threatening elements of destruction and waste. Something has been done to check forest fires yet what devastation they have wrought. Practical men tell us that twenty times as much has been sacrificed to flame as to the lumberman's axe. An illustration mentioned at the last session of the Canadian Forestry Association may be given. A settler in the Province of Quebec in order to clear the ground for a five bushel crop of potatoes started a fire that destroyed three hundred million feet of pine which to-day would be worth $3,500,000. Measures have been taken in many of the Provinces to prevent such destruction, but those who speak with knowledge declare that much yet remains to be done. Many of us although not actually concerned in forestry or in the lumbering industry have had occasion to tramp perhaps for half a day or more through forests ravaged by fire. There one can see the very abomination of desolation spoken of in Scripture. Then follows erosion of the soil consequent on the destruction of tree and plant life and this in turn works similar havoc. The waterways cease to be highways. Rivers cease to be channels of commerce and become raging instruments of destruction.

The importance of the subject has been most forcibly expressed by Dr. Fernow, director of the New York State College of Forestry, and an eminent authority on the economics of forestry. He says:—

"While we are debating over the best methods of disposing "of our wealth, we gradually lose our very capital without even "realizing the fact. Whether we have a high tariff or no tariff, "an income tax or head tax, direct or indirect taxation, bimetallism "or a single standard, are matters which concern, to be sure, the

"temporary convenience of the members of society, but this "prejudicial adjustment is easily remediable. But whether "fertile lands are turned into deserts, forests into waste places, "brooks into torrents, rivers changed from means of power and "intercourse into means of destruction and desolation—these "are questions which concern the material existence itself of "society, and since such change becomes often irreversible, "the damage irremediable, and at the same time the extent of "available resources becomes smaller in proportion to popu- "lation, their consideration is finally much more important "than those other questions of the day."

Let us consider for a moment the extent of our forest resources in Canada, their value from a mere monetary standpoint and the importance of their conservation. Dr. Fernow estimates that our nominal forest area comprises eight hundred million acres, but that the actual available area does not exceed four hundred million acres. To understand what this implies and what it means to us in the future let us see what has been accomplished elsewhere. In some parts of Europe the forests are under state control, that is to say not only the ownership but the management of the forests is vested in the state authorities. I do not suggest that any such course should be adopted in Canada but we may learn from their experience what can be accomplished by wise measures and careful management. Saxony has under state control 430,000 acres of rough mountain land—an area not larger than an average county in Canada. From this she has taken two hundred million dollars in the past fifty years. During that time the cut has been doubled and is of infinitely better quality than it was fifty years ago. Then, only 17% of the cut was serviceable, now 79% is serviceable and the standing wood in the state forests has increased by no less than 16%. The gross revenue per acre has increased from $1.75 to $6.67 and the net revenue per acre from 95c. to $4.37. Canada possesses a forest area one thousand times greater than that of Saxony. Make all reasonable allowances and then estimate what untold wealth this country possesses so long as the harvest of the forest continues.

What can we do in Canada to conserve our forests? The capitalist desires immediate profit, while the public interest requires that our forest area should be exploited not only with a view to the important consideration of profit but with due regard to continuity and to the preservation of these great natural resources. The forests if judiciously managed may bear a crop once in fifteen or even in ten years. If destroyed the crop cannot be renewed in less than a century. The object to be attained is continuity and conservation of the forests which are to be regarded as capital upon which individual en-

terprise shall not be allowed unduly to trench. We must of course have regard also to the necessity for a certain immediate profit to the capitalist who has invested his money and who has a right to carry on his operations as well as to the requirements of legitimate and bona fide settlement. How shall all these objects be obtained? The state can assist by aiding education in forestry as well as by direct control exercised through state regulation.

Along these lines the Canadian Forestry Association is working. Along these lines it is entitled to and should receive the assistance of our Parliament and Legislatures. I have very great pleasure in assuring you that not only do I take a deep interest in the subject but that I shall be prepared to support any reasonable measures within the limits of federal authority which may be devised for aiding in a work of such vital importance.

Hon. Frank Oliver, Minister of the Interior—It is a privilege which I appreciate very much to take part in the deliberations of this Convention, the object of which is so important to our country. As the special agent or bailiff of this Dominion Government having the responsibility for the management of its estate, it is for me rather to speak of what has been done, what is being done and what is hoped to be done in regard to the territory in the great North-West which is at the present time under the direct management of the Dominion Government. There the question is the direct opposite from what it is in these eastern provinces. Here the great question is the preservation of the forests with some small part of attention to production. There, the great question is not preservation; it is creation of the forests, with a small part of attention to the preservation of such forests as there are. Everything that has been said here or elsewhere in regard to the necessity of woods to successful agriculture is borne out not only by the scientific knowledge that has been acquired regarding the North-West, but also by the experience of the people who have lived there. It is accepted as a fact that the forest brings rainfall. We know that the forest is an evidence of rainfall and that the forest brings rainfall. It is interchangeable. If you have the woods you have the rain and by getting the woods you get the rain. It was some time before I assumed the responsibility in this connection that the Government took up this question of forestry in the west and while the requirements are so vast as they are—I say vast in comparison even with the available resources of this great country—it cannot be expected that the conditions have yet been met or even measurably met. The area of the North-West is so great and the conditions of lack of forest have prevailed for so many years, for so many ages, it may be said,

and these conditions are so different from those prevailing in the rest of the Dominion that it would scarcely have been the part of wisdom to have undertaken the work of reforesting the prairies on theoretical knowledge or the experience of other countries. Although this is not a conservative Government its measures in this matter have been to some extent conservative. They have looked to action upon known lines and to experiments for something upon which to base their future action.

As regards the preservation of the sources of water supply it is the high or hilly country, which, in the West is generally forested; in fact, in that country forest and hill are so intimately associated that there a piece of woods is often called a bluff, or hill. In the United States the word "bluff" is used to mean a hill, but in the North-West the word "bluff" is used to mean a clump of timber, the idea that there must be a hill if there is timber being so well grounded in the public mind by the facts as they exist. So that, one of the first things that was done by the Government in this matter was to take measures to preserve from deforestation wholly partially forested areas in the North-West by creating timber reservations in these localities. This, however, is a much easier matter to deal with sitting here in this comfortable room in this capital city of the Dominion, than it is where you have to deal with a large number of very energetic enterprising people who require that timber for the preservation of life. It is therefore a question which cannot be dealt with offhand; it must be considered from varying and directly opposite points of view. The Government have necessarily been cautious in this matter but it has made very considerable advances and hopes to make more as circumstances permit. That is in regard to the preservation of forest areas which will preserve the water supply in the surrounding country.

Besides this there is, in the northern and north-western parts of the Territories a very great area of country which is principally forested and there I would like to say that what the Premier has said in regard to the destruction of forests by fires applies to a tremendous extent. I think he said that in the Ottawa Valley the total destruction of timber was 90% by fire to 10% by the lumbermen. I think that in this forested area I speak of in the North-West where the timber is especially valuable because of the requirements of the prairie country the proportion would be 99% by fire and one per cent by the lumbermen. Every year there is a destruction by fire of timber of stupendous value, not so much in money value as in the value that the timber is to the settlers in the adjacent country where there is no timber. A difficulty arises in dealing with this question. There is a vast area of timber which has no immediate money value and

when it becomes necessary for the Government to ask the Parliament of this great country—this Parliament which concentrates the intelligence of Canada—for liberal appropriations for the patrolling and protection of these forests the request is likely to be closely queried as to where the reputation of this Liberal Government for economy has evaporated to. There is in that country a vast area of timbered land and that timber has a value altogether beyond its commercial value. It is being lost year after year to a stupendous extent and if it is necessary to take active measures for the patrolling of these forests to secure their preservation against fire I hope the results of this convention will be of such a nature and will have such weight with Parliament that it will not be difficult to get the money required to secure the protection of these very necessary and valuable forests.

Then, there is the great question of the creation of forests or woods on the prairie. There are limitations in that direction which people in this part of the country can scarcely appreciate. Here you have to actually fight the timber to keep it from growing. I do not find fault so much—if I may be permitted to differ from the Premier—with the instinct of those people in this part of the country which prompted them if they saw a tree, to cut it down, because it was either the people or the tree. If the trees were here we would not be here. The trees had to be destroyed in order that the people might live. But, in the North-West it is different. There, it is difficult to grow trees, There you have the Chinook to contend with and in speaking of the growth of forests in the West I may say that it is not the cold of the winter in the west that prevents forest growth; it is the Chinook wind, the mild wind that changes the temperature during the winter and produces conditions of dryness in the early part of the summer which presents the greatest difficulty in the growth of forests in the west.

The Department is grappling with the question in a conservative, yet in a progressive way; in fact, it has adopted a truly liberal-conservative method of dealing with the question. We have established a forestry station under the superintendance of Mr. Stewart and under the management of Mr. Ross and I, having recently had occasion to visit that locality, have been credibly informed that the forestry station is doing good work, that the work is being very highly appreciated by the people of the country and that, as the result shows, very considerable progress is being made as the Premier has borne witness to in regard to the growth of trees. But, the greatest progress that is being made is not in the number of trees that has been grown but it is in the practical knowledge that has been acquired as to the growth of these trees and when the knowledge has become well-estab-

lished we hope to be able to extend our operations to a greater degree so as to produce wider and quicker results. That is the position in the West in regard to forestry. Here it is to some extent—to some extent may I say?—a question of argument, an academic question; there it is a question of the highest, the greatest and the deepest importance and everybody in the country understands it. Therefore, any result which may come from the deliberations of this Convention which will lead in any way towards increasing our knowledge of the means to preserve existing forests or create new, especially means which may be applied to the western country, will be more than welcomed by the Government, by the Department of the Interior, and by the Forestry Branch of that Department.

Mr. E. E. Joly de Lotbiniere, President of the Canadian Forestry Association gave a sketch of the history of the Association and its objects. Starting in 1900 the Association has now a membership of one thousand and has brought the forestry question to a prominent place in the estimation of the public.

Mr. Gifford Pinchot, chief of the Forest Service of the United States, was called upon and addressed the Convention as follows:—Before saying a word about the forestry on both sides of the line, I have the great honour and pleasure of bringing to His Excellency the Governor General and to you, Mr. Chairman, a personal message from the President of the United States (loud applause). I am to express to His Excellency the warmest personal regard of the President, and to you and to the members of this Convention his heartiest good wishes and good will and his confident and to me most welcome expectation of good to result to Canada from the work of this Convention. And I am to say to you that the President's own belief in the fundamental, vital and immediate importance of forestry grows stronger year by year (loud applause). For myself I may say that, so far as I know there has never been, at any time, or in any place, a warmer or more effective supporter of forestry than the President (applause). It is a very great satisfaction to me to know that he is threatened with a rival in Canada in your own person. (Laughter and applause.) I am the bearer also of a message from Hon. James Wilson, Secretary of Agriculture for the United States, and my honored chief, who has asked me to express to you his appreciation of the wisdom which called this Convention, and to express his good wishes for the permanent success of this work, and to tell you of the pleasure he has had in sending a representative to be present at your deliberations. (Applause.)

You have called this Convention in recognition of the vital importance of forestry to Canada. Forestry is more closely, and I think it fair to say, more tremendously involved in the

prosperity and well-being of the American continent north of the Mexican border than in that of any other area on the face of the earth. (Applause.)

Timber and water in the east, water and timber in the west, are the great products of this great beneficent cloak of forest which has been spread over so much of our land on both sides of the line. We are apt to consider it as simply a truism, when we say that forestry is important. Well, so it may be, but it is one of those truisms that must be made widely known. But, unless we can specify what forestry will do for us in Canada and in the United States, we may very well consider that we have failed in the presentation of our case. I like to think of the forest as giving us not merely protection for our water supply, not merely the guarantee of the productiveness of our soils, not merely the assurance of continuity of desirable local climatic conditions, but also as doing what it actually does—supplying us from day to day with material which is, perhaps, on the whole, the most important material for the building up of our civilization. We call this an age of steel, and so it is; but it is not the less an age of wood (applause). And one of the things with which we are face to face all over this North American Continent is the coming scarcity, in no long time, of this chief ingredient in construction, the pinch of the lack of which is going to be felt widely and keenly when it comes. And we must remember that when this want does come, it will not be a question merely of reopening the source of supply as we re-opened the mines when we were threatened with a coal famine a few years ago;—(applause)—It will be a question of feeling that want for years, fifty years being the shortest possible time within which the material can be grown. This is a matter in which foresight is the primal duty. Signs are not lacking all over this continent that the approaching timber famine is not very far away. I am informed that the prices of pine in Ontario have doubled within the past ten years; and similar facts might be cited from the pine and other timber producing areas of the continent.

Now, let us pass briefly in review some of the ways in which the forest contributes to the national well-being. You all know these things, nevertheless it will do no harm for us to keep them in mind, as I think we should do throughout this Convention. Though it is true that, in the eastern part of Canada and the United States in the past, the farmer was obliged to clear away the forest before it was possible for him to build his house or support his family, it is also true that that time has almost wholly past. We have now reached the point where the forest, instead of being the enemy of the farmer in the east, is his most potent friend. And, so far as the west is concerned we have reached the point where

the farmer, without the forest nearby either on his own farm or within distance of reasonable railroad transportation, absolutely cannot prosecute his industry. (Applause.) We have reached the point where agriculture depends directly and immediately on the preservation of our forests. Just across the line, in Michigan, we have a most terrible example of the expense and loss and lack of productiveness the destruction of the forest on non-agricultural lands brings to pass. We may assume, then, that the fundamental industry of your great country and my great country is absolutely impossible in the absence of forest preservation. Now, the same thing is literally true of mining. We may say that when wood is gone as fuel we will burn coal. But it is obvious, on a moment's consideration, that we cannot get the coal in the absence of the forest, because mining is impossible without vast supplies of timber. Even steel, on which this age is said to be based, could not be won from the ground unless the forest gave the means to do it. Nor can steel replace the wood—in this sense, that the larger the amount of iron and steel used in construction the more iron and steel replace wood in steamboats, railroad cars and buildings, so much the larger is the total quantity of wood used in construction of that kind. The total consumption of wood keeps pace with the increase in the use of substitutes. We cannot build railroads, nor maintain them, without the forest. We figure that, if a tree were growing at the end of every railroad tie in every railroad in the United States, we should be able barely to keep these ties sound in the track, making no allowance for any increase in mileage, which increase is going on so rapidly. The annual consumption of ties on steam and electric railroads in the United States closely approaches 150,000,000 per annum, an enormous sum, the contribution of the forest to transportation and without which transportation would be impossible. The average citizen, the merchant, or call him by whatever name his profession requires depends in his daily life at every point on the timber supply. And I repeat it, for it stands to me in a vital place in the consideration of this whole matter, that wood is just as necessary to us in this day as a material base for our civilization as any other material; and if we are to preserve our prosperity, if we are to grow—and growth is the one thing that every citizen of Canada and of the United States looks forward to for his country—we must preserve our forests. That stands in the first place (applause).

Now, we on our side of the line have taken up this question, too late it is true—far too late, But we have been enabled by the greater number of our population for the time being to go ahead somewhat more rapidly than you have been able to do. Until a recent time you have been occupied with the actual subduing of the country, the vast heritage, that lies before you.

Lumbering Road on J. R. Booth's Limit, Madawaska, Ontario

A Shantyman's Lunch in the Bush

I think I might with your permission, say just a word concerning the fundamental principles upon which the forest service of the United States is doing its work.

The first of these is that all permanence in forestry in any country with political institutions such as those of the English-speaking race must be based upon education (loud applause). We are making it our most fundamental effort in the direction of having every man, woman and child in the United States understand that forestry means something to every home (renewed applause) that this is not an academic question, but a matter that appeals directly to every man living in North America at this time. This is the basis (applause). We are going into the schools. We are going to see to it—and this may be called a prophecy merely—that every school child, every boy and girl who passes from the primary into a high school shall know what forestry means; that in every university something shall be taught of forestry as a branch of general culture, not as a profession, but simply as one of the things that every educated man ought to know about (hear, hear). Then, we are trying to establish object lessons in forestry by cooperation with private owners, because, with us the great body of our forests are in the hands of private owners. We hope, by these object lessons to show to every man who cares to see that forestry is a practical thing, that it is not a theory, not merely something to talk about, but something that may be carried out in the forest with a profit. And in this we have been so successful that the great organization of lumbermen in the United States, the Lumber Manufacturers' Association has emphasized its belief in actual forestry recently by appointing a committee to raise an endowment of $150,000 for a chair of lumbering in the Yale Forest School (loud applause). They do it, of course, because they believe that they themselves will need foresters and because they feel that they must have men who know something about lumbering.

Now, as to the use of the public lands for forests. We base our whole policy on a principle stated by the President that we must put every bit of land to its best use, no matter what that may be—put it to the use that will make it contribute most to the general welfare. And we add to that that every acre of land which will contribute more to the public welfare by being maintained in forest, so far as we have that acre as a part of the public lands now, shall remain in public ownership. (Applause.) That means that we set aside, as rapidly as we can, and as our first duty, forest reserves wherever there are to be timbered lands in the United States.

We have already some 100,000,000 acres of these reserved, an area, unfortunately not one quarter large enough. But we took up this work after the greater part of the best timbered

lands in certain regions in the United States had passed under private ownership. You have been wise enough to keep the title in the State, and your opportunity of making forest preserves are better than ours have been hitherto. I might cite the instance of the State of New York, which you Mr. Chairman, have mentioned in order to point this moral. A former Governor of New York, Mr. Seymour, who was in office at the time when the forest lands of the Adirondacks had small value, looked far ahead and suggested that these lands should be reserved for State forests. He was laughed at, and nothing was done about it; the State parted with its title for a mere pittance. Since that time the legislative descendants of the men who refused to listen to Governor Seymour have paid—I do not know the exact sum, but it is not less that $3,000,000 or $4,000,000 to buy back the lands that might have been kept in full public ownership without any expense whatever (loud applause). And we in the United States will have to spend millions upon millions—we may begin with this session of Congress; I hope so—merely to buy back the land that we ought to have kept when we had the chance and the keeping of which would have involved no public expense. We are setting aside forest reserves and treating them as forest reserves as separate from the rest of the public lands. In carrying out this policy these forest reserves have been taken from the management of the General Land Office, which look after the public lands generally, but which is mainly a department to dispose of public lands, and put in the charge of the department of agriculture, to be used for purposes of production. We are using every possible resource of this forest reserve, timber, water, grass, mines and every other. Nothing in the forest reserve is exempted from use, but nothing is open to use that will keep the reserve from being permanent with the exception of the mines. We are going to see to it that those forest reserves continue not only through the years but through the centuries to make their contribution to the wealth of the country. And that is a perfectly feasible and practical thing to do.

Then, we are cooperating in the closest and most cordial way possible with the men who use the forest reserves. Forestry is a matter that, as a permanent policy can only rest on good will. One man can set more fires, if he chooses his time rightly, than ten times the number of men in this room can put out. We see clearly that we can protect our forests, protect our reserves, only if we have the good will of the people who live in the neighbourhood; and we are doing our best to secure that good will by treating the people fairly, and by making them pay the market price for whatever we give them. That does not seem, perhaps, to be the best way to secure the good will of these users; but we find that the men who use the reserves be-

gin to have much more respect for the officers who administer them and for the reserves themselves, if we are successful in doing with the reserve what any private owner would do with his own land. (Applause.) We see no reason why all the people as a body, should receive less from their reserves for the privileges which they give in them than would be the case if the whole of it went to a single man. And we are proving successful in securing market prices, and, I think, to a very considerable degree, conciliating the people in the neighbourhood. While, a few years ago, there was almost universal opposition to the forest reserves in the West, to-day organized opposition has disappeared and I believe that the policy which once would have been unanimously disapproved would now be almost unanimously supported if it could be put to the vote of the people in the region where our forest reserves lie.

One thing more: We are making a vigorous attempt to have the reserves handled from the point of view of technical forestry. We regard forestry as a profession, as much as engineering, law or medicine, and we are doing our best to see to it that the men who carry on the work of these forestry preserves shall be men trained to the service, either in the Government service or in the forestry schools—professionally trained men with a technical outfit which will entitle them to recognition, on the same plane, for instance, as a highly trained engineer. Resting on the foundation of this body of trained men, whose profession is forestry and who propose to do that and nothing else all their lives, we are trying to build up a special force that shall have an *esprit de corps*, a force continuing year after year, a force that can be sifted and sifted as the years go on, until we shall have the very best collection of individuals that there is anywhere in the Government service. For, it is one happy thing about forestry that you can get a better man to work for less money in the woods than at any other piece of work I know anything about. (Applause and laughter.)

Now, I have run over this matter very briefly and rapidly, and I have just one word to say in conclusion. Forestry with us is a business proposition. We do not in our hearts love the trees any less because we do not talk about our love for them. But you will never get the owners of a forest land to keep them in forest for merely sentimental reasons; that has been tried and it does not work. But the thing you can do, and the thing we are doing on a large scale in the United States is this:—If you can show these owners that it is worth while to practise forestry, that forest lands can be cut over, and if the methods suggested by a true system of forestry are followed the lands will be worth more than before you convince them that forestry is worth something.

And finally the end and aim of all this work is a very definite

one. I have said a hundred times that I have no interest in a forest that is not of use for something. If our forests are simply to stand there and all we get out of them is the knowledge that we have them, then, so far as I am concerned they disappear,—I care nothing about them whatever. But the great aim and object of this whole movement as the President has stated over and over again is the making and the maintenance of prosperous homes. Our forest reserves are part of the great equipment of our country for the good of its citizens; and, just so far as we use these forests to promote family life, to make prosperity for the people—in fact to make and maintain prosperous homes—just so far shall we think ourselves successful. (Loud applause.)

AFTERNOON SESSION.

WEDNESDAY, 10TH JANUARY.

At this session the first paper on "Dominion Forestry" was read by Mr. E. Stewart, Dominion Superintendent of Forestry. It is reproduced elsewhere.

Dr. Robert Bell, Acting Director of the Geological Survey, followed with a paper on "Forest Fires." The northern forest area, as defined by Dr. Bell covers a tract nearly 4,000 miles in length, by from 500 to 800 miles in width. There have been great forest fires in this region and the areas so denuded have been marked out by the Geological Survey. Looking over this country from a high hill, it presents a patchwork of different colors, according to the age of the different parts of the forest. There is the light green of the poplar and birch contrasted with the dark green of the coniferous forest. Most of the fires in the north are caused by lightning, but human agency is responsible for its share. The white men are careless and have taught the Indians to be the same. These fires sometimes cover tens of millions of acres, and the forests burned are of the value of hundreds, if not thousands of millions of dollars. Surely it is most important for the Government to take any reasonable means to prevent this destruction and loss. What we need to do is to give the forest a chance to grow. Dr. Bell exhibited a map showing the forest areas referred to, on which were indicated the burned-over and the still forested tracts.

C. H. Keefer, C.E., representing the Society of Civil Engineers, read a paper on "The Effect of the Conservation of the Forests of Canada on the Water Powers." After reciting the various factors that entered into the question, Mr. Keefer stated in conclusion, that the effect of the conservation of the forests on the water powers is most beneficial, and its importance cannot be overestimated. While the influence of forest covers on rainfall

is problematical, there can be no doubt of its direct influence in the regulation of flow and prevention of extreme floods, including loss, damage and waste of water power. The water powers of our country are second to none, their importance in view of the developments that have been made in the transmission of electric power is far reaching and this, with the great saving in cost of electric power over power generated by steam, should, with our enormous natural resources, place Canada in time in the front rank as a manufacturing and exporting country.

Mr. Thos. Southworth, formerly Director of Forestry for Ontario, submitted a paper on "Forest Reserves and their Management." After sketching the history of the forest reserves, which in Ontario are set apart on legislative authority, Mr. Southworth estimated the area that should be kept permanently in timber at forty million acres, which at a return of 150 feet, or 75c. to the acre, would mean a revenue of $30,000,000 per year. To achieve this result, something more than harvesting the most valuable sorts of trees in the most economical way is required. That system is converting Algonquin Park from a mixed pine and hardwood forest to a hardwood one. Working plans must be laid down covering a hundred years or more, plans that will provide for harvesting the present crop of various sorts of trees in such a manner as to secure the after growth of the right kind of trees and to regulate the cutting so as to secure evenness of supplies and of revenue.

Mr. M. J. Butler, Deputy Minister of Railways and Canals quoted from the Railway Gazette the instructions to drivers of railway locomotives, requiring care in keeping equipment in repair so that the escape of sparks may be prevented. The leading railways are using engines with extension fronts and screens with a quarter-inch mesh, and compound engines, with a softer exhaust, are being introduced.

Mr. E. G. Joly de Lotbiniere, suggested as an additional precaution, that it would be well to have a patrol along the line of railway.

Mr. Aubrey White, Deputy Commissioner of Lands and Mines for Ontario, outlined the system on which the forest protection service of Ontario is organized, and urged the necessity of protecting the forest we now possess. In connection with the building of railroads, the Canada Atlantic and the Temiscaming railways were instanced as examples of what could be done in the construction of such roads without destroying the forest by fire. Mr. White made a strong declaration in favor of reserving for timber production lands that are unfit for settlement.

Dr. B. E. Fernow pointed to the government as the great sinner in connection with the administration of the forests, and

urged a reconsideration of its policy in the granting of timber lands. Emphasizing the public interest in the forest, Dr. Fernow gave as an illustration the fact that in Germany the forests under government management, being nearly one-third, are in the best condition. The governments that are now spending money in protecting limits and improving limits, in building roads and railroads and preparing the property for effective management, are the governments that will earliest reap the benefit.

Mr. Jas. Leamy, Dominion Crown Timber Agent at New Westminster, described the fire protection organization carried on on Dominion Lands in British Columbia.

Dr. C. A. Schenck, of Biltmore, N.C., laid down as the three planks of a Canadian forestry policy; first, that the Dominion and the provinces should retain in the hands of the Government, in fee simple, all exclusively forest land; second, the protection of the forests from fire, and third, that the forest must be made a paying investment, whether the individual or the Government is the owner of the forest.

EVENING SESSION

WEDNESDAY, 10TH JANUARY.

At the Evening Session, Hon. Sydney Fisher, Minister of Agriculture, gave an address on "The Forest and the Water Supply," speaking particularly of the so-called semi-arid district in Southern Alberta, which depends largely on irrigation for its fertility. Stretching away eastward from the lower hills of the Rocky Mountains south of the C. P. R. we have a slowly descending plain descending eastwards and northwards with a very considerable fall all the way from the mountains to about Regina. Over that area generally water is scarce, so scarce that in many parts of it, without irrigation, successful cultivation is supposed to be impossible. I do not like to say myself positively that successful cultivation is impossible anywhere, because in the development of our Northwest especially, and in the development that has taken place in many ways all over Canada we are constantly, from year to year—I might almost say from month to month—discovering new possibilities in the development of our country which our fathers, and even people who have settled as recently as ten years ago, thought to be quite impossible. Therefore, I guard myself very carefully when I suggest that over a portion of that area, at all events, there is doubt about the successful cultivation of ordinary field crops. We must then look for some assistance to the ordinary climatic conditions for the cultivation of field crops, because that is the area of our country to which the whole world—not only Canada, but the British Empire and I might say the whole world—is looking for its future wheat supply. And it behooves us, therefore, to see what we can

do to make the production of wheat and other field crops there assured year in and year out without reference to what may be a particular season's climate. We are fortunate in many ways in looking forward to this. Just to the west of the area I have described, we have the eastern slopes of the Rocky Mountains. The eastern slopes of the Rocky Mountains are clothed at the present time almost entirely with a forest growth, a forest growth, which, perhaps some lumbermen might not consider of the greatest value, a forest growth which does not compare with the growth of the forests in British Columbia and does not compare with the growth of the forest in the old days in this Ottawa valley, but still a very considerable forest growth, a forest growth, which, at any rate, is quite sufficient to conserve and keep permanently conserved all the water supply which flows down through the streams on the eastern slopes of the Rocky Mountains most of which water eventually finds its way into the Saskatchewan River. Up to the present time, I do not think that any material inroads have been made into that forest growth, but I venture to predict, unless the greatest care is exercised to preserve it in the near future, the moisture of our plains will be considerably sacrificed and the mighty rivers which to-day come out of those hills and course through that prairie region will be turned, in the spring-time into floods and in the summer-time into dry water-courses. These great rivers and streams have cut deep courses through the fertile prairie, and as a general rule, the water-course itself is considerably sunk below the general prairie level. The farther and farther you go from the hills, the deeper and deeper becomes the valley in which the river runs. Fortunately, the general descent of the whole plain is so great that it is not a very difficult task to take the water out from the upper reaches of these rivers and by carrying it along on the upper levels over the prairie and keeping it within bounds we are able to distribute it over large areas of that country through irrigation, securing and ensuring the future development and cropping of the country. I believe that this is one of the most important pieces of work which the Government and people of this country must look to and see in the future.

A paper on "Forestry and Irrigation," prepared by Mr. J. S. Dennis, Commissioner of Irrigation for the Canadian Pacific Railway Company, was read by Mr. Pearce. Mr. Dennis pointed out the great value of the irrigation works in Southern Alberta, amounting to $3,500,000, and the necessity for preserving the forests on the watersheds of the eastern slope of the Rocky Mountains in order to preserve the water supply.

"Water Powers" was the subject of a paper by Cecil B. Smith, C E., Chairman of the Temiskaming Railway Commission, which is reproduced farther on.

Mr. E. G. Joly de Lotbiniere, read a paper prepared by Mr. J. R. Anderson, Deputy Minister of Agriculture for British Columbia, giving a description of the different species of trees found in that province and the uses to which they are put. Views of a number of scenes showing tree growth and different stages of forest destruction were shown.

MORNING SESSION

THURSDAY, 11TH JANUARY.

The first paper read was, "Forestry on the Experimental Farms" by Dr. Saunders, the Director of Experimental Farms. It was stated that the total number of trees distributed among the settlers in the Canadian North-west since 1889 was about two millions, and the quantity of tree seeds about ten and one-half tons. As each pound of this tree seed with reasonable care might be expected to produce five hundred to eight hundred seedlings, it was not surprising that the results of this work were everywhere apparent. As to tree planting at the experimental farms, the fact was noted that while the pine planted in 1889 was now 25 feet high and measured 9½ inches in diameter of trunk 4½ feet from the ground, a white spruce planted in 1890 was now 32 feet high and measured 5¾ inches in diameter of trunk 4½ feet from ground. The results of tree planting in British Columbia were given, showing that some hardwood trees of the east could there be raised and with more rapid growth than was the case here.

This was followed by a paper on "Farm Forestry in the Eastern Provinces," by Revd. A. E. Burke, of Alberton, P.E.I., which is given elsewhere.

"Tree Planting in the West" formed the subject of a paper by Mr. Norman M. Ross, Assistant Superintendent of Forestry of Canada. He said that by next spring 7,347,000 seedlings and cuttings would have been sent out, and they knew from actual inspection that 85 per cent. of these trees were growing.

E. J. Zavitz, Lecturer on Forestry at the Ontario Agricultural College, discussed the "Agricultural College Problem." The recklessness with which the pioneers of Ontario destroyed the forest was referred to, and surprise was expressed at the lack of knowledge in these days as to the value of certain trees. Last summer Mr. Zavitz found a farmer turning the last remnant of his woodlot into cordwood, and among other valuable trees were some black cherry trees from 15 to 18 inches in diameter. The valuable woods native to Ontario were disappearing and were being imported by manufacturers. We were now only using the poorer quality where once only the first grades would have been looked at. In 1884 a Toronto firm offered $18 to $20 per thou-

sand for white oak loaded on car at the point of shipment. To-day white oak was selling at $30 per thousand on the stump. Mr. Zavitz urged that settlers should be debarred from entering lands which were only fit for forestry. The policy and method of cultivating trees in wet lands of old Ontario would be a splendid object-lesson.

Hon. A. A. C. LaRiviere, representing the Government of the Province of Manitoba, expressed the great interest of that province in forestry, and stated that the government was now establishing an agricultural college on a large scale, which would afford means of education in tree culture and forestry.

Mr. J. D. Allan, President of the Toronto Board of Trade, stated that the report that would be carried back to the Board by the delegates it had sent was that the forest is one of the most important assets we have in this country, and that it must receive greater attention at our hands than it has in the past. Mr. Allan gave an interesting sketch of what he had seen of forest administration in Russia and Scotland.

Hon. Mr. Tessier, Minister of Agriculture, conveyed greetings from the Province of Quebec, and President G. C. Creelman, of the Ontario Agricultural College, and Mr. A. P. Stevenson, of Virden, Man., also took part in the discussion.

AFTERNOON SESSION

THURSDAY, 11TH JANUARY.

Hon. W. C. Edwards, President of the Quebec Limit Holders' Association, called attention to the great importance of the forests for their beauty, for their influence on the water supply and on agriculture. Speaking of the statement sometimes made that the forests of Canada are inexhaustible, or on the other hand, that they have all been destroyed, he took the medium position, and thought that a great deal could be done to preserve the forests. The chief agents of destruction have been forest fires, railways and illegitimate settlement. The all-important matter is to keep fire out of the forests, next to have proper government regulations, and next there must be careful cutting on the part of the lumbermen. In so far as the cutting of timber is concerned, my system would be that every mill owner should build his mill in proportion to the growth of his limits and cut annually the growth. If that is done, and fires kept out, the limits of Canada will never disappear.

As to the question of growth and the possibility of restoring the forest, my observation is that the growth varies very much in various districts, that in some places growth is very slow and in

some places very rapid. I think that perhaps this northern portion of the Ottawa region, and the portion from the Gatineau westward, is the most rapid growing pine district we have in this portion of Canada. In that region, it is my belief, that if the pine is carefully cut it will never be exhausted. I think that to deal intelligently with this subject and to be able to make the very best suggestions as to how the forest may be perpetuated one would need to know what is being done in other countries. I am well acquainted with some Norwegian lumbermen who tell me that their forests will never be exhausted. There they never replant; they just depend on natural reforestation, which, I think, is all that is necessary here. I do not think that replanting is necessary, although I think that in many instances, and in many localities, it might be desirable.

If I might be permitted to offer a suggestion in that re grd this would be my plan for a forestry school. I would set aside, say a thousand square miles, or 500 square miles, and on that I would establish a school of forestry. I would invite young men to come to that school to learn both theoretical and practical forestry right on the limits. I would then have an estimate made to ascertain as nearly as possible what, in a few years, has been the growth of timber on these limits. I would have these young men go round each year and mark the trees that can be cut. I would make them cut the timber, haul it and saw it. I would make every one of these young men into a first class forester and a first class lumberman, and these young men in time would become the lumbermen of Canada. That, in my opinion, would be the greatest step in advance in so far as the cutting of the forest in an intelligent way is concerned that could be desired.

I believe the day will come when the Province of Quebec, portions of Ontario and other portions of the country that I am not so familiar with, will be the manufacturing centres of the North American continent. How are we going to preserve these conditions? Denude the forests and you will not have these conditions; maintain the forests and you will have them. If a premium is offered to the people of the Province of Quebec to maintain their forests, unbroken, and to maintain the water supply which they have—the greatest inheritance that any people could have, in so far as power and manufacturing is concerned—that province, although its finances may perhaps be a little at fault to-day, will some day be the manufacturing centre of the continent.

Mr. J. B. Miller, President of the Ontario Lumbermen's Association, presented a paper on "Forestry from the Lumberman's Standpoint." He spoke of the difficulties in the way of the lumbermen, owing to the withdrawal of lands for settlement that was not permanent, and also to the work of the operators

in hemlock bark. For the older districts he suggested the establishment of a rule that there must be at least sixty per cent of arable land on all lots applied for, and then only where there are other lands in the same locality which are fit for settlement. The offering of small berths, and for limited periods, and the granting of pulp and pine concessions over the same areas had hastened the destruction of the timber. Mr. Miller's whole argument was for the permanent holding of forest lands and replanting where necessary.

Mr. William Little, of Westmount, Que., took up the question of the lumber industry and its relation to the forest. In the last six years prices had risen 10 per cent in the eastern part of Canada. There was a great loss in the way lumber industry was carried on. So far, vast areas of timber had been sold by governments to people for a mere trifle of their value. He knew of a man who boasted that he bought a timber limit for $20,000 from which he cut $200,000 worth of timber and sold it for $750,000. The selling of timber limits at a sacrifice was a common mistake of all the governments. Instead of Canada making money by lumbering, it made money by not lumbering. It was deplorable to look upon the immense losses caused by the sacrifice in timber sales. Mr. Little dealt in scathing terms with the lumbermen who went into the woods and chopped down valuable trees which were too small to make lumber.

"Forest and Lumbering in Nova Scotia," was the subject of a paper by F. C. Whitman, President of the Western Nova Scotia Lumbermen's Association. He said that in the past, forestry in Nova Scotia has not been given much thought. The government of the province was too lenient in disposing of the timber lands and should have kept control instead of making absolute grants. The cutting of the best timber and fire have depleted lands that to-day should be valuable; and they might be made so by reforestation. At present, there are signs of a greater interest being taken by the Government of Nova Scotia and by lumber firms in forestry. The timber owners feel more assured under the present Act of "Protection of woods against fires" of their holdings being protected, and more inclined to conserve their cuttings and let the smaller growth reach maturity. The future gives promise of attention being paid to forest values, more conservative cutting, and with natural reproduction and protection there is every reason to believe that forest wealth will continue to be one of the most important assets of the Province of Nova Scotia. There is still to be solved the best method of reforesting in Nova Scotia, the kind of trees to plant and who will undertake the work. It would appear to be a proposition that the Government should take up, and as they own 1,500,000 acres there is ample area on which to begin such a work, and there is no doubt the

Government could again acquire title to a large number of old grants and cleared holdings of private parties at a nominal sum per acre. A practical forester by going carefully over the situation could no doubt give valuable information and probably formulate a scheme that would work out successfully and be beneficial to the lumbermen and to the Province of Nova Scotia.

Mr. C. M. Beecher, representing the Lumbermen's Association of British Columbia, stated that on the coast the question of reforestation or tree planting was not of economic interest for the moment as the timber area is large and covered with a good stand. When lands have been logged or burnt over and nature has been allowed to work there has been a natural resowing, and the same trees are growing up in the forest again, namely: Douglas fir, spruce, cedar and hemlock. If it is a mere question of trees, our forests are inexhaustible, but if it is a question of merchantable timber, I regret to say that as far as our information goes now, the timber resources of British Columbia are limited. The lumber manufacturers are forced to take from their limits a small percentage of the trees and are able to ship only selected lumber. The burning question with the lumber mills of British Columbia to-day is the question of market and extending the outlet for the product of the manufacturers. Mr. Beecher spoke of the advantage that would be derived from a preferential trade arrangement within the British Empire, and asked that in government contracts specifications should call for Canadian timber.

Speaking of fire protection, he praised the work done by the Dominion Government in the Railway belt, and read a letter from Mr. O. C. Buchanan, President of the Associated Boards of Trade of Eastern British Columbia, strongly favoring action on the part of the Provincial Government to prevent forest fires.

Mr. H. M. Price, President of the Province of Quebec Pulpwood Association, in a paper on "The Pulpwood Industry" stated that a smaller diameter of wood had been cut than it was in the true interests of the pulp and paper mills to accept, or the owner of private lands to cut. Some twelve years ago the diameter shipped was six inches and up, while now four inches and up is accepted. Mr. Price believed that the cutting of trees for pulpwood under seven inches in diameter at the stump, and the shipment of wood under five inches in diameter should be discontinued.

Mr. J. F. Ellis, of Toronto, and Mr. Ferdinand van Bruyssel discussed the subject at the conclusion.

THURSDAY EVENING

11TH JANUARY.

A Banquet was held at the Russell House, which was presided over by the Premier of the Dominion. After the toast to His Majesty the King, followed that to His Excellency the Governor General, which was pleasantly responded to.

"The Forest Interests of Canada" were replied to by Hon. W. C. Edwards and Hon. F. J. Sweeney, Surveyor General of New Brunswick.

"The Allied Interests" brought responses from Mr. B. E. Walker, General Manager of the Bank of Commerce and Mr. J. D. Allan, President of the Toronto Board of Trade.

The toast of "Our Guests" was proposed by Sir Wilfrid Laurier in a felicitous speech and was responded to by Mr Gifford Pinchot, Dr. B. E. Fernow and Dr. C. A. Schenck.

"The Press" was responded to by Mr. J. F. Mackay, Business Manager of the Toronto Globe.

Over two hundred were in attendance and the banquet was a great success.

FRIDAY MORNING

12TH JANUARY.

Mr. Joseph Hobson, Chief Engineer of the Grand Trunk Railway and Mr. L. O. Armstrong, Colonization Agent of the Canadian Pacific Railway gave interesting papers showing the railway requirements for timber. The Grand Trunk requires 95,000,000 feet annually, and the Canadian Pacific 244,000,000 feet. These papers contained a great deal of interesting material which space forbids us to reproduce at present.

"The Pulp Industry of Canada" found an exponent in Mr. E. B. Biggar, Editor of the Pulp and Paper Magazine. The first part of the paper briefly reviewed the history of pulp and paper manufacturing, which had its inception at St. Andrew's in Quebec, in 1803. The first paper mill in Upper Canada was erected at Ancaster in 1820. In 1888 there were 34 pulp mills with a total capacity of 154 tons every twenty-four hours. Last year the number had grown to fifty-six mills, with a capacity of 2,470 tons. There were in 1888, 40 paper mills with a capacity of 173 tons per twenty-four hours. Last year the number of mills was 38, and the daily capacity 854 tons. It would, therefore, be seen that the capacity of the Canadian pulp mills had more than doubled, and the capacity of the paper mills increased still more the last six years. There are now in course of construc-

tion six pulp mills with a capacity of 630 tons, and eight paper mills with a total daily capacity of 375 tons. These mills manufacture all grades of wood pulp, and most varieties of paper. They not only supply the bulk of the home market on certain lines, but of recent years have developed an export trade.

Canada has the greatest area in the world of forest suitable for the manufacture of pulp, her spruce lands alone being estimated at 450,000,000 acres.

Mr. J. F. Mackay. Business Manager of the Toronto Globe, in a paper on "The Newspaper Publisher's Interest in Forestry," made a strong presentation of the interest of the newspapers in the forests from which their raw material was drawn.

"The Forest and the Mine," by Frederick Keffer, Manager of the British Columbia Copper Company, Greenwood, B.C., and "The Wood Supply of the Manufacturer," by J. Kerr Osborne, Vice-President of the Massey-Harris Company, gave a presentation of the needs of these two industries.

Dr. J. T. Rothrock, Forest Commissioner for the State of Pennsylvania, said that in his lifetime he had seen one-sixth of the area of the State of Pennsylvania pass from a productive to a non-productive condition. It was not necessary to go to the old land, nor to any part of the old world, to find the desert which has been made by the removal of the forests. I can take you to the hill-sides of Pennsylvania and show you exactly that condition—and that in a State not two centuries old. Dr. Rothrock told of the assistance given by the ladies to the forestry movement in Pennsylvania, and urged that in Canada their aid should also be secured.

Mr. Jas. Beveridge, Manager of the Mirimachi Pulp & Paper Company, stated that the annual cut for his business was 14,000,000 feet, and that if the government would hand over to him 23,000 acres of land, he would cultivate all the trees he wanted for his factory, pay out $175,000 a year in wages and put down plant worth $750,000.

AFTERNOON SESSION

FRIDAY, 12TH JANUARY.

Monsignor J. U. K. Laflamme, of Laval University, read an excellent paper on "Forestry Education." He stated that the Province of Quebec had sent two young men to the Yale Forest School and they would be given an opportunity to complete their forestry education in Europe. This would be the nucleus for a Forest School. It was urged that every effort should be made by the distribution of bulletins in English and French, through the

newspapers, and through the schools, to educate the people to the importance of the question.

Details were given of the good results obtained at Oka, through the efforts of M. l'Abbe J. D. Lefebvre, Cure of Oka, in the planting of sand hills with pine, spruce and other trees, with the outcome that the sand dunes are fixed and are bearing a valuable forest.

Dr. Judson F. Clark followed with a paper which will be found in full farther on.

Mr. B. E Walker, General Manager of the Bank of Commerce, called attention to the educational value of the Convention, and in connection with the question of forestry education stated that as a member of the Ontario University Commission his personal opinion was in favor of providing for a chair of forestry in the Provincial University.

The discussion was continued by Dr. Jas. Fletcher, Professor Penhallow, of McGill University, Professor Montgomery, of Trinity University and Revd. Thos. H. Boyd.

The following resolutions were submitted by the Committee on Resolutions and passed:—

1. RESOLVED, that the time is now ripe for a general forest policy for Canada, and that the federal government be asked to inaugurate the same.

2. RESOLVED, that this Convention would urge the importance of the exploration of the public domain in advance of settlement with the object of determining the character of the lands so that settlement may be directed to those districts suitable for agriculture and which give promise of the possibility of the establishment of permanent and prosperous homes for the settlers, and that the lands unsuited for agriculture should be withdrawn from settlement and permanently reserved for the production of timber;

That this Convention approves of the policy of Forest Reserves adopted by the Dominion and Provincial authorities and favors the extension of such reserves, as may be found practicable from time to time, so as to eventually embrace all lands suited only for the production of timber;

That in the administration of such reserves this Convention would approve of the policy of having the cutting done under the supervision of properly qualified officers, and that in such operations due provision should be made to ensure the reproduction of the forest.

3. RESOLVED, that in view of the great saving of timber throughout the Dominion which has been accomplished by the fire ranging staffs organized under Dominion and Provincial authorities, this Convention desires to place on record its ap-

proval of the establishment of a fire ranging system for the protection of the forests, and to urge that this system be extended to all forested districts as far as possible, and that, in view of the great interests to be protected, the service under such a system should be made as complete and effective as possible. In this connection this Convention desires to call public attention to the small expenditure made for the protection of the timber resources of the country in proportion to their value when compared with rates of insurance paid on other public property.

4. RESOLVED, that in view of the many important respects in which the water supply affects the industries of the country, in particular agriculture, irrigation and manufacturing, and the increasing value of the water powers, owing to the adoption of electricity for industrial purposes, this Convention would urge that special means should be taken for the preservation of the forests on watersheds so as to conserve throughout the year the equable and constant flow of the streams dependent thereon;

That in view of the large expenditure made on irrigation works in Southern Alberta and the intimate relation of the flow of the irrigation streams to the forests of the eastern watersheds of the Rocky Mountains, this Convention would specially urge upon the Government of the Dominion the necessity for the protection of the forests on this watershed;

5. WHEREAS in the older settled districts of Canada conditions are now such that great benefits would be derived by the country as a whole from some systematic movement to reafforest large tracts of land which at present are lying waste in the agricultural districts: and

WHEREAS farmers, as a rule, have no expert knowledge as to the cultivation of trees and find it almost impossible to obtain nursery stock of forest trees at reasonable prices and of good quality for planting purposes: and

WHEREAS the farmers of the country are, if properly informed, the right class of people to undertake tree planting in the agricultural districts: and

WHEREAS the scheme at present in operation in the West, carried on under the Dominion Government, which provides for the free distribution of forest tree seedlings and instruction as to their cultivation, has given satisfactory results:

THEREFORE RESOLVED, that this Convention would urge the governments, both federal and provincial, to take steps to encourage, as far as possible, both by instruction and by giving facilities for obtaining nursery stock suitable for afforestation, a more general interest in tree planting, especially on such lands as are at present unfit for ordinary agricultural purposes, and we would further urge the Dominion Government to make.

Loading Logs at Madawaska, Ontario

A Burnt Over Tract near Madawaska, Ontario

if possible, further efforts in this direction in the prairie regions where the results from tree planting are bound to be of inestimable value to the whole country.

6. RESOLVED, that especially in view of the proposed construction of a new transcontinental railway and the projection of other lines passing largely through coniferous forests, the attention of the Governments of the Dominion and the provinces, and also of the railway companies, be called to the serious danger of loss of valuable timber consequent upon the construction and operation of lines so located, if all possible precautions to prevent the starting of fires are not taken; and that it be urged that the question be given full and careful consideration.

That to the end sought, the railway companies constructing such roads should be required to furnish an efficient equipment and control to prevent fires.

That at such seasons as may be necessary it be required that an effective patrol be established along the afforested line of railway, whether under construction or in actual operation.

And further, that the officers both of the governments and the railways, be required to use all possible diligence to prevent the starting or spread of fires through defective equipment or through the carelessness of the operations or negligence of the employees under their control.

7. WHEREAS, it has been the common method in lumbering over a large portion of the timber area of Canada to fell trees by the use of the axe:

And whereas, it has been found that trees sawn close to the ground can be felled more cheaply than those cut down with the axe, resulting in a gain of from six to ten per cent in the scale of the logs and diminishing the risk of fire caused by chips in felling:

And whereas, the felling of logs after the season of snow has resulted in a large loss to the forests of Canada:

Therefore resolved that this Convention recommend to those who are in control of the public lands of Canada the advisability of making such regulations as will carry out the principles of this resolution.

8. RESOLVED, that this Convention is of opinion that the retention of rough areas under wood and the replanting of areas unsuited for agriculture would be encouraged if some action in the direction of relieving the same from taxation could be put into effect by the local governments and the municipalities.

9. RESOLVED, that the Government be, and is hereby requested to place forest tree seeds imported for afforestation purposes on the free list.

The following resolution was read by Mr. J. Fraser Gregory, of St. John:—

We, representatives of Boards of Trade throughout the length and breadth of the Dominion, delegates to the Canadian Forestry Convention in session assembled:

Resolve, that we heartily approve the interest taken by our National Government and the Premier, Sir Wilfrid Laurier, in calling this Convention and the assurance we have that the preservation of the forest shall receive the great attention it requires and demands.

That we will report to our various Boards the valuable lessons we have learned, and have them each and all impress on their Provincial Governments the advisability of following the example set by the Federal Government in taking steps to protect, conserve and perpetuate their forests.

On Saturday, through the kindness of the Grand Trunk Railway and Mr. J. R. Booth, a visit was paid to Mr. Booth's timber limit at Madawaska, where a pleasant time was spent and a shanty dinner was thoroughly enjoyed by all.

The Annual Meeting of the Canadian Forestry Association will be held at Ottawa, on Thursday, the 8th March, 1906, in the offices of the Forestry Branch of the Department of the Interior. Only the election of officers and other necessary business will be dealt with, owing to its following so closely the Forestry Convention.

An important announcement made at the Forestry Convention by the General Manager of the Bank of Commerce, Mr. B. E. Walker, was to the effect that all the managers on the staff of the Bank would be made members of the Canadian Forestry Association. This promise has been promptly fulfilled.

The Canadian Forestry Convention has the honor of recently welcoming to its ranks His Grace Monsignor Bruchesi, Archbishop of Montreal, and His Grace Monsignor Begin, Archbishop of Quebec.

Owing to the pressure of other business, it has been necessary for Mr. R. H. Campbell to retire from the editorship of the Forestry Journal. The next issue will, therefore, be under other editorial management.

FORESTRY ON DOMINION LANDS.

E. Stewart, Dominion Superintendent of Forestry.

If I know anything of the object of the convener of this great convention in calling you together it was to obtain the views of the people from all parts of the Dominion in order that good practical results might follow your deliberations. If we only meet and indulge in a pleasant academical discussion, without expressing some opinions of what should be done in a practical way, not only to preserve, but to propagate our great forests, this meeting will fall far short of its opportunities. The fact is, the matters inviting our attention in this connection are far more than academical; they are live issues that demand of the people of the country immediate action, and in the few minutes at my disposal I will ask your attention, first, to the extent of the forests under Dominion control; second, to what we are doing at present regarding them; third, what in my opinion should be done; and fourth, make but a very brief reference to afforestation on the plains.

When our north-western possessions are mentioned, the picture generally suggested is that of vast prairies stretching for hundreds of miles on every hand unrelieved by a single tree. Now while this is true of a very large extent of country it represents only a small part of the total land area owned and controlled by the Federal Government.

According to the census returns for 1901, the total *land* area under the control of the Dominion Government is 2,656,200 square miles. Of this, the bare prairie probably occupies 160,000,000 acres, or 250,000 square miles. The barren lands of the far north I have elsewhere estimated at four times that of the prairie, or 640,000,000 acres, or 1,000,000 square miles. These two would make 1,250,000 square miles of treeless land, and subtracting this from the total land area under federal control will give us 1,406,200 square miles, which is more or less wooded. The total land area owned by the provinces aggregates only 963,618 square miles, so that the Dominion timbered lands, according to this estimate, exceed the total land area, both timbered and cleared up of all the old provinces by 442,582 square miles.

But it may be truly said that on a very large proportion of this the forest growth is of little value for commercial purposes.

Let us make due allowance for this and estimate that only one-fifth of this land contains timber fit for such purposes. One-fifth of 1,406,200 gives 251,240 square miles.

We have now taken from the total land area under Dominion control the barren lands of the far north, and the prairie land, and then taken only one-fifth of the remainder in our estimate to represent the area of land containing merchantable timber; and we have still left 281,240 square miles. Suppose that the latter area contains only 2,000 feet, board measure, to the acre, or 1,230,000 feet to the square mile over ten inches at the stump, and we have left after all these reductions 359,987,200,000 feet of mature timber, which at the low rate of royalty to the Government of $1.00 per thousand would be $359,987,200, which sum represents but a small part of its value to the community and does not include the smaller growing timber which should be regarded as the agriculturist does his growing crop. It is true that much of this timber is not at present available, but it is a portion of the nation's inheritance and the Government as trustees of the state, are in duty bound to conserve it whether it is used by those now living or reserved for future generations.

This vast area represents Canada's woodlot. Let us save it while we may! The greater part of the timber is growing on land unsuited for agriculture, either from its high altitude or high latitude. We have in that great region, which is well described as our subarctic forest belt, a vast tract of such land. The spruce tree abounds everywhere, and as it is the most desirable of all varieties for pulp, it is even now being looked after for that purpose. This region too is the home of a great variety of the most valuable of the fur bearing animals whose existence is dependent on the preservation of the forest. Within it are many great lakes and rivers which, owing to the cool temperature of the water, contain fish of the finest quality.

We have also in those wilds, owing to the rough character of the country, rapids and waterfalls innumerable, which will furnish sufficient power for all purposes at little expense. Of its mineral wealth it is too early to speak, but the example of the Yukon teaches us that the explorer need not confine himself to the lower latitudes, and as timber is one of the great requisites for mining, the forest is necessary to its success.

But here too, important as the forest is for the purposes I have named, it is even more so for its influences in various ways. Time will not permit me to notice at any length, perhaps, the most important of all reasons for immediate attention to our forestry problem, and that is the necessity that the country at the sources of our water supply should be kept in forest. Denude for instance, the eastern slope of the Rocky Mountains of its forest growth, and as sure as result follows cause, you will destroy

the great rivers that have their sources there. You will create a raging torrent for a few weeks in the spring, and after that a water famine. You will destroy the North and South Saskatchewan, the Athabasca, and the Peace Rivers, and you will make a desert of our new Western Provinces. Your irrigation canals in Alberta will be raging torrents for a short time, and devoid of water when it is required. You will simply bring about a condition of affairs which anyone can see to-day in Southern Europe, in Northern Africa, and in Asia Minor, where large areas of country once fertile are now, owing to the denudation of the timber on the mountain side, practically a desert.

But let us look nearer home. The future of this City of Ottawa, as an industrial centre, depends on the valuable water powers of the Ottawa and Gatineau so near at hand, but unless precautions are early taken to preserve the forests at the head waters of these streams, we will have raging floods for a short time in the spring, followed by great scarcity of water later on which will render the power so unstable as to be practically worthless.

Again, to say nothing of the evil effects on the fertile lands further south that would follow the destruction of the forests lying north of the provinces which at present form a barrier against the northern air currents, the severe winter of those high northern latitudes would be made almost intolerable by the Arctic winds that would then blow uninterruptedly over the denuded land. The fact is that voices come to us from all quarters calling us to protect our timber areas.

WHAT ARE WE DOING?

I shall in a few words try to answer this question, so far as the Dominion lands are concerned, but it must be admitted that our efforts are small indeed compared with what should be done, but nevertheless sufficient to show remarkable results. Fires are the great enemy of our natural forest, and these usually accompany the early opening up of the country. The building of railways, the use of fire in clearing the land by settlers, and the camp fires of travellers are among the agencies that have caused great destruction of timber in the past. Lightning has also contributed, but in a much smaller degree. The latter is uncontrollable, but the destruction from the other causes may be greatly lessened by due precautions and the enforcement of regulations. Not only during the construction of railways through the timber are great precautions necessary, but after the roads are in operation the sparks from the engines are liable to start disastrous fires. This latter is a question that I will not pursue further, but it is worthy of further attention at this meeting.

In 1901 a system of forest patrol and guardianship on Dominion lands was started which has been somewhat extended since. I cannot give details of the system; suffice to say that rangers are assigned certain territory where it is deemed their work is most required. Each of these men is under the supervision of someone in the district, usually the head forest ranger, crown timber agent, or someone known to the Department. It is the duty of this supervising officer to instruct the ranger when to start work and when to quit and to certify to his time of service before his account is paid. In case of a dangerous fire starting, which requires more men to control it, the ranger has authority to engage such men for that particular purpose.

During the past season we had about forty regular rangers employed, principally in the Railway Belt in British Columbia, along the foothills of the Rocky Mountains, along the North Saskatchewan River and country north of that river, along the Athabasca, and in the wooded districts of Manitoba and Saskatchewan.

As to the result of such a service, the railway belt in British Columbia furnishes the best example. Prior to the adoption of the fire service five years ago, there was annual destruction of large quantities of merchantable timber, while during the past five years practically none has been lost, notwithstanding that they have had a succession of very dry summers, and outside of this railway belt hundreds of millions of feet of magnificent timber have been destroyed.

No better investment of public funds can be conceived of than in this protective service. What town or city would be guilty of such folly as to refuse to afford some system of protection against fire for its buildings, and why should the nation fail to take similar precautions to protect its own forest property? The buildings in a town or city can be replaced in a year while a century or more would be required for the restoration of a forest.

Within the past year the Forestry Branch has started making a careful examination of the forest reserves, and it is the intention to continue this work till we have a complete knowledge of the timber on them, the quantity, varieties and quality, rate of growth, etc., with a view of removing the dead and down timber and harvesting the full grown crop and fostering a permanent reproduction. It is also hoped to be able to employ expert men in the examination of other timber areas, in order to obtain information as to what areas it is desirable to further set aside as reserves.

One difficulty in our work is to know what we have. We know practically nothing of our timber and other natural resources extending over a large proportion of our possessions.

In the early history of Canada the pioneer was very much in evidence, but when the people settled down to sedentary occupations the spirit of adventure seemed to die out so that to-day we know no more, perhaps less, of our unoccupied wilderness than did the voyageur of two hundred years ago.

Exploration in advance of settlement is a necessity. With the knowledge that this would furnish us we would be able to assign such districts to agriculture as would be best suited for that purpose and to leave in forest land not adapted for agriculture, but suited for the growth of timber.

Canada is practically the only country in the northern hemisphere to which the eyes of the world are turned for a timber supply in the time of great scarcity which is fast overtaking us. Let us at once take means to preserve what we have for this contingency. Let us remember not only our present supply, but that we are dealing with that kingdom of nature where the life forces are at work and where reproduction and growth may indefinitely prolong the supply if nature is not prejudicially interfered with.

The attention that has hitherto been given to the forest in this country has been in cutting it down, either for the value of the timber or to get rid of it, in order that the land might be more profitably employed for agriculture; but the day has now arrived when we should cease to regard our productive forests as mines from which only a fixed amount of wealth can be obtained and then abandoned. We should recognize the fact of continuous growth and reproduction of the same varieties, crop succeeding crop for indefinite periods of time. To be sure, it takes about one hundred years for the growth of a mature timber crop, but it requires no labour on our part and it asks only that we allow nature, without interruption, to do its part and generally too on land useless for other purposes.

Owing to the long period required for the production of a mature timber crop the individual cannot be expected to take the same interest in it that he does in agricultural crops that mature in one year, and for this reason forestry belongs more to the state whose life is not measured by years, but by centuries. There is another reason why forestry in this country belongs more exclusively to the state than in perhaps any other country in the world, and it is owing to the fact that most of the land on which our valuable timber grows is still held by the Crown; and considering that the nation is the owner it is most appropriate that this meeting is called in order that the Government may have the views of those competent to give advice on a matter that they are called to administer.

Most of the countries of Europe make the administration of their forests one of their most important departments of

government. India, through the efforts of Sir Dietrich Brandis now possesses a forestry service which is not only producing excellent financial results, but is also working on lines that are greatly benefiting the country in conserving its water supply that was rapidly becoming exhausted. The United States within the past few years has awakened to the necessity of action and is now wisely expending large sums in the service, and there is no reason why Canada with the timber wealth it possesses, and with the advantages of Government ownership to which I have referred, should not take a leading place among the nations of the world in its forestry management, and this convention which might be called a forest parliament can do very much by resolution or otherwise to further this desirable end.

In this connection there is just one more point that I would like to submit for your consideration. It is one that I have had in mind for some time and which I am fully persuaded could be adopted without difficulty and would be greatly in the public interest. It is this, that in all future patents of timbered land a proviso should be inserted that at least 10% of the area conveyed should be left in timber; that the timber growing thereon should be the property of the patentee, but only to be cut under the authority and supervision of the Government. I believe such a reservation was made in some of the seignorial conveyances in Lower Canada, and the old Upper Canada Land Company if I am not mistaken, made a similar provision in some of their deeds.

I have little time left to say anything on tree planting on the plains which the Forestry Branch of the Department of the Interior has started there in cooperation with the settlers, and it is unnecessary that I should do so as Mr. Ross, the Assistant Superintendent, will present a paper dealing with that branch of our work. It is sufficient to say that when we have sent out in the spring the nursery stock now ready for shipment we will have distributed in all about 7,000,000 trees free of charge to settlers living on the bare prairie. The system we have adopted is meeting with gratifying success, and it is confidently predicted it will prove of incalculable benefit to the great plains region.

A number of the illustrations in the last annual report of the Canadian Forestry Association were, by oversight, not credited to the Forest Service of the United States, through whose courtesy they were obtained by Dr. Judson F. Clark.

A CANADIAN FOREST POLICY.

DR. JUDSON F. CLARK, FORESTER FOR THE PROVINCE OF ONTARIO.

When an individual of a nation is urged to undertake any new enterprise the advocate must be prepared to show that it is not only practicable and desirable, but that it is a business proposition, or in other words, that it will pay. That there are sentimental considerations urging better care of the forests is undeniable. That they should have weight is equally indisputable. But forestry is absolutely independent of such, its appeal to-day is as a business proposition to business men, and more especially as a business proposition to statesmen, for the whole history of forests and forestry from the time of ancient Babylon to the present has been a demonstration of the fact that the State is the best, if not the only good forester.

Personally, I think it is beyond doubt that the development of a rational, and therefore practical and business-like, forest policy by the Canadian Provinces and the Federal Government will have a greater influence on the prosperity and happiness of our country half a century hence than the solution of any other problem which is within the power of our generation to solve.

There are at least three reasons of paramount importance why Canadian forests should be managed with a view to the production of wood crops in perpetuity. These reasons have already been repeatedly discussed at the different sessions of the Convention. Permit me to repeat them briefly by way of emphasis and as a foundation on which to base some recommendations for a national forest policy.

For the Permanence of Lumbering Industries.

1. The necessity of a *permanent* supply of logs for the maintenance of our great and growing lumbering and other wood-working industries.

The products of these industries are absolutely essential for the future of our production, our transportation, and our manufactures. Aside, indeed, from the character of its people there is nothing which contributes so greatly to the prosperity and happiness of a people than an abundant supply of wood at reasonable prices. Wood forms the very corner-stone of modern

industrial life, and as years go by modern civilized man demands and uses more and more wood, all substitution by iron, steel, cement, etc., to the contrary notwithstanding.

There are some who are better acquainted with the forests than the markets, and others who are acquainted with neither forest nor markets, who still believe and speak of Canada's "inexhaustible" forests. Take any man through a 400,000 acre lot of fine forest so thoroughly that he will have seen all the trees, and it is most likely that he will be ready to believe in inexhaustible forests. Tell him that all the trees that he has seen would hardly supply the needs of the railways of North America for cross-ties for a single year, and his "inexhaustible" will appear as futile as it is. We have great but diminishing forests and great and ever growing needs for forest products.

For the Conservation of Stream Flow.

2. Second only in importance to the function of the forest as a producer of wood is its function as a regulator of the flow of streams.

Canada's wealth in her water-powers is very large. Some one has estimated that two-fifths of the water powers of the world are found on Canadian soil. Whether this be correct or not there is no doubt but that the water-powers of Canada vastly excel those of any other nation: What this will mean for her industrial future it is impossible to forecast, perhaps impossible to exaggerate. Add to this the value of the streams for irrigation, domestic use, and navigation, and who would dare guess how many figures would be required to express the value of Canada's streams a century or even half a century hence if maintained in their present efficiency?

If the forest lands of Canada be placed under a rational forest management, the present efficiency, by which I mean of course the regularity of her stream flow, may not be maintained only, but much increased. Present methods of lumbering with their accompaniment of fire on the lumbered lands are annually and to a large extent permanently, subtracting from the value of this great national asset.

For Public Revenue.

3. A third reason for conducting lumbering operations on non-agricultural lands with a view to improving and perpetuating the forests is found in the fact that it is only by maintaining such lands under forest crops that they may be made to permanently contribute to the wealth of the Provinces or the Nation. Compared acre for acre with arable lands, these rough lands have a low producing capacity. The vastness of the area involved, however, places the non-agricultural lands of Canada in the front rank of her natural resources.

Not only is it a great national duty born of necessity—the necessities of the future—that Canada care for her forests, but it will inevitably prove a highly remunerative business proposition.

Forest Situation in North America.

North America to-day cuts three-fifths and consumes more than one-half of the total lumber production of the whole world. This prodigious consumption is very rapidly increasing both on account of an increase in the per capita consumption and the consuming population. There can be no manner of doubt but that the present annual cut together with that destroyed by fire vastly exceeds the net annual production by growth. In other words a wood famine in North America is already in sight. I was asked the other day when it was due to strike. I replied that as near as I could interpret the signs of the times, the year 1900 would be about right, and that the pressure of prices was likely to become increasingly burdensome from decade to decade until the famine would be unanimously admitted. I understand that many purchasers of lumber are already admitting it.

Canada's Advantageous Position.

Canada will, if she be wise, be more interested in this wood famine as a seller than as a purchaser, and herein lies the possibilities of a great and ever growing revenue from her public forest lands.

The Canadian forests, which form beyond question the world's greatest remaining reserve of coniferous timber, form a band across the continent from the Atlantic to the Pacific bordering the richest farming and manufacturing area in the whole world. The population of the consuming area tributary to our forests has increased four-fold during the last half century, but its wood consumption has increased ten-fold. This marvellous increase in the use of forest products has already established stumpage prices which put national wood culture on a satisfactory financial basis from the standpoint of revenue alone. It should not be forgotten that the rise in prices which makes forestry a business proposition has come about in the face of an exploitation of the forests on both private and public lands such as was never seen elsewhere in the history of lumbering and cannot be again repeated in North America nor on any other continent.

The territory tributary to our Canadian forests which increased its wood consumption ten-fold during the past half century is to a very large extent merely on the threshold of its industrial development. Nothing is more certain than that

the present demand for the products of our forests will be indefinitely maintained—nothing more probable than that it will be greatly increased.

In view, then, of the desirability of caring for the forests as a sound business proposition from the standpoint of direct financial returns and its necessity from the standpoint of wood production and water conservation, I submit that no time could be more opportune than the present for the inauguration of a national forest policy having for its object the conservation of the forests by wise use.

Forest Protection.

In this forest policy first place must of course be given to forest protection and more particularly to the prevention of forest fires, for without reasonable safety in this regard there can be no forest management. Considerable progress has already been made by several Provinces in this matter, but everywhere much remains to be done. Further progress is needed along three lines, namely:

Improved fire laws.

More efficient administration of the fire laws, and the

Disposal of debris incident to lumbering operations.

Nova Scotia has at present the best fire law though it is in some respects surpassed by that of New Brunswick, and Ontario has the most efficient administration.

Practicability of Disposing of Debris.

In the report of the Ontario Bureau of Forestry for 1904 I have discussed in detail the practicability of burning the debris incident to lumbering operations in pineries. I shall only repeat here that it has been demonstrated that a good clean job of brush burning may be done on pine lands at a cost varying according to local circumstances of from 12 to 25 cents per M. feet, board measure, of the timber cut. Whether a similar burning of the brush on spruce lands be also practicable has not yet been demonstrated by any fair test on a commercial scale. I submit, however, that the making of such a test is one of the most urgent duties of the Provinces selling pulpwood stumpage. It will pay any Province vastly better to take ten or fifteen cents less per cord for its pulpwood and secure the safety and advantage to reproduction which goes with the burning of the debris than to secure the utmost present cash return and leave the areas cut over for pulpwood in the deplorable and menacing condition which is to-day characteristic of Canadian pulpwood slashings.

It need scarcely be added that the state rather than the

lumberman should in all cases bear the expense of such safety measures, for it is in the interest of the future citizens of the state that they are undertaken.

Woodland Taxation.

Forest taxation is, next to fire protection, the most important consideration in planning forest management on privately owned lands. Governments have in their control of the method and amount of taxation a powerful lever to foster or destroy the practice of forestry by private owners. Under normal conditions no woodland owner can be exempted from a fair and equitable share in the burden of government. Where, however, the tendency to deforest reaches the point where the general interests of a community are endangered, the partial or complete exemption from taxation of such woodlands as are devoted exclusively to forest purposes and come up to a reasonable standard of production may be resorted to as a remedial measure; or the taxation may be shifted from an annual tax on the land to a stumpage tax on the annual cut, thus converting the tax itself into a measure of restraint as regards deforestation.

Classification of Public Lands.

An important feature of a Canadian forest policy must be the exploration and classification of the public lands. Such lands as contain a satisfactory proportion of good plow lands and are reasonably accessible to markets should be opened for settlement as the land is required for agricultural development. Townships or larger areas in which the non-agricultural lands predominate should under no circumstances be opened for settlement but should be constituted Provincial or Federal Forest Reserves and be devoted to timber production in perpetuity.

Just what proportion of plow land contained should entitle a township or district to be classed as suitable for agricultural settlement is open to debate. In deciding this point it should be kept clearly in mind that a mistake in choosing too high a standard for the agricultural lands may be subsequently remedied at any time without embarrassment or loss, while the mistake of opening up for settlement lands unsuited for agriculture is certain to be a great and lasting injury to both settler and Province, and is well nigh irremediable, as witness many townships in Muskoka, Haliburton, and elsewhere.

Municipal Forest Reserves.

A second class of forest reserves which the Provinces would do well to foster is what may be termed Municipal Forest Reserves.

There are many townships having within their boundaries considerable areas of waste lands which after trial have been abandoned as unsuitable for growing field crops. The only hope of restoring such lands to useful production is by reforestation, and there are many good reasons that may be urged for the undertaking of the enterprise by the local municipality.

It would be good policy for the Provinces to assist such municipalities as are willing to establish municipal forest reserves by advancing the money for the purchase of the lands, and by organizing an efficient forest service for their management. In the course of time, varying from 15 years in the more southern parts to 30 or 35 years in northern districts, the townships would be in receipt of a steady and very considerable income from their municipal forests for the easement of local taxation. There are many municipalities in Europe having no higher prices for forest products than obtain in Western Ontario to-day whose income from such municipal forests pays the entire expense of maintaining schools, roads, and other local improvements, and in not a few cases there is a surplus which is annually divided as a cash bonus among the citizens.

Such a system of municipal forest reserves could with the utmost advantage be extended to the newer districts where townships are being opened for settlement. All that would be necessary would in this case be to select and reserve from location at the time of the survey a suitable area in the part of the township least adapted for agriculture. Such reserves being already stocked with merchantable timber would be capable of yielding a revenue to the municipality from the first.

Practical Forest Management.

The central feature of a forest policy and that which gives real worth to all the rest is of course the introduction of a system of practical forest management, having for its aim the perpetuation and improvement of the forest by judicious lumbering.

Canadian forest management will naturally differ widely from European forest management, for our forests, our transportation, our markets, and our people all differ widely. It will also differ somewhat from the forestry of our neighbours to the south, for there are characteristic Canadian conditions to be met—not the least of which is the radical difference in forest ownership and the relations existing between the lumbermen and the State. Canadian foresters may of course learn much from the foresters of Europe and will doubtless learn much more from those of the United States where many of the conditions are very similar, but in the end they must work out their own salvation by the development of a system of Canadian forest management designed especially to meet Canadian forest conditions.

Stock-Taking of Timber Resources.

As a first step in this direction it will be the duty of the Provinces to undertake a systematic stock-taking of their timber resources, for without a knowledge as to what thay have in the way of standing timber, any attempt at forest management must be blind and ineffective. This stock-taking will naturally include the kind, quantity, quality, state of maturity, rate of growth, and location of the standing timber; the character of the soil and its adaptability for growing particular kinds of timber; and a more or less complete topographic survey having special reference to the drainage, character of the surface and such other features as would be of importance in planning logging operations.

Knowing, then *what* there is and *where* it is and how it may be gotten out, the next step will be to limit logging operations as much as may be practicable to districts where the stands are mature or overmature. The mature timber must be sold under such conditions as will conserve alike the interests of the lumberman and those of the Province. The price paid for the logs must be made with the clear understanding that they are to be removed under such rules and regulations as will insure the reproduction and future safety of the forest. These rules and regulations must naturally be prepared and published in advance of the sale, that the purchaser may know definitely at the time of the sale the conditions under which he is to conduct the logging operations.

The Lumberman and Forestry.

Lumbermen are more interested in the perpetuation of the forests than any other class of citizens, and in any square deal will be found willing to do their share to that end. It is high time, however, that the Canadian Provinces ceased to sell the public timber under a system which makes it in the present financial interest of the logger to despoil the forest. Were the stumpage sold in a proper and business-like way there would be no need to implore the lumberman to think of the nation's posterity rather than his own, a plea which must always be futile, besides it is perfectly practicable to conserve and harmonize the interests of the lumberman and the public, present and future.

Trained Foresters Necessary.

Systematic care of forests implies of course a trained forest service.

There was a time when the doctor's office, the court-room, and the deck of a ship were the only places of training for the physician, the lawyer, and the naval officer, just as to-day the lumber camp is the only place of training for those who at pre-

sent direct the cutting of the Canadian forests. But the world has made progress in educational matters in the last fifty years, and to-day we have, established and maintained by the State, military and naval academies, schools of law and medicine, of mining, engineering, agriculture, and other professional and technical schools too numerous to mention.

With her vast interest in forests and forest products there can, I think, be little doubt but that the time has fully come for the establishment of a Canadian School of Forestry for the training of her coming forest service.

A Practical Forestry Training.

Time does not permit me to discuss in any detail the character of the instruction which should be given at such a school. In very brief, I would say that a broad elementary training in the so-called natural sciences and mathematics is a most necessary preparation for the forester's professional training. That the professional training must be as *practical* as possible goes of course without saying. To this end all theoretical instruction must be supplemented by practical investigation and application in the woods. I would go farther and recommend that on the completion of their school work—theoretical and practical—all students who have not previously had a practical training in the lumbering business be required to associate themselves with a lumber firm for a year for the purpose of studying and practically assisting in the various operations from the felling of the tree to the grading of the lumber for the market. This training will prove of value to students not alone in the matter of information gained, but will serve the useful purpose of bringing the foresters and the lumbermen in touch personally and professionally.

Assistance for Private Owners.

The educational side of a national forest policy would be incomplete without provision for the dissemination of a knowledge of improved methods of woodland management for the benefit of the private owners, who control in the aggregate many million acres of woodlands, which scattered as they are throughout the agricultural sections, are acre for acre the most valuable of Canadian forest lands. The Ontario Department of Agriculture and the Dominion Forestry Branch have already made an excellent beginning in this great educational work.

Such in brief is a glimpse of Canada's responsibility, opportunity, and duty. As we accept our responsibilities and as we do our duty according to our opportunity will we be judged by future generations as having been worthy or unworthy custodians of an almost unbounded natural resource.

Forest on a Hardwood Ridge from which the large Yellow Birch has been cut. Madawaska, Ontario

THE RELATION BETWEEN WATER-POWERS AND FORESTS.

CECIL B. SMITH, C.E., CHAIRMAN, TEMISCAMING RAILWAY COMMISSION.

CANADA is well supplied with coal, both in its extreme Eastern and Western Provinces, but over an area extending for three thousand miles from New Brunswick to the foothills of the Rockies, and from the United States boundary as far Northward as we have knowledge of a definite nature, there are no coal measures of importance that have yet been discovered; and whilst this deficiency is not an absolutely vital one, owing to the abundance of coal in the neighbouring United States, yet it is of great economic importance, and has been a large factor in retarding manufacturing in this country.

Now that wood for fuel has become scarce and expensive in many localities, there is a double drain on the pockets of our people, and a continually increasing stream of money is flowing across our Southern border to purchase coal for heating and power purposes.

Until quite recently this had not appeared very important because wood, being plentiful, was largely and often wastefully used for fuel and power, and because manufacturing was not carried on extensively, and therefore the power problem did not loom large in the public view. However, the last ten years have worked many changes, and we are now face to face with a condition and not a theory.

Street and suburban railways are operated by electricity; Cities and towns demand electric lighting; manufactures are increasing by leaps and bounds, and more and more coal continues to pour over our frontier to meet our ever growing demand for power.

The natural query is How and To what extent can this unfortunate economic condition be improved upon, and what is the proper channel through which the desired end can best be accomplished?

The direct use of water-power for pumping and grinding is embedded in history, and doubtless such uses will continue to form an important factor in daily life for generations to come; but, excepting in special cases, these uses will be and are, con-

fined to water-powers of small dimensions, and the service must be given in the immediate neighbourhood of the water-power.

Quite recently, however, the transmission of electricity for considerable distances has been fully demonstrated to be feasible and economically important, and at once it became evident that water-powers had assumed an increased market value by reason of the facility with which the power of water could be devoted to the generation of electrical energy, which energy could then be carried without serious loss or prohibitive expense, and in greater or less quantities to power markets and centres of population.

With the preceding statements postulated the natural question arises to what extent are we blessed with water-powers over this coalless area, and how convenient are they to centres of population? Also, what has been accomplished to the present, and what is the future outlook?

If we study a map of Canada we find the area before referred to, to consist, broadly speaking, of two drainage areas: one tributary to the Hudson Sea and the other to the St. Lawrence Valley, the population of the country being chiefly centred in the latter area. Doubtless the Saskatchewan and Winnipeg Rivers will soon become important from a power point of view; the former because of its relation to wheat grinding, the latter because of its nearness to Winnipeg; but looking at the St. Lawrence water-shed, one is at once impressed by the great number of large rivers, flowing Southward from the Height of Land, which all have excellent water-powers, and which, flowing as they do from a wilderness, full of swamps and lakes, are admirably uniform in their run-off, and liable to remain undisturbed for some time to come. The development of these powers is at present chiefly along the lines of milling and grinding, and only where situated near centres of population, such as Ottawa or Montreal, are they devoted to the generating of electricity.

Coming, however, to the rivers of that portion of Ontario, South of the Ottawa River, and of Quebec South of the St. Lawrence River, a different and much less satisfactory condition prevails; and although in earlier generations, these rivers may have been quite steady in their flow, this is, with two or three exceptions, not now the case, owing to the great amount of cleared land and consequent rapid run-off of the flood waters, as soon as the spring thaws have taken place.

Before coming to the main subject of this paper, which is the relation between forestry and water-powers, it may be interesting to dwell for a moment on the financial magnitude of the question under discussion. At the present time there has been developed in Canada about 350,000 H.P. of water-power, which probably, including transmission lines, represents an investment

of $25,000,000 to $30,000,000, and considered only on a ten-hour basis, means a saving of at least five tons of coal per horse-power-year, or 1,750,000 tons of coal per year as compared with about 4,500,000 tons annually imported. Now the near future will easily see this amount doubled or trebled if intelligent and comprehensive plans are adopted for development and distribution, and not only can a large amount of money be kept in our country, but industries and public utilities will be benefited by being supplied with electricity at reasonable rates.

Speaking generally, water-powers are valuable in proportion to the amount of water available at the periods of low water, which usually occur in August and September, and in February and early March, and it is a matter of common observation that each river is a distinct study in itself, as the variables are not only numerous, but largely beyond the control of man.

The chief features affecting the uniformity and total amount of flow are: (*a*) Drainage Area. (*b*) Shape of Area, whether compact or narrow and long. (*c*) Slope of country. (*d*) Kind of soil. (*e*) Rainfall. (*f*) Evaporation. (*g*) Condition of soil, whether cultivated, pasture or woodland. (*h*) Storage, natural or artificial. (*i*) Control of run-off from storage.

It will be noted that all but the last three items are natural conditions, and therefore beyond the control of man.

However, the large water-power developments which have been attempted to the present have been chiefly made on large rivers, and the pinch of low water has not been so serious as will be the case in the future when increased values will induce the development of smaller rivers to their fullest extent.

The practical problems of the control of river flow in the thickly settled parts of Ontario and Quebec Provinces group themselves naturally into three districts, which will be treated separately.

(A) Southwestern Ontario. In this district we have the Nottawasaga, Saugeen, Maitland, Ausable, Thames, Grand, Credit and Humber Rivers, all possessing originally valuable water-powers, but without any natural storage for the water, except in the soil, so that as this whole area has been practically denuded of forests and given over to agriculture, the water-powers have been nearly all ruined, and as the creation of artificial storage would be very expensive, and the country is too valuable as farm land to permit of it ever reverting to forest, little can be hoped for in the way of improvement, and the district will necessarily have to rely on Niagara as its chief source of electrical power.

(B) Central Old Ontario. We find here an entirely different natural condition, and owing to this an exceptional

opportunity presents itself for intelligent and comprehensive action which will, if carried out, be of great benefit to future generations.

The French, Maganatewan, Muskoka, Severn, Trent, Moira, Rideau, Mississippi, Madawaska, Bonnechere, Petawahweh and Mattawan Rivers, with their sources in lakes and swamps, all rise from a common plateau, largely unfit for cultivation, still chiefly in forest, and much of it still in the hands of the crown. They all possess excellent water-powers, many even now near to industrial centres, and up to the present time developed only to a very limited extent. Much of this central plateau is still in virgin forest, but much more has been cut or burnt over, and much partly cleared, on which thousands of families are eking out a meagre and precarious existence on land which would be much better occupied if devoted to the growth of another forest of pine and other trees indigenous to the region.

Those who have studied re-foresting will be agreed that to re-forest on *cleared* land means *close* planting as otherwise the trees form their limbs near the ground and become less valuable as timber. But to re-forest a large area of cleared land in this manner would be beyond the means even of a Government, and therefore the idea suggests itself that the proper course to pursue would be to hold this central plateau as it is at present, (and possibly even to re-forest some partly cleared or cut over districts), to limit the cutting of timber to ripe trees only, under crown supervision; to replant from nurseries, and guard from fires, and in connection therewith to gradually create a system of storages for water near the sources of the various rivers mentioned; lakes already exist in abundance: all that is needed is the construction of inexpensive dams to supplement those that have already been built by the Dominion Government on the Trent Canal, and elsewhere by lumbermen, and to place the control of the flow of water from these various reservoirs in the hands of proper parties, interested in making the most of the water-powers dependant on these lakes for the uniformity of their supply of water.

The question involved in this district thus presents two phases: one, the improvement of water-powers possessing wonderful natural storage, and amounting when developed to 200,000 or 300,000 horse-power, representing at least 1,500,000 tons of coal per year, and on the other hand the upbuilding of an extensive forest district naturally adapted to the growth of pine, but largely unfit for cultivation.

(C) Southern Quebec. The Yamaska, St. Francis and Chaudiere with other smaller rivers, have their sources in the foothills of the Notre Dame or White Mountains, and possess valuable lake storage, and while this district is largely arable and fairly well cleared, there are considerable areas which it would pay

to hold for all time as forest reserves in order to equalize the flow in the rivers above mentioned, and at the same time prepare valuable forests against the time when timber will be in still greater demand than it is at present.

Doubtless similar problems which exist in New Brunswick demand similar treatment, but unfortunately the sources of the St. John River are international in character, which complicates the problem, and the remaining rivers of the Province are not supplied with extensive natural storage, and must depend on soil storage only. Holding the uplands of this Province in forest seems essential to a preservation of its streams.

The relationship between stream flow and forests is an in timate one and in a country possessing valuable water-powers such as exist in almost every Province of our Dominion, this must be continually borne in mind.

The problem is too vast to consider in any other way than as one of preserving our present forests, rather than in creating new ones, and if the far-reaching effect of such preservation is thought of in connection with the preservation and improvement of our water-powers, an added incentive will be given to the natural desire to perpetuate for future generations our present valuable woodlands.

Fortunately the two interests are in harmony, and in preserving our forests, we can aid in developing to its fullest extent an equally valuable asset in our water-powers, which fortunately are to be found in every corner of the land.

FARM FORESTRY IN THE EASTERN PROVINCES.

Revd. A. E. Burke, Alberton, P.E.I.

There can be no phase of forestry, which fortunately is beginning to receive somewhat of the great attention which it deserves from the central authority, as essential to the general prosperity of the country as well as productive of direct influence on the conservation of its great water sources, the health of its people and the beauty and charm of life amongst us—nothing so eminently practical in its effect on the greatest number of our population as farm forestry. The farmer in the more fortunate wood-growing divisions of Canada has only within a comparatively short time awakened to the value of trees not only as a source of fuel supply—and fuel will always be a heavy charge against farm revenue—and the lumber which is always a requisite about the place, but as a temperer of the adverse winds, a protector of the fruit plantation, the pasturing cattle, the dwellers on the steading themselves; and as a source of beauty and comfort beyond anything else we can name.

Having to contend with the great forest at settlement, it is not wonderful that it was considered by the average pioneer an enemy; and, therefore, to be removed at the earliest possible moment. Even where wood and wood products were little sought, the torch and axe were in requisition until all the acres of the holding were for the most part bare and treeless. This did not so much matter where the misguided operator was somewhat isolated, but when all the land became occupied and a general policy of destruction was adopted, the effect was signally adverse to the productiveness of the lands and the comfort of the land holders. In the large provinces, even areas which would constitute states in smaller and less favoured countries were thus stripped; in the smaller provinces the dire result of such a short-sighted policy became more and more of an affliction. The new additions to the older provinces formed a magnificent reserve and afforded all the timber supply necessary for local requirements; the older sections began to find out the error of complete denudation; the public mind became awakened and informed to sane principles; and early an attempt to retrieve lost ground was discernible. That disposition to help themselves on the part of the people has actuated the Government of Ontario in the generous and organized system of re-

afforestation, educational and practical, which it is now pursuing. Quebec still has its great forests, but the settled portions are, in many cases, bare of trees. It has no such systematic policy as to forestry as its great sister province; but the farmer there, too, is alive at last to the advantages of the wood-lot, and will henceforward compel an enlightened policy not only with regard to the maintenance of the proper proportion of field and forest of his own locality, but also, since it affects him and the people generally, a conservative administration of the great forests of the Province.

In Maritime Canada there is still much to be done. The three Atlantic Provinces, smaller than the others as they are, and, therefore, divided and weakened in the effort which the times so imperatively demand in the way of forestry, can scarcely be said to have given this question the consideration it deserves.

Apart from Prince Edward Island, agriculture has not been the exclusive occupation of their people. Nova Scotia is a large mineral Province, and the development of these riches has occupied her attention almost entirely. Out of thirteen millions of acres scarcely one million is given up exclusively to agriculture, and except in the alluvial stretches which form her rich fodder fields, the land has not been in any locality so completely denuded as to threaten the failure or to adversely affect the growing capacity of her cultivated fields. An economic timber policy is greatly to be desired, however, and this will very beneficially affect not only the cultivated areas of to-day, but those which to-morrow may in the needs of greater production, be subjected to the plough.

New Brunswick is a well wooded Province of seventeen million of acres, only a very small portion of which is given over to agriculture. The growing of timber for the money that is in it has been always a commercial pursuit of the people although no systematic forestry has ever been inaugurated. A great portion of the lands still remain under the Crown. Some ten millions of acres are granted lands, it is true, but even those are practically half under forest of some kind. Certainly less than five millions of acres are devoted to crop production; and, so far as we know, no organized system of farm forestry has yet been demanded or evolved. Of the seven and a half millions under the Crown, possibly six and a quarter are under timber license and the remainder burnt or barren areas. In the farming sections the errors of other places are apparent. The wood has been cleared away and in many cases whole portions of country bared of trees to the great disadvantage of successful agriculture. New Brunswick, while not under present circumstances vindicating to itself, the title of an agricultural province is nevertheless susceptible of successful field culture much more generally than

has at all been attempted, and quite as much, if not more so, than countries which are freely accorded an agricultural name. Professor Johnston, F.R.S.E., who examined the Province carefully, reports that its soil is capable of producing food for five or six millions of people; capable of growing all the common crops on which man and beast depend; and possessing a climate suitable for the growing of crops in quantity and quality not inferior to the average soil of England. It is, therefore, greatly to be desired that, as agriculture must play a great part in the development of this Province when the population of the country becomes intensified, as we know it will in the not too distant future, a sane system of forest preservation be early resorted to, so that the fruitfulness of the future crop-producing areas may not be radically impaired.

The third and most generally fertile Province of Maritime Canada, termed by its admirers "the Garden of the Gulf" and "the Million-acre Farm," has already suffered, and is suffering very considerably every year, from the deprivation of its forest. The lands for the most part have passed from the Crown—only about fourteen thousand out of the one million two hundred and eighty thousand acres, are still in its possession, and these lands have been stripped of everything worth taking away long ago. The farmers themselves are, in the great majority of cases, obliged to purchase coal for fuel from the mines of the neighbouring Province of Nova Scotia, and building material from the New Brunswick mills. The farms thus bared are not at all being cultivated to their utmost extent; the Island is susceptible of maintaining under right conditions a system of the most intensive agriculture, and one which would sustain in comfort a population five times greater than its present one. The portions cultivated—and they are much greater than those of the other Maritime Provinces, comparatively greater than any other portion of Canada comparatively fruitful as they are, would be doubly so if the requisite forest influences were in full play. There are numerous places completely denuded which nature only intended for tree production and the safe-guarding of the splendid water sources with which the Province was originally endowed. One thought given to the insular nature of the country, its situation in the midst of a great wind-swept Gulf and its smallness, will convince anyone that the losses incurred to its husbandry, where unprotected from the blizzards of winter and the drying-out winds of summer, as well as the erosion which spring freshets and fall rains occasion, must be very serious indeed.

Little more than one hundred years have sufficed to transform this Province from a complete forest to its present bare and exposed condition. Then its flora was of the most engaging

Rollways of Pine Logs, showing the condition of the forest after lumbering

to be met with in the Western Hemisphere comprising a large range of coniferous and deciduous trees among them those mentioned by the intrepid explorer, Jacques Cartier, when on July 1st, 1534, he first trod Canadian soil in the Island Province. His Relations contain an admiring mention of our beautiful forest trees and in it he enumerates with great exactness the fir, the black, red and white spruce, the stately hemlock, the white and red pine, the larch and the cedar and the maple in four varieties; the white, black, yellow and canoe birch; the wide-spreading beech; the elm; the ash in variety; the oak, the aspen, the cherry and many other inferior species. The axe, the torch, man's cupidity and the utter disregard of the governing power have almost swept away this precious heritage.

Within recent years we have come to recognize our sorry plight; we have aroused the public conscience; we have attempted to quicken the provincial authorities to some action which may save us from further loss, and start us out on the way of retrieval. A Commission was appointed to examine into the case a few years ago, and whilst their report may have little technical value it has by sounding the alarm at least manifested to the apathetic farmer a condition of things he otherwise might never have realized, to wit, that forest growth is essential in most situations, at all events, as a protection to the farm from the chilling winds which sweep over the Gulf and adversely affect all life upon the Island in winter, resulting often in many of the dread diseases which come from exposure to such temperature, and increasing to an extent unknown in the old days, when the country was tree clad, the scourge of consumption, the Great White Plague, now a general menace.

Forest protection is necessary to the farm lands so that water can penetrate the soil and be available for crop production. If the whole farm area is deprived of the advantages which the forest floor affords for the conservation of the water precipitated, the exposed soil hardened by the tramping of cattle and the patter of raindrops, must shed it superficially if it is anywise compact. As a consequence these waters are not only lost to crop production but, gathering into rivulets, carry great quantities of the rich soil with them as well as furrowing the fields with gullies and runs. This carries away valuable plant food, covers the lowlands with silt, damages the roads, and swelling the water courses causes them to break their bounds and dissipate the water, which by subterranean channels should feed them later. In Canada to-day it is estimated that not less than two hundred miles of fertile soil are washed into rivers and brooks annually, and those who examine the public accounts will be surprised at the immense sums of money expended each season in digging out those lost farms from the harbours and

rivers of the Dominion. Many thousands of dollars worth of crops and other property are destroyed by overflows and floods and many more by the droughts which one Province or another suffers yearly—all or nearly all of which would be avoided if the water supply of the country were properly regulated; and the conservation and management of the forest is the only agency available to this end.

The tempering effect of the forest on the farm need only be mentioned. By modifying the velocity and temperature of strong winds a great reduction is brought about in the protected fields. We plant wind-breaks about our orchards and out-buildings to secure shelter and thus temper the hot winds of summer and the cold blasts of winter. An extension of this system to the fields would greatly increase the yield in crops. The increased moisture which forest protection affords because of the decreased evaporative power of the winds, the velocity of which has been reduced by passing through forest, is very considerable. It is estimated that a foot in height of forest growth will protect one rod in distance, and a succession of tree plantations would very materially increase this protective power. The forest tempers the farm, too, by preventing deep freezing of the soil and shortening the cold of winter.

Whether or not the forest may increase the water fall over the adjacent area is still a question open to discussion, but no one doubts that by transpiration, the moisture near forests is greatly increased and vegetation thus beneficially affected. But even if no increase is admitted in the rainfall because of forest influences the availability of whatever does fall is greatly increased by a forest growth properly located. In forests the water percolates through the soil most thoroughly and the snow fall is caught by them and melted so gradually as to be subject to little waste. Larger amounts of water are, therefore, held by the forest soil and sink deeper into it than into that of the open fields. The sun and wind, the great moisture-dissipating agents, not having full play in the forest, the conservation of moisture is much easier than elsewhere. The water supply available in the soil is thus increased 50% scientists tell us. Increased percolation and decreased evaporation afford large quantities of moisture to feed the springs and sub-soil waters and these are finally made available to the growing crops in times of extreme drought.

The forest as well as watering, tempering and protecting the farm supplies it with much useful and valuable material. Those who have to purchase coal at big prices know how it eats into the year's revenues. Once established the wood-lot properly handled will reproduce itself and supply in reasonable proportions not only the fuel but much of the timber and lumber

required in the up-keep and extension of farm construction. The poorest portion of the farm, that unfit for tillage, may thus be made to bring in the best returns. On a well regulated farm of one hundred acres 25% should be left in forest. In harvesting, the openings should not be made so large at any time in this wood-lot as not to be easily re-seeded from the adjacent trees.

The forest will not only benefit the farm and add to its value in all the ways we have been describing, but it will so beautify it as to make life doubly pleasureable to those upon it and also to the community in which it is placed. "A thing of beauty is a joy forever"—and what so beautiful as a thrifty tree in the open, a line of trees by the roadside, a clump of trees in some waste corner, a well kept grove or wind-break sheltering the farm buildings, or a wood-lot lifting its head high to the sky in conscious pride of its worth on the rear line of the holding? The value of that farm, if by any necessity it has to be put on the market, is greatly enhanced by such adornment and the extra cost of it has been little or nothing to the farmer when everything is computed. Nay, it has paid him a hundred fold, bettering and blessing his life.

> "Nature is man's best teacher. She unfolds
> Her treasures to his search, unseals his eye,
> Illumes his mind, and purifies his heart,
> An influence breathes from all the sights and sounds
> Of her existence."
>
> —*Street.*

The question comes naturally to every lip. "How are we to restore in sections impaired the proportion of forest to field, how maintain it where it exists at present? How are we to bring about in Eastern Canada a sane system of farm forestry?" To our mind a general forestry policy should be quickly and effectually evolved by the central authority, not only with regard to the new countries under its control where the mistakes of older Canada must not be repeated, but also in the older portions where the national life has been adversely affected by the dangers with which the sacrifice of the forest have menaced it in its economic, agronomic, climatic, hygienic and aesthetic relations. As with agriculture even where the provinces have supreme control, a paternal policy productive of the best results has been long adopted federally by which educational and practical assistance has been bestowed, so in the forestic endeavour the presence of the instructor and the bestowal of stock wherewith to re-plant may become necessary. The farmer can thus be taught the value of his wood-lot at comparatively little expense to the country, and the result in prosperity and national

happiness will far outreach the returns, great as they have been, in any other line of agricultural effort. A fully equipped Federal Department looking to the maintenance and necessary extension of forestry in every portion of Canada is the necessity of the hour. Let us hope then, that in the general impetus which this Council must give to this great national interest, farm forestry in Eastern Canada will not be overlooked.

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Three years after a fire on Turtle Mountain Forest Reserve, showing dense young growth.

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Canadian Forestry Journal.

Vol. II. May, 1906. No. 2

ANNUAL MEETING OF THE CANADIAN FORESTRY ASSOCIATION.

The Annual Meeting of the Canadian Forestry Association was held at Ottawa on the 9th March. Among those present were the President, Mr. E. G. Joly de Lotbiniere, Hiram Robinson, J. F. Ellis, Professor John Macoun, Wm. Little, H. M. Price, E. Stewart, W. C. J. Hall, Mr. MacLeod, Miss. M Robinson, J. M. Macoun, Roland D. Craig, H. C. Wallin, R. H. Campbell.

The report of the Board of Directors was read by the Secretary as follows:—

REPORT OF THE BOARD OF DIRECTORS OF THE CANADIAN FORESTRY ASSOCIATION.

Your Board beg to submit their report for the year 1905-06, and in doing so can congratulate the Association on the most successful year in its history. It is a subject for some pride to look back to the beginnings of this Association in 1900 when it commenced its career with a handful of members and made its appeal to a public which hardly understood even what the word forestry meant, with its present position, supported by a membership of nearly 1,200 representatives of the whole Dominion and with an aroused public opinion which is ready to listen and anxious to learn.

Forestry Convention.

The most notable event in the past year's history is the Canadian Forestry Convention which was held at Ottawa on the 10th, 11th and 12th January, 1906. This Convention was called by the Right Honourable Sir Wilfrid Laurier, Prime Minister of Canada, in accordance with the suggestion conveyed by him to the last Annual Meeting of the Forestry Association and the call was responded to by a large and representative gathering, which discussed forestry questions for a period of three

days. The interest taken in the proceedings by His Excellency the Governor General, by the Prime Minister, who personally presided over its deliberations, and by Mr. R. L. Borden, leader of the Dominion opposition, assisted much towards its success, and the Forestry Association, under whose auspices the Convention was held, owe the heartiest thanks to them and to those who assisted by the reading of papers and in other ways to the splendid result. The representative character of the Convention, composed as it was of clergymen, politicians, lumbermen, business men, educators, farmers, scientists, journalists, means that the effects will be far reaching. The success of this Convention means the opening of a large opportunity to this Association to advance the forestry movement and full advantage should be taken of the occasion to further the objects for which it exists.

Membership.

In view of the Convention, a special effort was made during last year to increase the membership of the Association by sending out circulars of invitation and otherwise, and as a consequence of this work and the interest aroused by the Convention, the number of members has been increased from 562, as reported last year, to 1,161. In this connection the support given by the Banks to the Association deserves special recognition. The following Banks have paid the fees for membership of their Managers in the Association: Bank of Commerce, Merchants' Bank, Bank of Montreal. A comparative statement of the membership for the last two years follows:—

	1905	1906
Nova Scotia	21	67
New Brunswick	22	77
Prince Edward Island	3	6
Quebec	113	225
Ontario	187	368
Manitoba	72	115
Assiniboia	22	53
Saskatchewan	4	
Alberta	42	90
British Columbia	32	85
Yukon	.....	2
Newfoundland	1	1
United States	32	56
Other Countries	11	13
	562	1,158
Life Members	39	

The receipts for last year were $2,428, including a balance of $916.11 from last year, and the expenditure $1,124.84.

The thanks of the Association are due to the Governments of the provinces of Ontario, Quebec and British Columbia for grants in aid of the work of the Association, and also to the Forestry Branch of the Department of the Interior for providing for the publication of the Annual Report and other services.

It is only right that mention should be made of the work of Miss Robinson of the Forestry Branch, who though not on the recognized official staff of the Association, has rendered efficient service in the keeping of the Treasurer's books and in many other ways.

Publications.

The Canadian Forestry Journal has been published throughout the year as a quarterly and it is hoped that it has been satisfactory to the Association. It is desirable that the Annual Meeting should consider this question of the official organ carefully and fully. If the Journal could be issued more frequently its usefulness would be largely increased, and as the present editor has submitted his resignation, it is well to consider if the time has not arrived when provision might be made for an editor and business manager who could devote the greater part of his time to this and similar duties.

In addition to the Forestry Journal, the Association would find it of advantage to issue a series of bulletins for the information of the public and also to supply material to papers and news agencies. Despite all that has been done, there are large circles of public opinion still untouched and it will require persistent and constant effort to thoroughly reach all classes and all parts of the Dominion.

A well edited paper, with a large list of subscribers and frequent publication could, with good business management, obtain an income from advertising that would go far to make it self-supporting. For this purpose a managing editor, who can give most of his time to the work, is a necessity.

The Sixth Annual Report containing the papers and proceedings of the last Annual Meeting was published and distributed as usual. This report serves a special and useful purpose, but it may be considered whether the papers might not appear in the Forestry Journal if publication is made more frequently.

Vice-Presidents.

After the last Annual Meeting the Board of Directors appointed the following Vice-Presidents:—

Prince Edward Island, Rev. A. E. Burke; Nova Scotia, Hon. J. W. Longley; New Brunswick, His Honour J. B. Snowball;

Quebec, Hon. S. N. Parent; Keewatin, His Honour the Lieutenant Governor of Manitoba; Assiniboia, His Honour A. E. Forget; Alberta, Wm. Pearce; Athabasca, F. D. Wilson; British Columbia, Hon. H. Bostock; Manitoba, Hon. J. H. Agnew; Ontario, Hon. Nelson Monteith.

The Resolutions passed at the last Annual Meeting were transmitted to the Minister of Railways, to the Local governments and to others interested and were acknowledged with promises of consideration.

It may be noted that the Transcontinental Railway Commission, in calling for tenders for the construction of the Transcontinental Railway have included special requirements in regard to the protection of the forests along the route from fire, this being a question dealt with by one of the resolutions.

Forest Fires.

Forest fires caused considerable loss in different localities during the past year. In Nova Scotia one village was destroyed. In New Brunswick, Moncton was threatened and for a time the situation in several places was serious. In Quebec the smoke from fires interfered seriously at times with navigation on the St. Lawrence River. Ontario did not suffer heavily nor did the western provinces, except British Columbia. The weather conditions east of the Rocky Mountains during the early part of the season were such as not to require very close patrol service, but later it was found necessary to have the rangers continuously on duty. In British Columbia we seem to be passing through a cycle of dry seasons and that of 1905 was one that threatened the greatest destruction of timber. At one time it was feared that the whole of the valuable timber in the Shuswap country would be swept away, and for weeks a large body of men under the Dominion Fire Rangers were kept constantly fighting the fire with the result that only a small quantity of merchantable timber was destroyed. The Kootenay district seems to have suffered most heavily.

An important work to be done by the Dominion Government is the protection from fire of the large extent of northern forests, as settlement and railway construction extends into them.

Tree Planting.

The Dominion Government is continuing and extending the system of co-operation with the settlers in tree planting which was started in the year 1901. During the past season nearly two million trees were distributed to settlers on the bare prairie, and this spring (1906) a little over that number will be sent out, making a total distribution of about seven million trees, besides a considerable quantity of tree seeds.

The examination made by the inspectors last season showed that about 85% of all hitherto distributed were then growing.

In Ontario, in connection with the Agricultural College, preparations are being made for a supply of trees for distribution in that province, a nursery for that purpose having been established.

Forest Reserves.

An advance step which has been made in connection with the administration of the Dominion Forest Reserves is the commencement of a regular timber survey. The survey of the Turtle and Moose Mountain Reserves was completed and it is the intention to continue the work next season on the large reserve in the Riding Mountain. The value of such an examination will be to give data as to the quantities of dry and green timber on each reserve, the different species and the annual growth of each species.

Experiments are being made in Nova Scotia by private persons in the reseeding of burnt lands with spruce, the seed being imported from Germany. In one case a tract of ten thousand acres is being seeded.

Forestry Legislation.

In all the Provincial Legislatures advances in Forest legislation are being foreshadowed and it is expected that the present year will show considerable activity in this respect, both in the Dominion and the Provinces. The Forestry Convention has had a great stimulating effect in this respect.

Invitations have been received from British Columbia and from the Maritime Provinces for the holding of a Summer meeting of the Forestry Association. These invitations will be submitted.

The thanks of the Association are due to the press for valuable assistance, and to the railway companies for their kindness in granting single fares for this meeting.

Respectfully submitted.

A letter from Mr. R. H. Alexander, Secretary of the British Columbia Lumber and Shingle Manufacturers' Association, was submitted by the Secretary, conveying an invitation to the Forestry Association to meet in Vancouver in June.

A similar invitation for a meeting at Halifax, Nova Scotia, was received from Rev. A. E. Burke, and was also submitted to the meeting.

After some discussion it was decided that the invitation from British Columbia should be accepted, provided satisfactory rates could be arranged with the railway companies.

The following changes in the Constitution of the Association were passed:—

Clause 1, setting forth the objects of the Association was amended by adding the following sub-clause:

(6) To secure such forestry legislation from time to time from the Federal and Provincial governments as the general interests demand and the particular needs of the people seem to require.

The office of the Secretary-Treasurer was established, the editor of the official organ was added to the list of officers, and the number of the Board of Directors increased from seven to fifteen. The quorum of the Executive Committee was fixed at five.

The Forestry Journal was discussed and it was decided that as soon as possible it should be made a monthly publication and that, in view of the resignation of the present editor, a permanent editor should be appointed so soon as the funds of the Association will permit.

The election of officers resulted as follows:—

Patron, His Excellency the Governor General; Honorary President, the Right Honourable Sir Wilfrid Laurier; President, E. Stewart; Vice-President, H. M. Price; Secretary-Treasurer, R. H. Campbell; Assistant Secretary, Roland D. Craig; Board of Directors: J. R. Booth, Hiram Robinson, Monsignor J. C. K. Laflamme, Dr. Wm. Saunders, Hon. Sydney Fisher, Thos. Southworth, E. G. Joly de Lotbiniere, Hon. H. Bostock, Wm. Little, Hon. W. C. Edwards, Professor John Macoun, J. B. Miller, W. C. J. Hall, J. F. Ellis, Gordon C. Edwards.

At a subsequent meeting of the Executive Committee the following Vice-Presidents were appointed:

Ontario, Hon. Nelson Monteith; Quebec, Hon. A. Turgeon; New Brunswick, Hon. F. J. Sweeney; Nova Scotia, Hon. Arthur Drysdale; Prince Edward Island, Rev. A. E. Burke; Manitoba, Hon. J. H. Agnew; Saskatchewan, His Honour A. E. Forget; Alberta, Wm. Pearce; British Columbia, His Honour Sir Henri Joly de Lotbiniere; Keewatin, His Honour the Lieutenant Governor of Manitoba; Mackenzie, F. D. Wilson; Ungava, Peter MacKenzie, Hudson's Bay Co., Montreal; Yukon, W. W. B. McInnes, Commissioner.

A committee consisting of Messrs. E. Stewart, J. M. Macoun, Roland D. Craig and R. H. Campbell was appointed to supervise the editing of the Forestry Journal pending the appointment of an editor.

A resolution appreciative of the service rendered by Miss M. Robinson of the Forestry Branch to the Forestry Convention and the Forestry Association was passed.

1. Puba from back. Bush with clearing in front of Manager's and Laborers' houses.

2. Bridge over Swamp, made by Puba Natives under white supervision.

3. Hauling Timber to Waterway.

4. Collecting logs previous to putting them in the water, just outside the picture.

LOGGING IN SOUTHERN NIGERIA.

A. Harold Unwin, Assistant Conservator of Forests, Benin City, South Nigeria.

In a previous article * some account of the forestry and timber operations in West Africa was given. Logging in every country is a most fascinating work, both to take part in and to watch. In this tropical country the vegetation in the real forest belt is so dense that before actual felling operations can begin a large clearing is made near the river, which is to be used for floating logs. Here are native huts for the wood cutters, including a mat-roofed house for the white manager in charge. Such a view, with the typical "bush" in the background, is shewn in illustration number one.

It must be remembered, too, that in such a forest, only perhaps one tree in a hundred is a mahogany of mature growth, which makes it extremely difficult to control the varying felling parties, each under its native foreman. The trees having been felled, "roads" are made, i. e., the bush is cut up to 6 feet from the ground, and any very bad hollows filled in with small billets of wood. The whole gives the appearance of a large tunnel-like arbour. The swamps which occur at intervals have to be bridged by ramming in a number of small stakes and fastening with various vine stalks and crosspieces, making the whole a strong, though very elastic structure. Illustration number two shews one of these fully half a mile long. In crossing one, about a year ago, the writer saw a carrier go clean through, leaving his load, which he was carrying on his head, on the bridge. He was subsequently pulled out of the reeds and mud into which he had fallen.

In the ordinary bush, skids, made of small billets of very hard wood, are laid on the tracks already cut. Along these the logs are drawn by other gangs of natives. A log 4 feet square and, say, 12 feet long on an average, takes 70 or 80 "boys," as the haulers are termed, to drag it at all, and then only with pauses every now and then and continuous shouts from the foreman, and a kind of "song" from the men. When a log really gets stuck, and this is not seldom, levers are supplied at the back and a tremendous lot of "human" energy uselessly expended. It is very difficult to get natives to haul together. Illustration three, though a poser, shews this to advantage.

* Canadian Forestry Journal, Vol. I, pp. 173 - 175.

The ground, as is natural by its low elevation about the sea up to 200 feet, and with it a very thick layer of forest humus, is very soft, or other means of transport would be adopted. Then too, the trees are so isolated that a tramline or light railroad would not pay. In the near future, the Indian buffalo, or the indigenous elephant, it is to be hoped, will be harnessed and thus draw the 3, 4, 5, and even 6 ton logs. During a day (6 a.m. to 5 p.m.) a gang of natives manage to bring in up to 5 logs grown a distance of a mile to a mile and a half, very slow work to be sure. These are gradually collected at the waterside to be stamped before being put into the water. In the fourth picture we have such a scene, though the quantity of logs is by no means typical, as there are few there, compared to some shipping points where hundreds collect in a month. From this place they are sent down in small rafts of 5 or 10 logs, about 80 miles, where they can be made up into large rafts to go down to Koko Town, or Benin River, where the steamers pick them up before starting back on their 5,000 mile track to Great Britain.

It goes without saying that all this is very expensive, and works out at roughly 2 cents a foot, board measure, which is, of course, very high, even for Africa with its undeveloped roads. It shews again the great part which transport plays in the timber and logging industry. The freight from the West Coast to England at $6 a ton (recently reduced from $8 and $7 to this figure) is about the same as from similar distances from India, Siam or other countries, for the same class of material. Nevertheless, it amounts to roughly a cent a foot. Therefore, at a market price of, say 6 cents a foot, board measure, (an average rate for 1904) transport from the forest makes up half that. Government dues of all kinds, recently fixed at nearly $14 per ton, works out at 0.6 cts. per foot on average material, and at the price quoted form 1-10 of the cost, which is by no means high, compared to Algeria, India, Ceylon and Java. The price of the timber at 6 cts. a foot, c.i.f. Liverpool, is low, and the above rates become very favorable at a price of 12 cts. per foot, such as was obtained during 1902 and 1903.

NOVEMBER, 1905.

We are glad to see that the British Columbia government has made an appropriation, though only $5,000., for fighting forest fires during the ensuing year. For an adequate system of fire protection at least ten times that amount would be required, but as the value of the forests become more fully appreciated we may expect the provincial governments to make larger appropriations for their protection.

CANADIAN FORESTRY EDUCATION.

A. H. D. Ross, M.A., Yale Forest School.

The forest has been aptly described as "the balance-wheel of nature," and the farther we look into the matter the more firmly are we convinced that this is really the case. It is the most highly organized portion of the vegetable kingdom, and its effects upon its environment are extremely important and far-reaching. By a ruthless disturbance of the "balance-wheel," the once powerful Persian Empire has been reduced to a state of pauperism. The destruction of her forests was swiftly followed by the drying up of her streams, the disappearance of her fertile fields, and the shrinkage of her vast population to something less than eight millions of people. Syria, Spain, Turkey, parts of Italy and southern France also know, to their cost, what a disturbance of nature's balance-wheel means, and if we are wise in our day and generation we will heed the teachings of history and try to profit by the sad experience of these countries, and do our utmost to preserve the proper balance between our woodlands and the areas cleared for agricultural purposes.

In all parts of the world the forest was first valued as a harbor for game. Later it was regarded as an impediment to agricultural development and relentlessly slashed and burned to get it out of the way. As good timber became scarce it was exploited in the most ruthless manner and vast areas were rendered almost worthless for the production of further crops. Both in itself and in its far-reaching effects upon mankind the forest is marvellously complex and only the most highly civilized peoples have acquired a clear conception of its relation to the future welfare of the nation. By the decay of its resources a nation may cease to exist, and whilst debating over the best methods of disposing of its wealth it may even lose its capital without ever realizing the fact. Only slowly does it seem to dawn upon the public mind that the loss of our forests without adequate restoration will be the deadliest imaginable blow to our future progress and prosperity. It is high time that war should be waged against the useless destruction and needless waste of our forest wealth, and that provision should be made for future crops of trees. A prosperous nation cannot be built up in a desert, nor on the other hand can a people continue in power and influence when the territory from which they draw their substance shall have receded into barrenness. The standing of a nation is well

measured by the distance it is able to look ahead and make provision for the future, and in Canada the time seems to have arrived for a more systematic and scientific study of the conditions of reproduction and development of our forests, so that sufficient data may be available on which to base plans of management for the future. The attention of the world, and particularly of the great republic to the south of us, is being directed to our forests which are rich with a great variety of trees and constitute one of our most important sources of wealth. But it must be remembered that wood, in one form or another, is an absolute necessity in the present stage of our civilization, that our people use enormous quantities of it, and that during the twentieth century our population is almost certain to reach the eighty million mark. Hence, it will be seen that, even with our great forest areas (much of which is of inferior quality), we must adopt a more scientific method of management if we are to make anything like adequate provision for the home consumption, and leave a fair margin for export to other countries. It is only by a general and far-reaching system, based upon an adequate, scientific and practical grasp of the whole situation in all its aspects that our people can hope to avert the evils which have overtaken other lands as a result of the disappearance of their forests. Hence, there has arisen the necessity for a class of men with a training of a highly technical nature—men thoroughly grounded in the principles of silviculture, lumbering, milling, transportation, political economy, etc., and with a clear conception of the relations of things that at first sight do not seem to be related even in the remotest degree. In other words, Canada needs schools to train foresters to undertake the proper management of her vast forests, and to prevent their ruthless destruction by fire and axe.

To the objection that there is no room for trained foresters in Canada we would reply that, some thirty years ago when President Loudon and a few other far-sighted gentlemen advocated the establishment of an Engineering School in connection with Toronto University, they were told that there was no need for it, and that such a movement simply meant the stranding of a lot of young men at the end of their courses in engineering, without hope of employment. Fifteen years later when Professor Goodwin and others advocated the establishment of a School of Mining in connection with Queen's University, they were told the same thing, and to-day there are still plenty to tell us it is perfect madness to establish a Provincial School of Forestry in Ontario, in Quebec, in New B unswick, or anywhere else. The fact remains, however, that neither Toronto nor Queen's University can meet the demand for graduates from their technical schools. The training received in both institu-

tions is so thorough that it has created a demand for itself, and there is every reason to believe that the graduates of a first class Forestry School would be just as eagerly sought after as the graduates of our engineering and mining schools. The science of forestry includes both the theoretical and the applied portions of botany, ecology, physiography, dendrology, wood technology, silviculture, treatment of woodlands, seeding and planting, forest engineering and mapping, forest administration and law, forest protection, lumbering and transportation in all their complex relations, and forest hydrography. Whether such an extensive course of studies should be attempted in a four years' under-graduate course as it was at Cornell, and as both Queen's and Toronto Universities have proposed doing; or whether it should be made a post-graduate course for men who are university graduates in the natural sciences, as at Yale and Michigan Universities, will depend upon the degree of specialization we wish our foresters to attain.

A forester is not a mere botanist let loose to air his facts at the expense of others; neither is he a fire ranger, a lumberman, a sportsman, an arboriculturist, a dendrologist, a silviculturist, or any other ist. He must clearly understand all these phases of the question, and their relation to one another. He is constantly being called upon to deal with universal and economic questions of tremendous magnitude and importance. His profession touches life at many points, and he must of necessity be thoroughly well trained for his life work if he is to be of the highest service to the state. The state cannot afford to place such tremendously important questions as the Science of Forestry has constantly to deal with in the hands of a corps of inefficiently trained men. President Roosevelt says "The forestry problem is in many ways the most vital internal problem in the United States;" and Ex-President Cleveland says "Through the teachings of intelligent forestry it has been made plain that in our Western localities ruinous floods and exhausting droughts can be largely prevented, and productive moisture in useful degree at needed periods secured by a reasonable and discriminating preservation of our forest areas. The advocates of irrigation have been led to realize that it is useless to provide for the storage of water unless the sources of its supply (the forests) are protected; and all those who, in a disinterested way, have examined these questions concede that tree growth and natural soil on our watersheds are more valuable to the masses of our people than the foot-prints of sheep or cattle." From whatever point of view we approach the subject we cannot get away from the fact that the forestry question is one of national importance. The forester must possess a thorough knowledge of the life history of each kind of tree to be grown; the influences effecting its welfare; the methods employed in its management; the technical proper-

ties and uses of its wood, bark, gum, or other products; the removal, preparation and marketing of these products, and the various economies that may be gained by skilful operations. He must possess a knowledge of all that pertains to the growth and production of forest trees, and with this knowledge he must combine the further knowledge of how to manage a forest property so as to produce conditions that will result in the highest attainable revenue from the soil by wood-crops. His business is to grow crops of trees, AND MAKE THEM PAY. If he does not succeed in this, we are better without him. If he can succeed, and does succeed, then we should secure his services as soon as possible.

The idea that scientific foresters are purely theoretical, and of little or no use, is now pretty well exploded, even in America, and it will not be long before the science of forestry is recognized as a distinct profession here as in Europe, where much of the timber land is made to yield a yearly revenue of five dollars per acre, instead of being sold for taxes. The forester does not aim to oppose nature, but to assist her; to make use of the favourable conditions naturally existing in any given locality, and to hold in check the unfavourable ones. He exercises his skill in the selection of the most suitable species, and modifies their growth so that they will produce the most valuable timber in the shortest possible time without diminishing the value of the soil for the production of future crops. Just as the agriculturist is engaged in the production of food-crops, so the forester is engaged in the production of wood-crops. Both carry on their business for the practical purpose of a revenue; both must protect the crop from insect ravages, fungous diseases and fire; both must guard against the impoverishment of the soil, and constantly aim to increase its value. In each case the land is the principal capital, and any part of it either wholly non-productive or turned to a less profitable use than it might be represents so much wasted capital. Like other forms of capital, there is no reason why our forest wealth cannot be made to perpetually renew itself and yield ample interest from year to year without diminishing the original endowment. In addition to the growing of wood-crops for profit, the forester must consider the indirect effects of the forest on rainfall, the flow of streams, the growing of grain and fruit crops, and many other complex problems. He must cultivate a receptive attitude of mind, and endeavour to develop what may be best described as FACULTY—the rare gift of understanding the real relations of problems that at first sight do not seem to have any bearing whatever upon one another. Just as the science of botany deals with everything pertaining to vegetation, so the science of forestry has to do with everything connected with forests—EVERYTHING.

Like agriculture and mining, forestry has a scientific basis,

and when better understood will command equal attention and be recognized as a factor that enters largely into the more important economic questions of the day. Just as our agricultural colleges and experimental farms require a large number of professional men with superior technical training to teach the principles of agriculture and investigate the new problems that are constantly coming forward for solution, and just as our mining schools and our Geological Survey Department need highly trained specialists to teach us how to develop our mineral wealth, so our forestry schools and our Bureau of Forestry will be expected to employ highly trained specialists for the teaching of the principles of forestry and the investigation of its complex problems. Twenty years ago the science of forestry was regarded as an abstract and debatable theory, and all knowledge of it was confined to a few scientific experts and enthusiasts whose views were regarded as of doubtful value. To-day the most intelligent and public-spirited members of the community regard the treatment of our forest resources as a vital and urgent economic problem, and there seems to be widespread recognition of the fact that the preservation of a due proportion of the land in forest for all time is the only possible means of securing either agricultural fertility or a lasting supply of timber. The whole question is an exceedingly complex and difficult one, and calls preeminently for the exercise of the providential functions of the state to counteract the destructive tendencies of private exploitation. The state being an institution for the purpose of insuring not only our present, but our future and continued welfare must, necessarily, take an interest in the permanence of the natural resources upon which its welfare rests.

Inasmuch as the time required for a crop of trees to reach the most profitable age for cutting is so long that very few private owners can afford to adopt this branch of farming on a large scale, it can best be conducted by the state—by the people as a whole, and for the benefit of all. The experience of centuries goes to show that while the individual makes the best farmer, the state makes the better forester, and usually the only safe and good forester. This being the case it seems to be the plain duty of our legislators to make adequate provision for the training of an efficient corps of men with the technical training necessary for the proper management of our magnificent forests. Under rational management their producing capacity can be increased manifold, and a handsome revenue obtained from them. No other economic problem confronting our legislators is equal in importance to that offered by the present condition and future fate of our forests. The opportune time seems to have arrived when effective public interest in forestry education and forest preservation should be persistently aroused and stimulated.

LETTER FROM MR. LOUIS MILLER.

The following letter from Mr. Louis Miller, of Crieff, Scotland, submitted by Mr. F. C. Whitman, President of the Western Nova Scotia Lumbermen's Association, at the Forestry Convention, contains a criticism of Canadian lumbering methods which is frank, if not complimentary, and also shows that private enterprise is active in Nova Scotia in efforts to remedy the effects of deforestation. Mr. Miller expresses his thanks for the new Forest Fire Act, providing for a fire ranging system which has been passed in Nova Scotia and continues:

Unfortunately, however, the whole of Nova Scotia has not adopted that fire bill, but only certain portions of it, and I wish you could use your influence with the authorities to get it adopted by the whole of Nova Scotia. For instance, I have a property of about 100,000 acres of forest lands at Ingramport, at the head of St. Margaret's Bay, and the district of Nova Scotia, in which that property is situated, has not adopted the fire bill, and as I am practically a stranger in Nova Scotia and only come across for a month or two in summer, I don't know the parties to whom to apply, or I would urge them to get the whole of Nova Scotia to adopt that fire bill.

About two years ago we had a serious forest fire at Ingramport, caused by some fishermen coming out from Halifax—some of the officers of the garrison regiment there—to fish in the lakes on our property, with the result that they set fire to the forest and burnt up about 10,000 acres.

When a forest fire takes place in Nova Scotia, or any part of Canada, a crop of bushes and hardwood comes up afterwards, and the burnt ground is entirely lost for twenty or thirty years, for it is only after that time that the natural crop of spruce trees begins to come up.

I have had large experience in Sweden during the past 25 years, and I have been all over Finland and Russia. The accessible Russian forests are practically all exhausted, while those of Finland and Sweden are very nearly the same. During the past few years the Swedish people have taken alarm and started a Government system of planting over the country, which is the cheapest and probably the best I have yet come across. In Scotland it costs £2 per acre to plant young trees. In Sweden, however, they plant the seed. Wherever a forest has been destroyed by fire, or has been cut down, the Government employs a forester with about a dozen or twenty boys. The boys are

One year after planting at the Forest Nursery Station, Indian Head.

Cedar Forest along the Columbia River, B.C.

placed in a row about six feet apart, each with a small hand-iron; they take out a small hole in the ground, drop four or five seeds in it, tramp on it with the foot, and pass on, taking out holes in this way from three to six feet apart. One pound of seed plants about five acres and the seed costs one shilling per pound. In this way the Swedish forests are replanted at a cost of about 25 cents per acre. Seed thus planted grows up immediately, and I have seen Swedish forests planted a few years ago now with a young crop of trees a few feet high.

When I got the 10,000 acres burnt in Nova Scotia, I took out a ton of spruce seed from England to plant up that burnt ground, but was very much astonished to find I was charged 20% duty for importing it to Nova Scotia. I remonstrated with the Ottawa authorities, who compromised the matter by reducing the duty to 10%. I think, however, it is short-sighted policy on the part of the Canadian Government to levy a duty upon seed imported for planting up waste ground in Canada. For example, I reckon that an average acre of forest in Nova Scotia or Canada contains about 6,000 feet of timber, and the cost of cutting down, manufacturing and putting f.o.b. 1,000 feet of lumber is about $10.; so that on every acre of forest property cut down, about $60. has to be expended in wages disbursed in the country and which benefits the people of the country. It is therefore of very great importance to Canada to have its waste ground covered with forest, instead of lying barren, because it means employment for the people and benefit all round. I am planting up that 10,000 acres of burnt land on my property by employing about a dozen boys and doing it on the Swedish system. One man goes behind them to keep them in a straight line. A boy, as a rule, can in this way plant about five acres per day. By planting up this 10,000 acres of burnt land with spruce seed I expect in five years to have the whole ground covered with a crop of young spruce trees three to four feet high, which in 25 years, will be suitable for making pulp, and this instead of having the ground lying waste for 20 or 30 years growing hardwood bushes.

I also took over a small quantity of larch seed which I wish to experiment with on my property, but the Nova Scotia soil is suitable for spruce, and except for experimental purposes, the crop planted should be spruce.

Forest management in Nova Scotia and Canada is about the worst anywhere. In fact, there is practically none at all, and I don't think any of the Canadian or Nova Scotia lumbermen know anything at all about their forests. Some of the chief of them with whom I have conversed have never seen their forests, or at least only to a very limited extent. During the past five years I have had many forests in Nova Scotia, New Brunswick and Quebec examined with the view to purchase, only to find

the bulk of them terribly mismanaged and destroyed. I have reason to believe that the same state of matters exists everywhere in Eastern Canada, and that the forests there are much more exhausted than the Government or the people who own them themselves believe. In fact, I don't know where to find a really good forest to purchase in any part of Canada or Nova Scotia; they have all been cut down recklessly without any system at all. The easiest and best of the trees have been cut, the root cuts taken off for logs, and the great big tops allowed to lie in the forest. In fact, the forests have just been wasted and destroyed, and the Canadian Government will have to waken up immediately ere it is too late. All over Quebec and New Brunswick the big trees have been exhausted, and if the Government were to insist upon their conditions being adhered to and only those trees cut of stipulated size according to law, three-fourths of the Quebec and New Brunswick mills would have to close, because they are at present fed with under-sized trees, which, according to Canadian laws, are being illegally cut.

The Canadian Government should send young men to Germany for a year or two's study of forestry and forestry laws adopted there, their system being perhaps the best at present in existence. I think, however, that the Swedish system would be far cheaper and more suitable for Canada than probably the German system. The Germans have cheap labour and they can afford to plant young trees, but labour is dear in Canada, and the Swedish system, if adopted, would, I think, be more suitable for Canada and Nova Scotia, because it would be cheaper and could be done on a much larger scale. The German forestry laws compel proprietors to replant the ground and not to allow it to lie waste.

In fifteen years the pine in the Southern States of the United States will be exhausted; the United States will then be in desperation for lumber and will have to get its supply from Canada or the Pacific Coast. Canada will not be able to give the United States half the supply it requires, because Canada has destroyed and exhausted its accessible forests much more than people have any conception of, and the sooner Canada sets about preserving and protecting its forests and replanting the burnt ground, the better it will be for the future of the country.

I have been through the Northwest of Canada as far as the Pacific Coast, all through Manitoba on to Vancouver, and am of the opinion that Canada requires all its Eastern forests to supply the plains of Manitoba and the Northwest with the necessary lumber, during the next twenty to thirty years. I have been all over Quebec and New Brunswick, and everywhere I have gone to examine forests, I have found them depleted and exhausted, and especially in Quebec, no sooner is a forest cut down than a

fire sweeps up everything remaining; the damage by fire there is something enormous and a system of replanting the burnt ground should be immediately adopted all over Canada.

My experience of Nova Scotia is that an average or fairly good forest will give a growth of about 5% per annum—in other words, I reckon our property at Ingramport, Nova Scotia, to contain about 6,000 feet per acre of growing trees on an average over the whole ground. I don't mean 6,000 feet of big trees ready for cutting, but of all sizes of trees from perhaps the thickness of your arm upwards. On 100,000 acres this means 600 million feet, 5% growth on which would be something like 30 million feet per annum. Of course, the small trees are growing even more rapidly than the big ones. If any one were to cut down the big trees on this ground, there would not probably be more than half this quantity available of big timber suitable for deals, but the small growing timber is, in my opinion, quite as valuable as the big timber, because it is growing rapidly every year, and it takes the place of the big timber. Of course, lumbermen ignore the future, and look only to where they can get sufficient big trees every year as big as possible to feed their mills, and in a matter of five to ten years Nova Scotia will be practically exhausted, except a very few properties. The same remarks apply to Eastern Canada. Of course, there are large forests away north from Lake St. John and north in the direction of Hudson's Bay, but they are inaccessible, and the cost of getting them out is far too great at present, and what we have to deal with are the Eastern Canadian forests already opened up, and which, in my opinion, will be exhausted in ten to fifteen years unless some system is adopted by the Government of replanting on an extensive scale, and the only way to do that properly is to send men to Germany to study the German methods and also to study the system of planting adopted in Sweden and to have a system introduced into Canada which will benefit a future generation as well as the country.

On the 10,000 acres of burnt ground on my property, I have cut down all the trees, large and small, and have made the burnt trees into lumber to get the ground properly cleared up so that I can replant it immediately, and during the past two years I have been occupied at that. By the end of next year I hope to be finished with it, and then I propose to thin out the forest systematically year by year, as we do in Sweden, that is, to take a certain section of the forest each year and cut out the big trees carefully and to branch out these big trees to three or four inches at the small end, so that the branches may fall down on the ground and disappear quickly, and to log out these trees to about five or six inches at the top end and clear up the forest properly, instead of the system at present in vogue of cutting down a big tree and only taking off a root log and allowing 30 or 40 or 50 feet of the top

part of the tree to lie in a great big bunch with the branches all on it, which just means a temptation for a big forest fire, and a great waste of lumber. By taking say a certain section each year of 1,000 acres or more and thinning out the big trees, and cutting over the whole forest in this way, systematically, as we do in Sweden, the result is that in 20 years the forest that has previously been cut over and which has had the light let into it, is in a better condition than ever.

The big Swedish sawmill owners, as a rule, own sufficient forests to feed their mills for the future by cutting only what they estimate to be the yearly growth, and by going through the forest systematically section by section every 20 years or so and thinning out the big trees only in such a careful way that the forest is not destroyed and that fire is not encouraged. If the same system could be adopted in Canada it would be a great future boon to the country.

Norway and Sweden have practically for the past fifty to sixty years supplied the world with lumber, but now their forests are practically exhausted and their production will go down rapidly in the future, and the demand upon Canadian forests, both for Great Britain and the United States, will, in the future, be greater than ever. No system has been adopted by the Canadians of protecting and replenishing their forests for the future, and the result will be that the Canadian forests in ten or fifteen years will be entirely depleted and exhausted, unless the Government immediately wakens up.

That Newfoundland is becoming interested in the preservation of her forests is shown by the following extract from the speech from the throne delivered recently:

"Fully apprehending the importance of our forest's wealth and its relation to the fisheries and other industries, my ministers have decided to create additional forest reserves, and while permitting legitimate lumbering operations in such localities as may seem expedient, to prevent the erection of sawmills upon such lands as are reserved in the public interest. A Bill dealing with this matter will be submitted for your consideration."

HOW SHALL FORESTS BE TAXED?*

EXTRACTS FROM A PAPER READ BEFORE THE SOCIETY OF AMERICAN FORESTERS BY ALFRED GASKILL, FOREST INSPECTOR, UNITED STATES FOREST SERVICE.

The question of how forest lands should be taxed is a most important one, and while the systems of forest taxation in the United States are in some respects very different from our own, just as our systems vary in the several provinces, the general principles underlying the systems of the two countries are nearly enough alike to make these extracts from Mr. Gaskill's paper of interest to Canadians. That inequitable taxation is responsible for much forest destruction is the claim made in the first part of the paper and all the extracts here given deal with this aspect of the question.

"No other question concerning the woodlands of the country, save that of fires is so important, and we shall make little substantial progress in the effort to induce private owners to maintain their forests until the present condition shall have been relieved and the forests be so rated that they shall bear no more than their fair share of the cost of government . . . . In all the older states, those wherein lumbering has greatly enhanced timber values, the tax levied upon standing timber is often a warning to the owner that he must cut it or run the risk of great loss, and when he has cut it the bare land is taxed so high that he is forced to abandon it.

"A few attempts to correct the evil, through partial exemption, rebates or bounties have been made. But, though such measures may serve for a beginning, the real need is for laws that, recognizing the public utility of forests, adjust the necessary tax levies to the facts and conditions that govern tree growth, and to the long periods of time that are required to produce timber.

"In general, it is assumed that taxes are imposed for the protection of persons and property, as well as for public necessities, yet rarely is the obligation extended to woodlands. The forest is not only allowed to go unguarded, but everyone may tramp and camp therein and do almost what harm he will. The common law and statutes relating to forest depredations are notoriously disregarded, and, though the conditions in some parts of the country have been bettered of late years, private forest and public suffers much damage from careless and malicious sojourners.

* See paper on "Woodland Taxation" by Dr. J. F. Clarke in "Canadian Forestry Journal" for October, 1905.

"Under the common practice of intrusting to local officers the levying of taxes upon real estate, forests are assessed, almost without exception, on the basis of agricultural land; that is, the land is estimated to have a certain value if cleared, and the standing timber is worth so much more, or is viewed as an incumbrance. The latter case is by no means rare in hardwood sections. In many instances, perhaps in most, the assessment is fair so far as the value of the property is concerned. In many others it is far too high, because the land is not fit for farming, and therefore valueless, except to grow trees. At the same time, the timber often has only a potential value, since it can not be marketed for want of roads or some other temporary unreadiness. The argument is entirely apart from the admitted inability of many of the assessors to truly value woodlands, and who therefore resort to guessing, and from the quite general belief that in cases where the owner is a corporation or a non-resident with no local interests, the property may be taxed to the limit. These things are not to be avoided under any system. In short, whether the assessment be made fairly or unfairly, the forest is considered a form of property which should be realized on at the earliest possible moment and the more it can be made to yield to the county, prior to its extinction, the better for the county.

"One can easily understand the temptation that confronts the assessors in regions where everything is wanted—roads, schools, public buildings—to use the taxing power for present advantage, yet instances are plenty of communities established on the returns from forest property and utterly abandoned as soon as the original timber was all cut. The few farms that had been taken could not keep up the roads and other public works.

"But the wisdom or unwisdom of raising a revenue once for all upon forests is only a small part of the question. The forest land is not farm land uncleared, and a forest is not the crop of a season. The problem concerns itself chiefly with those areas which in their nature are fit only for tree growth, and with a crop representing the accumulated investment of the owner for as many years as were required to bring the trees to maturity. If a man buy a mature forest, he acquires the investment of another; if he plants or waits for a natural one to grow, he gets no return for many years. In either case, his forest serves the public by providing a common necessity—wood—and by the beneficent influences that it gives freely.

"These considerations make it apparent that the forests occupy, or should occupy, a separate place on the tax list; that they need to be treated differently from farms and town lots and mines. In fact, it will be necessary to show that growing trees should be considered personal property, not real estate, as they are now by practice or by law in virtually every state in the Union.

FOREST FIRES IN BRITISH COLUMBIA.

Mr. J. R. Anderson, Deputy Minister of Agriculture for British Columbia, has again furnished the Association with a detailed report on the fires that occurred in British Columbia last season, with a partial estimate of the value of the forests destroyed. Though the season was very dry in some parts of the province, the destruction of forests by fire was, on the whole, not great when the great extent of the province is taken into consideration. Railway locomotives are a constant menace to the forests through which they pass and as there is apparently some difficulty in punishing the offenders under the Act now in force, it is hoped that it will be so amended that railway companies may be compelled to take better precautions and be made liable for the full amount of the loss caused by the negligence of their servants.

The comparatively small number of fires last season was due in part to a better observance of the Bush Fire notices posted everywhere. These notices have made everyone familiar with the laws relative to forest fires and prospectors and miners, as well as ranchers and settlers, are acquiring the habit of putting out their camp fires, instead of leaving them to smoulder. More care is also taken by those clearing up land to prevent fire from spreading to the adjoining forest. The preventive measures taken by fire wardens and their promptness in dealing with fires have done much to restrict the loss from this cause.

There are few seasons in which there is not a considerable destruction of valuable forest by fire on Vancouver Island, but 1905 was a notable exception. In Cumberland District there were no fires, the greater care taken by settlers and the heavy rains of July and September being the cause. In Cowichan the only fire reported was a small one up the Koksilah River, on the lands of the Victoria Lumber Manufacturing Co. The fires in this district are as a rule attributed to prospectors. The agent at Alberni, where there were no fires, thinks that the best preventive measure is to warn the public just before and during the dry season. In Alberni District East, which includes all that portion of the district lying east of the head of Cameron Lake, as well as Lasqueti and Texada islands, there were no fires. The agent says: "This portion of the district has been entirely free from bush fires this season and as the Bush Fire notices were posted up all over the district before the dry weather set in, I think it has had the effect of making campers and others more careful in

setting out fires." The agent for Nanaimo District gives the same reason for there being no fires there. In the Newcastle District there was but one fire which was about 12 miles back of Ladysmith. It burned over a part of the ground that had been logged by the Victoria Lumber Co. in 1904, but it did little or no damage to standing timber.

On the mainland there were many fires in some districts, but none that destroyed a very wide extent of forest. For the Grand Forks District the agent reports: "Forest fires prevailed mostly in the latter part of July and up to the rainy weather in the beginning of September; they were not so destructive as those of the previous year on account of the breaks formed by the fires of the year before. The timber destroyed was mostly young, and consequently of small size. The most frequent origin of fires in this locality was the engines of the various railway lines, and as under the Act of last year there seems to be a difficulty in bringing a railway company to book they go merrily on with their destruction. Some of the fires were started by the Kootenay Power linemen, but after they had been given to understand that they would get into trouble, that source ceased. The estimate of loss by fires might be placed at about $5,000."

In the Greenwood District, the first serious fire seemed to start in the Boundary Creek Valley near Anaconda. A few men were employed to prevent it from spreading, and at the same time protect the wagon-road bridges and culverts. In this they were to some extent successful, but soon a number of other fires were noticed in the mountains which quickly spread over a large area—about 10 square miles—which was particularly dry, owing to a long, hot summer and lack of rain. The police endeavored to trace the origin of the fires, but were unsuccessful.

The exceptional heat and dryness of the summer was generally thought to be the cause of the unusual number of forest fires in the Kootenay District where they caused more damage than for several years past. As the greater portion of the district is unsettled, it is impossible to arrive at any accurate estimate of the loss of timber, though it must have been considerable. Fires caused the destruction of government roads and bridges in this district to the extent of $3,000. The efforts of the fire warden doubtless reduced the threatened fire losses. A system of supervision is recommended by the agent which will permit of officers getting early to the fire, and it is suggested that provincial police officers be authorized to make expenditures up to $25, without waiting for special authority.

There were a good many small fires in the Okanagan District, but only one—near Peachland—that caused much destruction. In most cases the causes of their origin were investigated by the police, and there were several prosecutions. The agent there

reports a marked improvement in public sentiment in recent years, regarding the prevention of fires and thinks that the best preventive measure is a full investigation of the cause of every fire reported and the prosecution of the offenders when detected.

In the Upper Fraser country there were few fires, and none of them very destructive. The summer was unusually dry and warm in the Barkerville District, though almost continuous rains prevailed in the Clinton District. In the lower part of the Barkerville District, along the Fraser River, a fire started in July and ran a few miles through a sparsely wooded country, but was extinguished by the settlers before much damage had been done. About the same time a fire started in the Quesnel Section of the same district, a short distance from the town of Quesnel Forks, but was quickly got under control by the prompt action of the government agent at that place who engaged a number of men to fight the fire, which was put out with but trifling loss. About Lillooet there were three or four bush fires which covered an area of but a few acres. The rainfall was heavy and frequent.

Although the early part of the summer was one of the hottest and driest on record in the Nicola District, the destruction of forest by fire was very small. The agent reports that recent years show that increased care is being taken to extinguish fires.

The only fire near Port Simpson was one in the neighborhood of Lorne Creek, which was started by lightning. The area burned consisted mainly of small spruce, birch and poplar, of little or no commercial value.

All the government agents were asked to state the causes of fires, so far as known, and to suggest remedies. Their replies are naturally somewhat similar and only a few of them have been quoted in the preceding paragraphs. The agent at Nicola makes a suggestion that seems well worth acting upon. It is that a special effort should be made to interest the Indians in forest preservation. A circular addressed to all the chiefs could not fail to cause the matter to be discussed in their councils and if in the different sections one reliable Indian, at least, were appointed with instructions to act promptly when a fire started and even given some authority to take preventive action much loss might be avoided. Ignorance and carelessness on the part of the Indians doubtless cause many fires, but it should not be very difficult to teach him to be more careful.

*SCOPE AND USE OF ARBOR DAY.

SUGGESTIONS FOR MAKING THE PLANTING OF TREES BY SCHOOL CHILDREN AN EXERCISE IN FOREST WORK.

Arbor Day was instituted in Nebraska in 1872 by Hon. J. Sterling Morton, afterwards Secretary of Agriculture, and has since made its way from State to State until provision for its observance exists in almost every State and Territory.

The central idea of Arbor Day is the intelligent and appreciative planting of trees by school children. The planting is usually accompanied by exercises, which are intended to impress upon the children the beauty and usefulness of trees and thus to lend to the work the value of a bit of nature study. Arbor Day has undoubtedly done much to inculcate a love of trees, and has given added impetus to the general movement for the better knowledge and the wiser use of forests.

Yet there is no question that Arbor Day can be made more practical than it has been; that it can be brought into closer touch with forestry by being made the opportunity for carrying out simple steps in forest work. The permanent results of Arbor Day from the standpoint of successful planting have frequently been disappointing. Too often species entirely unsuited for either economic or ornamental planting have been used. Still more common causes of failure have been the lack of sufficient care in doing the work, and neglect of the trees after they are planted. In this way much of the educational value of the work is lost. By leaving the trees unprotected from animals, insects, and other destructive agencies the intended good example is turned, for want of a little care, into a negative one.

But even when the planting has been well conceived and wisely carried out, there is often lacking, in work of this nature, all reference to the larger aspect of forest planting. The ultimate aim of the day might well be to prompt and encourage not so much a sentiment for trees as a sentiment for the forest. Yet the practice has been to plant individual trees rather than groves, and the relation of the single tree to the forest has not been pointed out. Talks on Arbor Day have not dwelt enough upon the economic side of forestry, or have tended to give a wrong impression of the whole subject by lamenting all cutting of trees.

* U. S. Dept. of Agriculture, Forest Service Press Bulletin, No. 123.

The effect of this has been actually opposed to the forester's teachings.

Arbor Day is the time for disseminating sound, practical knowledge regarding forestry in its broader aspect. The mere act of setting a few trees, without reference to the commercial utility and the protective value of forests, is but a small part of the work of the day.

The proper season for planting is not everywhere the same. South of the thirty-seventh parallel, especially in the more humid regions, fall planting is perhaps preferable, but north of this the winter comes on so quickly that the trees have scarcely time to develop roots strong enough to support them until spring, and spring planting is therefore more advisable. The right time to plant in spring is when the ground has ceased to freeze and before budding begins. Evergreens may be planted somewhat later than hardwoods. The day to plant is almost as important as the season. Sunny, windy weather is very unfavorable; cool, damp days are the best. For this reason it is well to leave the date for Arbor Day unfixed, so that the best opportunity may be chosen. Such exercises as are desired can follow when the planting is done.

The careful selection of trees for a specific use and situation is essential to success, and proper planting is equally important. Though less fastidious than agricultural crops in their demands upon the soil, trees can not be set in a rough soil at random and then expected to flourish. They should be planted without allowing their roots time to dry out from exposure to the air. When delay between procuring the trees and their planting cannot be avoided, the roots must be kept moist by standing them in a "puddle" made of earth and water mixed to the consistency of cream, or "heeled-in" by nearly burying them in fresh earth. In setting the trees it is important to place them about three inches deeper than they stood originally, and to spread out the roots and pack the soil firmly about them. Two inches of soil at the top should be left very loose, to act as a mulch to retain the moisture.

Large trees are by no means always the best to plant. Small seedlings may be secured easily and cheaply, and are much more likely to live. If these are set out in good numbers after the pattern of a commercial plantation they will become in due time a true forest on a small scale.

If only a few trees are planted, as is usually the case, it is still possible to make plain the true relation of such work to forestry. No matter how few the trees, they may be made to illustrate planting for commercial or protective use.

The scope of Arbor Day planting may be sometimes broadened by securing permission from some public-spirited citizen or

nearby farmer for the children to plant a small block of trees on his land. This could be made a practical demonstration of how such work is done on a large scale.

Outside the scope of the actual planting, it is well to bear in mind that Arbor Day is not the only day on which trees deserve the intelligent thought of the children. They need care throughout the season. Watching the plantation thrive under right treatment greatly adds to the educational value of the work, which otherwise leaves but a slight impression.

It is all-important that the plantation should became a model of what can be done along these lines. In after years the children should be able to point with satisfaction to the work of their school days.

A bill of great importance to the forest interests of New Brunswick was introduced by Hon. Mr. Tweedie, which provides for the appointment of a sub-committee of the Executive Council to act with the Surveyor-General in the carrying out of the provisions of the act and authorizes them to employ the necessary number of competent men who will be charged with the following duties:—

(a) To make a complete survey of the Crown timber lands of the Province and to divide the same into districts.

(b) To classify such lands and make a thorough and exhaustive report on the same.

(d) To describe as minutely as possible the character, quality, rate of growth and accessibility of the timber in each district.

(c) To distinguish lands fit for agriculture from forest lands and to subdivide the former into one hundred acre lots.

(e) To report on the value of timber lands now under license.

The Lieutenant-Governor in Council is authorized to reserve from settlement or from license Crown timber lands at or near the head waters of rivers to such an extent as may be deemed advisable to preserve and protect the water supply, and to make regulations against forest fires and for the general administration of the Crown timber lands.

The bill also authorizes the Lieutenant-Governor in Council to make regulations governing the charges of boom companies for log driving.

THE WESTERN HORTICULTURAL SOCIETY ENDORSES WORK OF FORESTRY CONVENTION.

The Secretary of the Western Horticultural Society has forwarded from Winnipeg a copy of the resolutions passed at the recent convention of the Society. The members of the Canadian Forestry Association will be delighted to know of the great interest taken in the west in everything pertaining to the preservation of forest lands.

The resolutions are:—

"RESOLVED, that the Western Horticultural Society, having more than 200 members resident throughout the three central provinces of Central Western Canada, in annual convention assembled, heartily endorses the action of the Premier of Canada in calling the recent Forestry Convention at Ottawa, and that this Society is in full accord with the resolutions passed at said convention, and

"RESOLVED, that in the opinion of this Society, the forest reserves now existing in Western Canada by order-in-council should be immediately made permanent by legislation, and that the most stringent regulations be enforced to protect these reserves from fire, including the acquirement of the right of any settlers therein, where their presence may endanger forests, and

"RESOLVED, that in view of the rapid settlement of the country, an immediate topographical survey should be made of the forest areas bordering on or situated within the prairie districts with a view to setting aside further forest areas as permanent reserves, and

"RESOLVED, that in view of the great destruction caused to the forest areas dotting the prairie districts in many parts of the country by prairie fire, that any restrictions upon the railways looking to the prevention of fires caused by locomotives, etc., should be made to apply to the prairie country also, so far as it is within the jurisdiction of the federal authorities. The destruction of timber within the prairie country by fires has been proportionately as great as in the wood districts of the eastern provinces, as witness the enormous destruction wrought in the Turtle and Moose mountains and other timber areas within the prairie area. An effort should be made to restore and maintain these forests, even to the extent, if necessary, of acquiring the rights of settlers therein, and

"RESOLVED, that this Society hears with pleasure of the reported acquirement by the Federal Government, of railway woodlands in Northern Manitoba, with the object of conserving our valuable northern forests. Large areas of these northern forests should undoubtedly be maintained for all time as forest reserves, and

"RESOLVED, that this Society endorses the plan of tree distribution in the west as carried out by the Department of Interior and would advise a continuation of the same within reasonable limits as to the varieties distributed, so as to cause as little injury as possible to our important home nursery interest, an interest which has done a great work in encouraging horticulture and forestry throughout our prairie regions; also, that special attention be given to the planting of trees on government lands in the prairie provinces which are not suited for general settlement."

The past month has been unusually dry and warm in the Northwestern Provinces and as a result the Dominion Forest Fire Rangers were called out earlier than usual.

Reports received at the Forestry Office, in Ottawa, record numerous fires as having been started. Generally, they have originated on the prairie, but in some cases have, notwithstanding the efforts of the rangers, assisted by the settlers, spread into the timber. In the southern part of the Spruce Woods Forest Reserve, in Manitoba, it is feared considerable damage has been done to the young timber and in the foot-hills of the Rocky Mountains along the valley of the Red Deer River a large fire was fought for a week. Something like six miles of trench was dug, from which back firing was done, making a fire break around the timbers. Notwithstanding this, a strong wind sprang up and the fire leaped over this guard, got into the timber and destroyed a small sawmill which was operating there. It was feared that another larger mill with some 400,000 feet of lumber would also be destroyed, but was saved by very hard and continuous work. It is to be hoped that the dry and warm weather that has prevailed in Alberta and Saskatchewan ever since the spring set in may soon change or serious consequences will result, both to those interested in the forests and in agriculture.

We notice a very strong popular demand for government control of water powers. If we wish to protect the power for the use of the people, we shall have to start at the source and withhold from private control the watersheds from which the supply of water comes.

Aspen and Birch on the Turtle Mountain Forest Reserve.

TURTLE MOUNTAIN FOREST RESERVE.

ROLAND D. CRAIG, F.E.

During the past summer the Forestry Branch made an examination of the Turtle Mountain Forest Reserve in southern Manitoba, with a view to obtaining definite information as to the condition of the present stand, the possibilities of timber production and the steps necessary for the protection of the forests growing thereon.

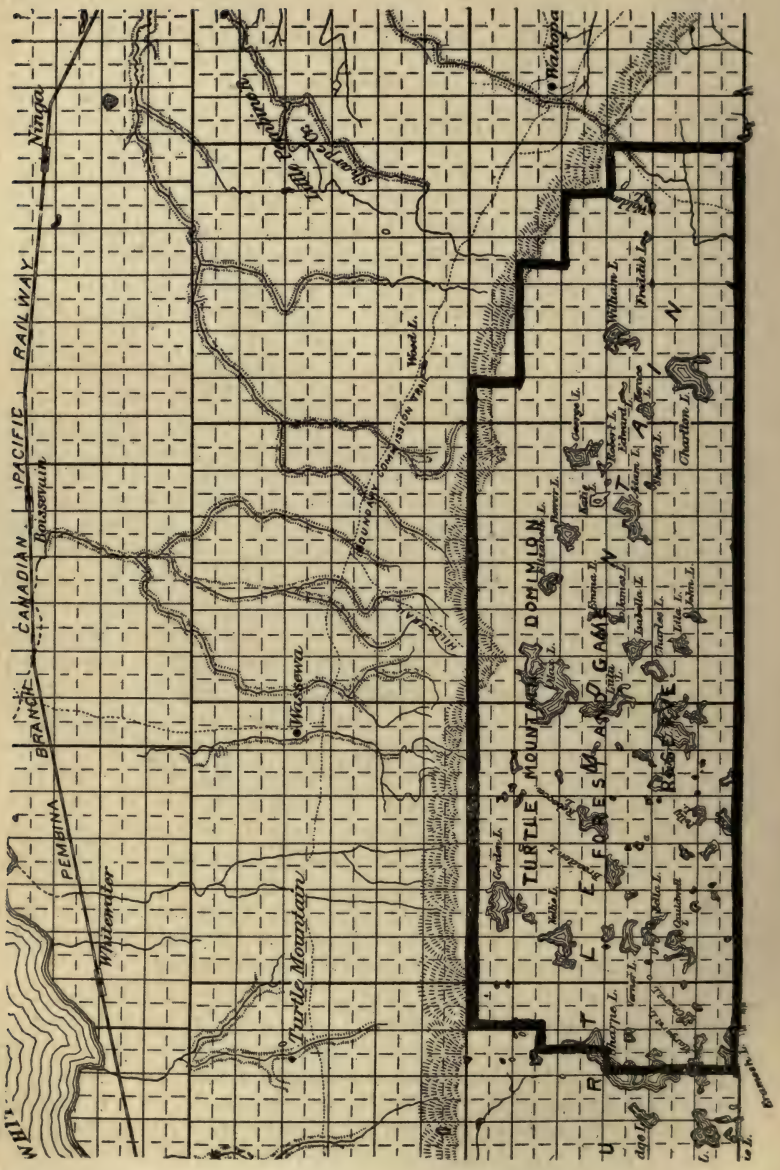
The Reserve covers 69,920 acres of rough, hilly, and sloughy country in Township 1, Ranges 19, 20, 21 and 22, and as is almost always the case in the middle West where there are hills or water you will find timber, as a result of these natural fire breaks protecting the trees from the fires which sweep over the prairie. The general elevation is only 300 to 500 feet above the surrounding prairie. Lakes and sloughs cover about 15,000 acres, leaving 55,000 acres of timber producing land. As a glance at the accompanying map will show, the country to the north and east is watered by many streams which rise in these hills. Some of these form the head-waters of the Pembina and Whitemud rivers, but a number of others lose themselves on the prairie.

The mature stand is composed of aspen, 43%; balm of Gilead, 14%; white birch, 21%; scrub oak, 9%; ash, 8%; elm, 5% and an occasional Manitoba maple. There was originally a much larger proportion of oak, but the demand for oak logs and posts has been so great that now very little remains.

Since the advent of the settler fires have been so frequent and so destructive that now only 1,600 acres remain uninjured; on 6,400 acres the forest has been partially destroyed and the remainder is devoid of large timber, but is covered with a dense reproduction which if protected from further fires will in a few years produce even a better stand than the original.

Several small sawmills have in the past operated in these forests, but at present only one is left and it takes only a small number of logs for a very limited local trade. The day of the log buildings is past in that region, so that now the main uses of the reserve are to supply fuel and fence material, to protect the watershed, to harbor game, to serve as a pleasure and health resort, and for its general ameliorating effect upon the climate.

Farmers living within a radius of 50 miles come to the Reserve every year for their supplies of wood and during the last


CANADIAN PACIFIC RAILWAY
BRANCH
PEMBINA
Whitewater
Turtle Mountain
Rossburn
Minnedosa
Shell River
Birch River
Wood L.
Riding Mountain
Waterhen
Duck Mountain
TURTLE MOUNTAIN FOREST RESERVE
DOMINION
Crescent L.
Clear L.
Moon L.
Star L.
Spruce L.
Pine L.
Maple L.
Birch L.
Oak L.
Elm L.
Ash L.
Poplar L.
Willow L.
Cedar L.
Hickory L.
Walnut L.
Chestnut L.
Beech L.
Hazel L.
Ironwood L.
Basswood L.
Tamarack L.
Spruce L.
Pine L.
Maple L.
Birch L.
Oak L.
Elm L.
Ash L.
Poplar L.
Willow L.
Cedar L.
Hickory L.
Walnut L.
Chestnut L.
Beech L.
Hazel L.
Ironwood L.
Basswood L.
Tamarack L.

Measuring the rate of growth of Aspen in the Turtle Mountain Forest Reserve.

three years an average of 425 permits have annually been granted to settlers, who have taken out 4,900 cords of fuel, 25,000 b. ft. of logs, 3,350 fence posts, 715 roof poles and 200 fence rails. As private land outside the Reserve becomes cleared and the population increases, the demand on the Reserve timber will become greater.

The present stand contains approximately 75,000 cords of green wood and 60,000 cords of dry wood, fit for fuel. About 1,333,000 b. ft. of saw material could be cut from the green wood. Though the amount of mature timber is small, there is a most excellent reproduction throughout the Reserve, which, from the standpoint of the forester, is the most important part of the stand. On account of their ability to throw up suckers, the aspen and balm reproduce more readily than the other species and form respectively 69% and 12% of the reproduction.

From the data collected this summer the following table gives a conservative estimate of what may be expected from the dense stands of reproduction now one to twenty years old.

Age	No. trees per acre	Av. dia. Bh. inches	Av. height feet	Av. volume cubic feet	Yield per acre-cords
10	4,000	1.5	13.5	.1	4
20	2,500	3.2	28.0	.8	22
30	1,200	4.7	38.0	2.4	32
40	850	6.0	46.5	4.3	41
50	625	7.2	51.0	6.8	47
60	425	8.7	54.0	11.1	52
70	335	10.1	56.5	14.0	55
80	300	11.1	58.0	17.4	58

With a rotation of forty to fifty years, which would be sufficient for fuel production, an annual cut of one cord per acre or 55,000 cords could be made without reducing the capital stock. This amount would supply a farming area of over 2,000 square miles with fuel and fence material.

This supply of wood in the midst of a bare prairie country is of great value to the settlers and there is no reason why, if protected from fire and indiscriminate cutting, there should not be sufficient timber produced on the area now reserved to supply the local demand for all time to come.

In a plan of fire protection the first requisite is a system of trails which will enable the ranger to thoroughly patrol the Reserve and to quickly get to a fire. At present the greater part of the Reserve is inaccessible in summer. These trails will also act as fire guards and will often prevent the spread of fires before they reach large dimensions. Outfits of fire fighting tools should be kept at two or three convenient places ready for use. It is

impossible for a single ranger to notice every fire when it first starts, for he may be in a distant part of the Reserve, but there are along the edge of the bush farmers who could be appointed fire guardians, and whose duty it would be to report fires to the ranger as soon as noticed, and to take such steps as are necessary to put them out. Three or four of such men would greatly assist the ranger in protecting the forests. The fire guardians and the ranger should be supplied with telephone communication with Boissevain, the nearest town, so that fires can be promptly reported and assistance procured if necessary. By comparing the direction of the smoke from the various stations a fire could be readily located.

Placing the value of the wood at the low figure of $1.00 per cord, the annual revenue of the Reserve would be $55,000.00, which justifies considerable expenditure for protecting and improvement. There is no reason now when the pioneer days of the country are past that the farmers should not pay for their wood, at least enough to make the Reserve self-sustaining. In this way the expense of administration would be borne by those who are benefited by it and they would be more directly interested in having the forests protected.

There are within the Reserve a number of squatters who settled there in direct defiance of government orders, and have therefore no rights beyond those of any law breaker. These men are a constant menace to the forest, directly by the fires which they frequently set and by grazing large numbers of cattle in the young forests, and indirectly by encouraging trespass. There should be as little delay as possible in removing these objectionable and dangerous settlers.

As a summer resort, the Turtle Mountains are becoming very attractive, and as the timber grows the beauty of the country will greatly increase. Picturesque lakes abound, and in some of them there is good pickerel fishing. On the United States side bass have been introduced with good success, and the example is worthy of imitation. Large game is not plentiful, but there are some jumping deer which, if protected, would soon increase in numbers.

This Reserve, though not large, is of immense value to the surrounding country, and as the land is not at all suitable for agriculture it should on no account be opened for settlement, or the timber allowed to be destroyed.

NOTES.

The "Indian Forester" has for its leading article in a recent issue an editorial on "Forestry in Canada" in which the work of the Forestry Department and Forestry Association is written of in terms of the highest praise. The tone of the article may be judged from its opening paragraph:

"Among the British Dependencies which are now paying serious attention to the future adequate protection of their forests, Canada may be said to take a foremost rank. For many years the destruction of the vast forests existing in the colony had been carried on unchecked and this reckless overcutting has within the last few years attracted the attention of all thoughtful statesmen and others interested in the future well-being of the Dominion. It became increasingly obvious that if some steps were not taken to put a stop to the existing state of affairs irreparable damage would result, both climatically and financially, to the country. Opinions were also freely stated in the home markets that it would be but a matter of a few years for the supply of Canadian-grown timber to give out, even in spite of the fact that 75% of the Dominion is under forest. This being the state of affairs the forestry movement will be welcomed alike by statesman, financier and merchant."

The Minister of the Interior has introduced an important Bill in the Commons which, if passed, will set aside some seventy Forest and Game Reserves on Dominion Lands within the Provinces of Manitoba, Saskatchewan and Alberta and in the Railway Belt in British Columbia.

The lands proposed to be set aside are *non*-agricultural but suited for a permanent production of timber. They are situated at the sources of water supply so necessary in every district but especially so in a country like our prairie provinces where the precipitation is scant and where under the most favorable conditions summer droughts are always feared.

It is not the intention to prohibit the cutting of mature timber on these reserves but rather to place these to their highest use for the production of timber and with this object in view a rational system of cutting will have to be enforced and care taken that fire does not follow such cutting as has been the general rule in the cut over lumber districts in the past. Prospecting and mining will be allowed under special regulations.

Grazing will be permitted only to such an extent as not to interfere with the growth of the young trees.

Regulations will be enforced to protect the animals, birds and fish on the reserves.

A meeting of the Executive Committee of the Canadian Forestry Association was held on the 27th of April to consider the summer meeting and the appointment of an editor for the Forestry Journal. As the Committee were not in a position to make the appointment of a permanent editor, Mr. J. M. Macoun was appointed temporarily, and the editorial committee, previously elected, were continued as an advisory committee.

It was decided that, although final word as to rates had not been received from the railway companies, sufficient information was available to justify confirming the acceptance of the invitation of the British Columbia Lumbermen's Association for a summer meeting in Vancouver, in September. Messrs. E. G. Joly de Lotbiniere, Thos. Southworth, Gordon C. Edwards, Revd. A. E. Burke, G. Spring-Rice, Roland D. Craig and R. H. Campbell, were appointed a committee to carry out the arrangements.

One of the most beautiful of our forest trees is the Tulip-tree (*Liriodendron tulipifera*) which is found growing wild in many places in southwestern Ontario. Its name is derived from its large tulip-like flowers and wherever it grows it is real addition to the beauty of the region and has besides great economic value. It is not probable that the Tulip-tree can be successfully grown north and east of Kingston but anywhere between Kingston and Detroit and on almost any kind of soil it should thrive. Propagation should be entirely by seeds and these should be sown thickly in a bed of light, rich, sandy soil. Of the possibility and uses of this tree "Forestry and Irrigation" says:

"For shade and ornament the Tulip-tree possesses great merit and is deserving of very general propagation. * * * Forest planting of the Tulip-tree for economic purposes has never been attempted, but judging from the form and rate of growth of the natural forest-grown tree, and the value of the wood, few trees would be more profitable for such a purpose."

Mr. E. Stewart, Dominion Superintendent of Forestry will leave for the west about the middle of May.

It is Mr. Stewart's intention to visit a considerable portion of the afforested area of the western provinces before returning and he will probably make a trip down the Mackenzie river.

HISTORY OF THE LUMBER INDUSTRY OF AMERICA.*

"To the memory of men of brain and brawn who hewed out of the forests of the New World room for Civilization, and to the men of to-day who are making the American Lumber Industry an agent of commercial progress at home and abroad, this work is dedicated."

It is now pretty well understood by all students of the subject that the success of a nation in almost any part of the world depends upon the maintenance of a due proportion of forest, for the forest not merely distributes water in the soil, but regulates the precipitation which is necessary for the proper cleansing of the atmosphere. More than this, modern industries depend, to a far greater extent than has hitherto been generally understood, upon a due supply of timber for the thousand and one uses to which wood is put by civilized man. In a word, the life of a nation is largely the life of its forests. Yet, strangely enough, this fact has never been sufficiently recognized by the historian, and the consequence is that those who seek to follow the life history of many nations are reduced to collating the gossip of the court or the official records of battles when, in fact, the real sources of the actions which they record lie far back in the treatment by the people of their forests and forest wealth. The cutting off of the forest has turned many a place into a desert, making it necessary for its inhabitants to move on and possess the land of some less wasteful people, and so have come those intrigues and wars the minutiæ of which are so faithfully recorded by the writers of history. It seems strange that the original facts have been so generally omitted by the historians that it is almost impossible—even in the case of those nations whose rise and subsequent downfall have clearly followed the wilful waste and afterwards woeful want of their forests—to trace back to their cause even effects so marked and, in the end, so disastrous. Even in America, whose chief attraction from its earliest settlement has been its forest resources, the historian seems not only to have failed to collect material easily available, but to have been almost wholly blind to the importance of such facts as were easily within his reach.

Fortunately for those who are to come after us and who will seek to understand our actions, as we seek to trace out the causes

*The History of the Lumber Industry of America, by James Elliott Defabaugh, Editor of the American Lumberman. Vol. 1, Chicago, the American Lumberman.

of the actions of those who preceded us, the widespread interest in forestry promises to repair this neglect in very large measure. One of the most striking evidences of this movement is the first of a series of four large and handsome volumes on "The History of the Lumber Industry in America," which is just now claiming the attention of the public. This history, which promises to be an indispensable work of reference for those interested in the subject, as well as a most interesting account of the facts, is the work of Mr. James Elliott Defebaugh, editor of the American Lumberman. The work is published by the American Lumberman in Chicago. Volume I, which is now before us, contains 559 large octavo pages. The matter is divided into 31 chapters. After an excellent account of the discovery and early settlement of America in which the attractions to settlers held out by the forest are clearly shown, the author goes on with an account of North American forest geography. This chapter is especially valuable. It gives an account of the timbered area, with some consideration of the influence of climate upon forests and vice versa, and closes with a cyclopedic list of the commercial tree species of America. This latter portion of the chapter, which must depend for its value upon its perfect accuracy is based upon Mr. Charles S. Sargent's work, "The Sylva of North America," and is illuminated with foot notes giving quotations from that work on all points likely to arouse questions or require elucidation. Following this comes a portion of the work which will be of special interest to Canadians. About 135 pages, divided into three chapters are taken up with an account of the forest resources and lumber history of Newfoundland and Eastern Canada. One chapter is devoted to Labrador and Newfoundland. In the account of the latter is given a list of the principal trees found on the island and a brief history of the lumbering business leading up to the Harmsworth concession of which so much has recently been written. A brief summary of the Crown lands timber regulations is also given.

The first chapter, relating to Canada, is devoted to the commercial forests of this country. The omission from this portion of the work of any account of the great Pacific Coast forests of Canada and the industries which have been founded upon them, which omission naturally challenges the attention of the intelligent reader, is explained by a paragraph in which the author says that this 'will be reserved for detailed treatment in connection with the history of the lumber industry of the Pacific coast of the U. S. with which it is closely connected and which have been developed together.' Bare mention is made of the forests of the Canadian Northwest, although the author speaks of a practically continuous forest of sub-arctic species and characteristics, as existing to the north. It is to be hoped that in subsequent volumes the facts concerning this vast forest, which is becoming

better known every day, will be summarized. In the chapter under discussion the general accounts of Canada's forest resources, such as those made by Mr. Stewart, superintendent of Forestry for the Dominion are drawn up so that the reader is given a general idea of the wealth of Canada in this respect. Closing this chapter the author says:

"These speculations are extremely general, but they serve the purpose of pointing out that Canada is enormously rich in timber and the possibilities of long continued production are almost incalculable."

A valuable chapter on the forestry and forest reserves of Canada then follow. This gives an idea of the general trend of the legal conservation of Canada's forest resources. The records of the Canadian Forestry Association have evidently been liberally drawn on for this chapter, and, as near as we can judge, the facts and figures accurately state the position up to the time at which the writing of this volume must have ceased. Concerning the Dominion Forestry Association, the author cites one fact which, as this great work will probably be the standard for many years to come, is worthy of note as giving credit where credit is due. The author says that "to Mr. E. Stewart, superintendent of Forestry, more than to any one man is due the credit of the formation of the Dominion Forestry Association, for it was he who, on February 15th, 1900, called the meeting at which the organization was recommended, and as a result of which the organization was effected on March 8th, 1900, in the city of Ottawa."

The summary of Canadian Forest Reserves shows a grand total of 18,760,000 acres, and an addendum refers to and describes the Nepigon forest reserve of 4, 578,560 acres and the more recent Gaspesian reserve of about 1,600,000 acres under the Provincial Government of Quebec. In the chapter entitled, 'Canada—Production and Trade' the census figures of 1901 in relation to forest products are summarized, as well as many other tables of products, exports and imports, showing the greatness of Canada's trade in these lines. A special chapter is devoted to the cooperage stock industry of Canada which affords opportunity for summarizing the history of a most interesting trade which, to a far greater extent than many think has affected the progress and development of Canada.

Each of the Eastern Provinces of Canada is dealt with separately, a vast deal of information being summarized concerning its forest area and products, the laws governing the exploitation of the forest, the history of lumbering and even the personnel of the trade. As affording a means of comparing the present with the past, the account of Canadian lumbering conditions closes with a summary of a careful article published in 1874, showing the state of the industry at that time.

About half of the present volume is devoted to the history of the lumber industry of the United States. A feature of the first chapter is a table which, though it covers less than a single page, gives a mass of information of immense statistical value. It shows the wooded area of each state, originally, and in 1905, in comparison with its total land area. According to this, the present wooded area of the U. S. is 1,040,450 square miles, or 35 per cent. of the whole. The States vary in wooded area from Alabama, 72 per cent., to Nebraska, 2.9 per cent. The different wooded areas, as well as the changes that have taken place in the course of industrial development are described so as to form an excellent basis for the work that is to follow. The next chapter deals with the U. S. public land policy, which leads up to a consideration of forestry and forest reserves—a most interesting subject—and to tariff legislation, lumber production and foreign trade, each of these great subjects being handled in a separate and voluminous chapter.

Author and publisher alike are to be congratulated upon the design of this work and upon the splendid way in which that design has been carried out thus far. The work is one which must have a large sale not only among those engaged in the trade, but among the students of economics everywhere.

A recently enacted bill in Iowa does away with a long-standing grievance, and ought to do much to encourage the planting of forest and fruit trees in that State. It provides that on any tract of land in the State of Iowa the owner may select a permanent forest reservation not less than two acres in continuous area, or a fruit tree reservation not less than one, nor more than five, acres in area, or both, and that upon compliance with the provisions of this act such owner or owners shall be entitled to an assessment on a taxable valuation at the rate of one dollar per acre for the land.

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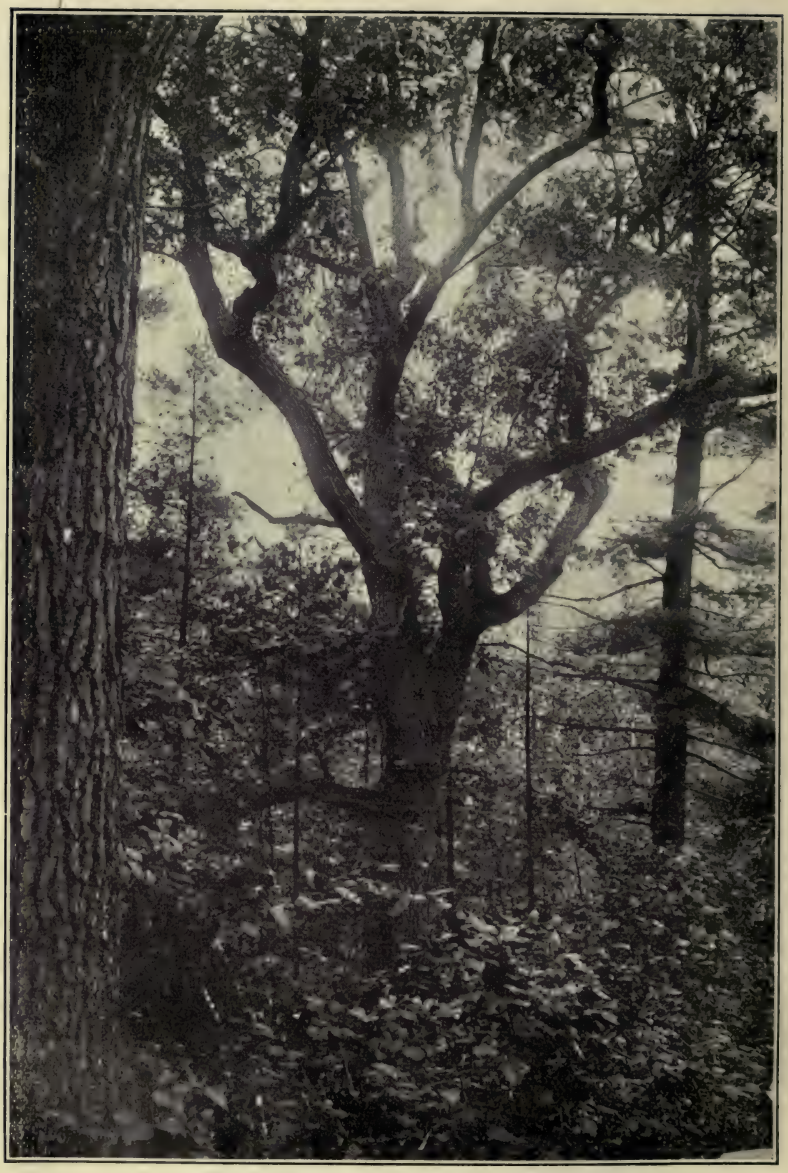

Frontispiece.

No. 1—A White Oak Weed.

Canadian Forestry Journal.

Vol. II. August, 1906. No. 3.

CANADIAN FORESTRY CONVENTION.

Vancouver, B.C., 25th, 26th and 27th September, 1906.

On the invitation of the British Columbia Lumber and Shingle Manufacturers' Association, a meeting of the Canadian Forestry Association will be held at Vancouver, B.C., on the 25th, 26th and 27th September next. This invitation was submitted to the Canadian Forestry Association at its Annual Meeting held in March last, and it was then decided that the invitation should be accepted. The British Columbia Lumbermen's Association is making every preparation to welcome the delegates to the meeting and to make their visit as pleasant and interesting as possible. This is the first meeting of the Forestry Association to be held in British Columbia, and it is particularly desirable that a large number should attend from the Eastern Provinces to show their interest in forestry and their appreciation of the kindness of the British Columbia Lumbermen's Association.

A splendid opportunity will be given to see the forests of British Columbia, and the scenery, both of coast and mountain, which is unrivalled in the world. As the Exhibition at New Westminster will be held in the following week there will be an opportunity for seeing a collection of the best products of the Province. This Exhibition is specially noted for the exhibits of fruit and live stock in addition to the products of the mine and the forest.

His Excellency, Earl Grey, Governor-General of the Dominion, has kindly accepted an invitation to and will open the Convention.

Eastern Provinces.

The Railway Companies have granted only the usual summer tourist rate for this Convention for points east of British Columbia. Particulars as to rates may be obtained from local ticket offices.

Tickets may be purchased any time up to the 15th September but for Winnipeg and points west, may be used up to the date of the Convention. The final return limit is 31st October. Stop-over privileges will be granted both going and returning at points west of Winnipeg. All tickets must be executed for return passage at destination by joint agent, for which a fee of fifty cents will be charged. Tickets to other coast points than Vancouver are sold at the same rates, and it would be well for those attending the Forestry Convention to secure tickets through to Victoria.

British Columbia.

The usual convention arrangements have been granted for points in the Province of British Columbia.

Delegates must purchase first-class full rate (not temporarily reduced) one way tickets to place of meeting (or, to nearest junction station, if through tickets cannot be obtained) and obtain certificates to that effect on Standard Certificate form. Ticket Agents are supplied with Standard Certificates and are instructed to issue them on application.

Where delegates have to travel over more than one railway to reach place of meeting, they will require to purchase tickets and obtain certificates as above from each railway unless otherwise arranged for, and the issue of through tickets authorized.

The Secretary of the Convention is required to certify on each Standard Certificate, over his personal signature, that the person named on the certificate attended the convention, and to state thereon the actual number of delegates who paid railway fare coming to the Convention and who hold Standard Certificates to that effect.

On surrender of Standard Certificates, properly filled and executed, to Ticket Agent at the place where the Convention is held (or at the nearest junction if tickets for the going journey were purchased to it) at least ten minutes prior to time train is due to leave, continuous passage tickets (not good to stop over) for the return trip will be issued, at rates set forth below, on the conditions of the certificate and by the same route as on the going trip.

Rates will be as follows:

If one hundred (100) or more delegates hold Standard Certificates, correctly filled in and certified as directed, they will be returned to their original starting point free.

If twenty-five (25) delegates hold Standard Certificates, correctly filled in as directed, they will be returned to their original starting point at one-third of the one way first-class fare (not temporarily reduced).

If twenty-four (24) or less delegates hold Standard Certificates, correctly filled in and certified as directed, they will be returned to their original starting point at two-thirds the one way first-class fare.

CERTIFICATES WILL NOT BE HONORED.

1. If ticket for going trip is purchased more than three (3) days (Sundays excluded) before the date of the opening of the Convention.

2. Unless ticket for going trip is purchased within three days prior to the Convention (Sundays excluded) or during the continuance of the meeting.

3. If not signed at the meeting by the authorized Secretary whose signature appears below.

4. Unless surrendered to Ticket Agent, and ticket for return trip purchased within three days (Sundays excluded) after the adjournment of the Convention.

5. Unless presented to the Ticket Agent not less than ten minutes before train is due to leave.

No certificates except of the standard form (procured from railway agent when purchasing ticket) will be honored.

The Programme in outline is as follows:—

TUESDAY, 25TH SEPTEMBER, 1906.

Arrival and reception of visiting members of the Canadian Forestry Association.

Inspection of Lumber and Shingle Mills.

8.30 p.m.—Public Reception to His Excellency the Governor-General.

WEDNESDAY, 26TH SEPTEMBER, 1906.

10 a.m.—Opening of the Convention;
Preliminary business;
Addresses, papers, &c.

2 p.m.—Addresses, papers, &c.

9 p.m.—Banquet.

THURSDAY, 27TH SEPTEMBER, 1906.

10 a.m.—Addresses, papers, &c.

2 p.m.—Addresses, papers, &c.

Papers and addresses will be given by R. H. Alexander, Secretary of the British Columbia Lumber and Shingle Manufacturers' Association; F. W. Jones, President of the British

Columbia Mountain Lumbermen's Association; E. Stewart, President of the Canadian Forestry Association and Dominion Superintendent of Forestry; Overton W. Price, Assistant Forester for the United States; Dr. Judson F. Clark, Forester for the Province of Ontario; Roland D. Craig, Inspector of Dominion Forest Reserves.

The Secretary will be pleased to furnish any further particulars as far as possible.

The Canadian Pacific Railway Co. has begun tree planting on quite an extensive scale along its western lines. A contract has been let for a small acreage of breaking near Wolseley on which it is the intention to experiment with tamarack for ties. A piece of ground is also to be planted at Medicine Hat with jack pine and tamarack for the same purpose. Over 100 miles of trees are to be planted between Winnipeg and Calgary, for snow breaks, and at several stations trees are to be planted around the station grounds, and prizes are to be offered the section foremen who make the best showing. This work, if carried on successfully, ought to encourage tree planting among the farmers of the west.

The area set aside for forest reserve purposes has more than doubled in the United States since 1904. In that year it comprised less than 50,000,000 acres, while now more than 100,000,000 acres are reserved. In some states the exemption of large areas from taxation means in the future a serious loss of revenue to the counties in which the reserves are situated. In order to remedy what seemed to be an injustice the Forest Service submitted a Bill to Congress to grant 10 per cent. of the total receipts from forest reserves to the counties in which they are situated. These receipts for the year ending June 30th were $767,219.96, and they are expected to increase immensely from year to year. The 10 per cent. contributed to the county funds is safe-guarded in the act by a provision that it must be spent entirely for the maintanence of schools and public roads.

THE TIMBER PIRATE.

The article of Senator Edwards, published elsewhere in this issue, covers completely the important subject with which it deals—the destruction of valuable timber as a result of the operations of those who make a pretence of settling lands in timbered areas. The matter is mentioned here not in the hope that we can add anything to what Senator Edwards has said, but with the object of urging every reader of the *Forestry Journal* to use his influence to bring about a better public policy than that which now prevails. Opinions may differ as to the best method of accomplishing this reform, but, if the people insist that the question shall not be shelved until reform has actually been accomplished, our legislators will certainly solve the problem satisfactorily.

The fact that, in certain portions of the Dominion, the fire-ranger system has greatly reduced the forest waste is no reason why efforts to make a clear distinction between the real settler and the timber pirate disguised as a settler should be relaxed. This pretended settlement is a cause of steady loss and a constant menace to the most valuable forests we have. The unavoidable dangers are bad enough; but this worst one of all can be removed if the people of Canada will realize the startling fact that the same men who are robbing them of little patches of timber have endangered and are still by their very presence endangering millions upon millions of public forest property.

The incorporation of the Northern New York Forestry Association last June is evidence of the rapidly growing interest that is being taken in the preservation of the forest and in the replanting of waste lands. The chief object of the organization is to collect and distribute information on these points. The Association will make a special study of the best means of removing the mature timber from the forest without injury to the younger trees and will oppose the policy of those who advocate the leaving large forest areas untouched. Many lumbermen and operators took a prominent part in the organization of the Association.

THE UNIVERSITY BILL.

One of the most important bills passed by the Ontario Legislature at its last session was the University Bill. Last October a Royal Commission on the University of Toronto was appointed and after a thorough investigation of the needs of the University a report was issued in time for the Government to act while Parliament was in session. The members of the Commission were Messrs. J. W. Flavelle (Chairman), Goldwin Smith, W. R. Meredith, B. E. Walker, H. J. Cody, D. Bruce Macdonald and A. H. U. Colquhoun (Secretary). The work of the Commission was so satisfactory that all but one of its recommendations were adopted by the government and embodied in the University Bill. This recommendation referred to an endowment in land. The Commission wrote: "By the settlement of the Provincial boundary we have obtained control of what is called New Ontario. It does not, therefore, seem unreasonable to express the hope that out of this enormous area at least a million acres will be set aside for the University and University College."

In introducing the University Bill, Premier Whitney said that the matter of land endowment was reserved for further consideration, and that inasmuch as the Government had recently been getting back some lands from the railways, it might be that they would have some lands for the University. He further said that he thought the Government was not prepared to deal with the matter at the present session or words to that effect.

The importance of such an endowment is so great that in our opinion the future of Forestry in Canada depends in no small degree upon the decision that is finally come to by the Ontario Government. We publish elsewhere the recommendations of the Commission relative to instruction in forestry. These recommendations were adopted by the Government and a school of Forestry will be established in connection with the University.

Instruction in forestry must be practical and experimental as well as theoretical. There must be forest lands upon which cutting may be begun at once in order that the earliest students may receive all the benefits to be derived from a course in forestry, and there must be other lands upon which experiments running over long periods of years may be made. These lands should comprise large areas in different parts of the province so that in addition to serving their main purpose they would prove an object lesson to lumbermen and others holding timber lands in their vicinity. If the recommendation of the Commis-

sion be acted upon and a million acres of government land be set aside as a university endowment, half the amount might be made up of virgin forest and half of lumbered and burned over lands. The virgin forest should include pine, spruce and hardwood lands. The lands that have been lumbered or burned over would afford ample opportunity for experimental work. For immediate practical results virgin forest is essential. The appalling waste, the reckless disregard of future needs which characterize most, if not all, forest operations in Canada, will continue until practical demonstration can be made on a large scale of the cutting and selling of the forest crop under conditions which would ensure the perpetuity of the forest and at the same time yield the full value of the trees cut. Such demonstration could be made every year by those who were responsible for the administration of the endowment lands, the amount of timber cut depending of course upon the needs of the University. In other words an endowment of virgin forest lands would make a large and annually increasing revenue available from the first.

Of almost equal importance with the endowment itself is the tenure under which the lands might be held by the Board of Governors of the University. If the public interests were safeguarded in such a way as to make it impossible for the Board of Governors, or those acting for them, to permanently injure the forest while realizing on the standing timber, the lands might be given to the University outright, but in any case no satisfactory results could be hoped for under a grant of less than fifty years. A lease for one hundred years would be better, with provision for renewal if all the conditions under which the grant was made had been lived up to. If it were provided that all proposed sales of timber should be approved by the Lieutenant Governor-in-Council and that after a careful estimate of the growing timber no more should be cut each year than would be replaced by the annual growth, the management of the land might safely be left to the Board of Governors, the greater part of the administrative work falling, of course, to its Forest Department.

Good results cannot be expected of any school of forestry which has not under its control forest lands upon which practical work can be carried on and the most practical side of forestry in a new country like Canada is not re-forestation but conservation. To cut the trees that may be marketed with profit, to market them to the best advantage, and to preserve the young standing timber should be the chief work of those who have the management of large forest areas. Should the University Board of Governors be given control of the lands they have asked for, the work of their Forest Department would be of inestimable value to the government departments administering forest lands, not in Ontario alone, but in every part of the Dominion.

SO-CALLED SETTLEMENT IN FOREST AREAS.

BY HON. W. C. EDWARDS.

There is little that is new to be said upon the subject of the injury done to our forests by the system, or lack of system, which allows people, under pretence of making and carrying on farms, to endanger an immense wealth of standing timber. The evil has been exposed again and again, and every day brings new illustrations of the loss to the public to which it gives rise. It is evident, however, that the public have not yet learned the lesson—though they have paid dearly for the schooling—and it is necessary to take every opportunity to make known the facts in order that they may help to create a public opinion which will compel the adoption of a wise policy.

It is necessary to make it plain, first of all, that no complaint is made concerning the bona fide settlers on land fairly suitable for agriculture. The man who makes and carries on a farm is a useful man, and room and opportunity must be provided for him. Even though a genuine settler may occasionally start a forest fire which will destroy far more than that settler's own value to the community, it is not fair to consider the matter in that light. On the whole, the settlement of good agricultural lands, even in timbered areas, is valuable work for the country, and unavoidable accidents, or even ordinary display of human heedlessness, must be allowed for in connection with the work. That which is to be condemned is the mere pretence of settlement, which goes on as a means of plundering the public timber wealth of the country. In districts quite unfit for agriculture men will take up land under the pretence of settlement. They comply with the necessary forms, hold the land long enough to sell the timber upon it, and then abandon their "farms." The few acres on which such a man pretends to settle may be surrounded to the depth of miles with standing timber which either belongs to the public or in which the public has a direct financial interest because royalty must be paid upon every foot of it that is made into lumber. Being a plunderer who merely assumes the disguise of a settler this man has no interest in the immensely valuable timber by which he is surrounded. If, by carelessness in carrying on his own petty and illegitimate operations, he should start a fire which destroys thousands or millions of dollars' worth of timber, he loses nothing, nor can he be punished in any way unless the fact can be established that the disaster was directly due to his wilful or

negligent action—a danger which is practically non-existent, for proof in such cases is impossible.

It is a fact which has often been stated, and is now pretty well accepted by those who have made even a cursory study of the subject, that, for every tree which has been cut down by the lumberman and manufactured into articles of commercial value, at least twenty trees have been destroyed by bush fires—absolutely wasted. I speak with confidence on this subject so far as the forests of Eastern Canada are concerned, and I believe that those familiar with conditions in the great forests of the West will agree that the proportion of waste that I have given holds for that portion of the country also. The loss to the country in this way is beyond all calculation. There is no more saddening example in our country of needless waste than this destruction by fire of immense tracts of timber which, if now standing, would form one of our most valuable assets.

The public formerly regarded forest fires as natural phenomena or as visitations of an inscrutable Providence. But, just as it has been learned that epidemics of disease are due to human ignorance or carelessness, and can be prevented, so it is now pretty generally understood that forest fires, as a rule, have their origin, not in natural and ungovernable causes, but in the heedlessness or negligence of men. And, of all those who are guilty on this count, the worst by far is the man who makes pretence of settling as a farmer on land which should be continued in forest growth. In 1904 I made the formal and deliberate statement to the Quebec Commission on Colonization, that, in my opinion, at least ninety per cent. of the forest destruction in Ontario and Quebec had been due to settlers setting fires for the purpose of clearing the land. I have not changed that opinion nor do I see how one can reach any other conclusion who has had means of estimating what fearful destruction even one careless person can cause. I quoted to the Quebec Commission one case within my own knowledge, the destruction of a large portion of the most valuable pinery on the River Eagle, a branch of the Gatineau, by a settler clearing land for a potato field. It would be laughable, if it were not so sad, to think that, while the settler raised a crop worth, perhaps, $5.00, the public suffered a loss of at least $1,000,000. This is not an isolated instance, even in the amount of waste, for equally destructive fires, arising from the same cause, are known in many portions of Eastern Canada.

There is a way to clear land by burning without destroying the country. By setting the fire in proper relation to the direction of the wind, carefully watching the fires set, and taking other simple precautions, fire can be restricted within any desired area. The bona fide settler, the man who is really making

a home for himself and his family and who looks forward to spending a lifetime of growing prosperity in the home he is creating, is ready to take these precautions, for they are all in his own interest. But the so-called settler who has taken up a little patch of land merely that he may rob the country of the timber that stands upon it, is in a hurry to realize his gains, and expects to abandon the place as soon as he has done so; consequently, he has no more regard for the rights and interests of others than has any other pirate.

It is very satisfactory to be able to state that the fire-ranger system adopted by the Provinces of Ontario and Quebec is greatly reducing the destruction caused by forest fires. As that system is more fully established and covers a wider range of territory its beneficial results become more apparent. Countless acts of carelessness on the part of settlers, prospectors, sportsmen and others, which, in former days, would have resulted in widespread fires, are prevented or their injurious results checked in good time. The constant increase, in recent years, in the value of standing timber, means that the saving due to careful supervision is greater than it would have been in former times when a great portion of the timbered area had little or no value, owing to lack of facilities for bringing the product to market.

On the other hand, this increase in value means that there is all the greater inducement to the so-called settler to carry on his nefarious schemes. There is a tendency also to systematize this form of robbery, certain parties keeping as their employees or retainers a number of men who make a practice of securing timber lands by this illegitimate means of pretended settlement. The more valuable the standing timber becomes, the greater is the inducement to schemers of all kinds to find means of capturing the timber on the public domain without rendering an equivalent to the public either in money or in service. This means that the law should be made more and more stringent—on the simple principle that the more valuable the thing to be guarded, the more careful should be the watch that is maintained.

The public would be more alive to the importance of this matter, I believe, were it not for an indefinite opinion—but one strongly held—in the minds of many people that our timber resources are "inexhaustible." With the keeping down of fires and the improved methods of taking off the crop, I believe it is possible to go on cutting spruce in our eastern forests for an indefinite time. But the same is not true of our pine, the crop upon which our calculations of forest wealth in the past have mainly been based. The pine tree does not grow so large or yield such good timber in the northern country as it does in the region where the most extensive lumbering

operations are now carried on. This means that our pine supply is by no means "inexhaustible," as so many are apt to think. At the rate at which destruction now goes on, the pine of eastern Canada will, in time, follow the pine of Michigan, which as many will remember, was spoken of as "inexhaustible" not so very many years ago. The more the waste by fire is prevented the better chance we shall have to keep our spruce as a perpetual source of revenue and to prolong the returns from our pine. And, if fires are to be prevented, it is not enough to maintain a fire-ranging system to put out fires,—the man who most frequently starts the fires, the pretended settler, must be eliminated.

Though I have dwelt upon the saving of the standing timber, that is not, by any means, the only point to be considered. No matter how valuable the standing timber, it would be disastrous to the country to turn it all into money. Upon the maintenance of the forest depends the proper balance in the flow of our waters. This is a vital point in agriculture and in all the industries based upon agriculture. But the point of immediate importance is the maintenance of our water-powers. Considering their force, their wide distribution and the ease with which they can be developed, the water-powers of Canada, I believe, are second to none in the world in immediately prospective value. People used to smile when they heard me say, some years ago, that, because of its timber and its water-powers, the Province of Quebec must soon be regarded as richer than any other Province or than any State of the American Union. Industry has now reached the stage of development at which the value of the rivers in Quebec that rush down from the mountains to the sea is about to be generally realized. Take away the forest and you take away these water-powers as commercially useful agencies,—the water may still flow, but it will be in the form of freshets in the spring and rivulets in the autumn, a form which could no more be made useful than the cyclones of Dakota can be made useful. There is no danger that lumbering, as it is now carried on by the best firms, will denude the country so as to unbalance the regular flow of the streams. The trees taken off are those which, while they are most valuable in the market, can best be spared from the forest. They are quickly replaced by younger growths which prevent the too-rapid melting of the snows and preserve the forest floor which acts as a vast sponge in keeping back the too-rapid outflow of the waters.

The problem of our forest wealth can be answered by keeping down the ravages of fire; and the problem of keeping out, or putting down, fire can be answered by our present methods together with the elimination of the timber pirate who operates in the disguise of a settler.

SOME TYPES OF FOREST WEEDS

JUDSON F. CLARK.

From the Standard Dictionary we learn that a "weed" is "any unsightly or troublesome herbaceous plant that is at the "same time useless or comparatively so . . . .; especially such "a plant as is positively noxious or injurious to crops, . . . also "any herbaceous plant out of place." Had the lexicographer omitted the word "herbaceous" his definition would, I think, describe the greatest bane of rural life to a nicety. To adapt the definition thus amended to forest conditions we must read "wood crops" instead of simply "crops." A shorter definition of the term "forest weed" would be "a plant which is injurious to the reproduction, growth, or quality of wood crops."

I recall having once been taught that all agricultural bugs fall into two classes, viz.: those which feed by eating the plant, and those that live by sucking the plant juices. The individual bugs of each class were said to be very numerous, but the treatment of all was simplicity itself, namely, to feed the "biters" with paris green and bathe the "suckers" with kerosene emulsion. Plants which are injurious to the reproduction, growth, or quality of wood crops resemble the agricultural bugs, in that they fall into two classes, both as regards their life habits and methods of treatment. Herbaceous plants and shrubs form one class, and undesirable trees the second.

The herbs and shrubs are alike in that they are absolutely dependent for their existence on the light that is able to penetrate through the "canopy" or "crown cover" of the forest. Many herbs and shrubs are killed by even moderate shade, others are killed only by a comparatively dense shading. No herb or shrub can thrive sufficiently to cause appreciable harm under a close crown cover of many of our native forest trees. The hard maple and the beech among the hardwoods, and the hemlock, spruce, and fir among the conifers are especially notable for the density of their shade. The absolute necessity of light for plant development on the one hand and the possibility of shading the forest soil on th other at once suggests the remedy for herbaceous and shrubby forest weeds, which is to establish or maintain a crown cover of at least moderate density where such weeds are troublesome or likely to be so. In the case of groves of trees having open crowns, such as the black walnut, or tulip, or old oak stands, underplanting with beech or hard maple is sometimes resorted to to destroy the weeds and to protect the soil from sun and wind.

No 5—A White Pine Weed.
(Courtesy of U. S. Forest Service.)

No. 3—A Black Cherry Weed.

No. 7—An Undergrowth which is not Weed Growth.

No. 6—Weed Ironwoods.

By virtue of their ability to form part of the crown cover and thus insure their light supply, the weed trees constitute a special class requiring radically different treatment. Here again, however, no matter how varied the kind, age, or quality of the weed trees, the practical forester has but one remedy, and that remedy is the ax. Figures 1-6 illustrate several types of this class of forest weeds.

In Figure 1 is seen a particularly bad example of a white oak weed. This tree, with its much branched and hollow trunk, is entirely worthless, except for fuel, and even for this purpose it is hardly holding its own, the annual loss by decay fully offsetting the gain by growth. Meanwhile it is shading to death seven white pine saplings, any one of which could occupy the space to excellent advantage. Very evidently the proper treatment is to fell the oak, taking care to save at least one, but better several, of the pines.

This should of course have been done many years ago. The pines, though not more than two to four inches in diameter, are all over 40 years old, their small size being entirely due to the limited supply of light which was available under the huge crown of the oak.

Figure 2 shows a struggle for possession of a small opening in the forest between a chestnut and a white pine, with all the advantage in favor of the chestnut. In fact it is evidently but a matter of time when the pine will be entirely destroyed by its rival. The chestnut, like the white oak and pine, is an exceedingly valuable forest tree. This particular specimen is, however, to be regarded as a weed in that it is of inferior form and is hindering the development of what is undoubtedly a more valuable neighbor.

Figure 3 illustrates a large black cherry standing over a splendid reproduction of white pine. Any tree shading so fine a stand of young pines would necessarily be classed as a weed, especially if the soil were sandy as is the case where this photo was taken. The cherry being sufficiently large for logs, this "improvement cutting" should be a very profitable move whether viewed from the standpoint of present returns or that of future revenue.

Figure 4 illustrates the baneful influence of an older and inferior tree in a young hardwood stand, As is readily seen, this tree is itself almost wholly worthless and incapable of improvement. Originally the reproduction of young hardwood trees, so well shown in the background, obtained light equally well immediately around this tree. The seedlings were, however, gradually shaded to death and finally disappeared. A few of the more hardy ones still survive, but are stunted almost or quite

beyond recovery. Viewed from the forester's standpoint, there is here a portion of excellent forest land which has for twenty years been wholly non-productive. The removal of the weed tree which is the cause of the trouble will be immediately followed by a vigorous natural reproduction by seeding from the neighboring trees.

In Figure 5 we have a good example of what foresters call "advance growth." The meadow on the right has been seeded from the trees on the left. The first seed year was—on account of grazing, unfavorable weather conditions, or other cause—productive of but slight result, a tree here and there being all that survived. A second seed crop was more fortunate and resulted in a splendid stand of young trees all over the meadow. Under the circumstances the two older trees shown standing together in the centre of the illustration are forest weeds. If they remain they will, because of their advantage in height over their near neighbors, grow to be broad-topped branchy trees, producing a very inferior grade of lumber. If they are removed at once the gap will be quickly closed by the growth of the younger trees, which, being of fairly even height and standing closely together, will grow tall and straight. The lower branches will, because of the density of the shading, die before they become large and finally drop off, thus improving the quality of the wood produced.

Figure 6 illustrates the condition of many Western Ontario woodlots. For many years this woodlot was not grazed, and contained a fine growth of young timber of a dozen species. 11 years ago it was opened for cattle grazing, and has been used for this purpose to a greater or less extent every season since. During the early years of the grazing it was noticed that there was a great destruction of the young trees, but as there seemed to be plenty remaining, it was thought that no great harm was done. When this photo was taken, an examination was made of about four acres, with the result that there were seen many hundreds of hop hornbeam and blue beech (Ironwoods), some six or seven elm, but not a single ash, oak, basswood, or maple, although many large seed trees of these species were present. The small trees shown in the figure are ironwoods exclusively. The hop hornbeam and blue beech are so nearly worthless for forest purposes that they are always regarded as weeds, the more so in that they are prolific producers of seed and can thrive in a comparatively dense shade, often occupying the ground almost to the exclusion of better species. Live stock do not care for their foliage, hence they are unduly favored where even light grazing is practised.

Figure 7 gives a view along a line fence between woodlots in Huron County, Ontario. The lot on the left has been heavily

No. 2—A Chestnut Weed.

No. 4—A Soft Maple Weed.

grazed, that on the right has not been grazed for 9 years. Many farmers regard an undergrowth of young trees such as is shown on the right as so much weed growth, and it is by no means uncommon to find owners desirous of improving their woodlots, going to considerable trouble and expense to clean up such growth. This is a very great mistake. An undergrowth of young forest trees not only insures the perpetuity of the woodlot—furnishing young trees to immediately occupy the places opened by the removal of mature trees—but greatly contributes to the vigor of growth of the larger trees present by shading the soil from sun and wind. The function of the undergrowth in shading the soil from the light is to prevent the growth of moisture-robbing weeds and to conserve the humus content in the soil. The exclusion of the wind prevents direct evaporation, and enables the fallen leaves to lie in place to form a protective surface mulch, which is alike valuable as a conserver of moisture and as a fertilizer.

The forest reserves of the United States estimated to be worth $250,000,000 in cash are now being administered at a cost of less than one-third of 1 per cent of their value, while increase in that value of not less than 10 per cent. a year is taking place. Receipts from sales of timber are increasing so rapidly that in the near future the forest reserves will be self-sustaining.

That forest planting on waste lands and watersheds will prove profitable is the opinion of many large industrial companies in the United States. The rapidly diminishing supply of railroad ties, mine timber and lumber, has made the necessity of planting clear to far-sighted users of forest products. Among these are the H. C. Frick Coke Company, The Keystone Coal and Iron Company, The Pennsylvania Railroad Company, The Johnstown Water Company, The Monroe Water Supply Company and the Pennsylvania and Lehigh Coal and Navigation Company. The water supply companies have been forced to take action on account of the decreasing water supply, due to the denudation of the forest. The U. S. Forest Service cooperates to the extent of sending a technical forester to make a preliminary examination of the lands on which planting is contemplated. This determines whether planting is advisable. If the preliminary report is favorable, a detailed plan for planting and nursery work can be made at a cost to the owner of the actual expenses of the work.

THE DECIDUOUS WOODS OF BRITISH COLUMBIA.*

By J. R. Anderson.

Broad-leaved Maple—*Acer macrophyllum.*—This tree is so named on account of the extraordinary size of its leaves, one authenticated specimen which I collected measured 16½ inches from the point at which the stem joins the leaf, to the tip of the leaf, and 12½ inches across. The flowers come early, before the leaves, and are of a yellowish white in crowded pendant racemes. The leaves turn a golden yellow in the autumn. This is probably the commonest and best of this class of our woods. Its range is all over the lower lands of Vancouver Island, the Gulf Islands and the mainland to the westward of the coast range. It grows to a large size, the trunks frequently attaining a diameter of three and four feet, and when growing close together, or with other trees, very straight and tall. When growing singly in the open it forms a magnificent shade tree, one remarkable specimen near Victoria, covering a space of probably eighty feet in diameter. Other specimens at Alberni, by actual measurement, cover spaces of sixty feet and over. The wood is close grained, takes a fine polish and is well adapted for furniture, inside finishing and carriage building. That part, which, by reason of an abnormal growth, is known as "Bird's Eye Maple," is very beautiful. Although utilized by furniture makers, and in some cases for inside work, it is comparatively little used and is only cut by one or two mills to supply the demand. The natives, where this wood occurred, used it to a considerable extent for paddles, and for some articles of domestic purposes.

The Smooth Maple.—A smaller tree which is sometimes erroneously called Vine Maple, is *Acer glabrum*, with two other synonyms. On Vancouver Island and the lower mainland it sometimes attains to the dignity of a tree. The leaf is five-pointed, flowers few, on the coast, but plentiful inland, where it never attains a size larger than a large bush. I may say that according to my recent investigations, I feel a doubt as to the identity of the inland tree with that of the coast. The wood of this variety is white and close grained, but it has never to my knowledge been put to any practical use; this, however, may be accounted for by the fact that it does not occur in any great quantities. This maple is very ornamental, and makes a fine

*Part of a paper read at a meeting of the Natural History Society, Victoria, B.C., 14th May, 1906.

shade, and as it does not grow to any great size, is well adapted for small grounds. The leaves in the autumn turn red, sometimes striped with yellow.

VINE MAPLE—*Acer circinatum.*—This tree, as its name indicates, grows small and crooked, much in the shape of a vine. Its range is confined to the mainland, to the westward of the Coast Range of mountains, where it grows in dense impenetrable thickets, and does not occur on Vancouver Island or to the eastward of the Coast Range on the mainland. It seldom exceeds 8 inches in diameter at the butt, and is a most useful wood to the settler, as, the wood being tough, it makes excellent wagon tongues, handles for implements, ox bows, and various things of that kind. The natives made use of it for various household utensils, such as spoons, dishes, etc. The bark is smooth and green, the leaves are seven-pointed, nearly round, turning to a beautiful scarlet in the autumn; the flowers, which occur in loose corymbs, are a dark red, and the seeds are in twos, with the wings spread at right angles.

WESTERN OR RED ALDER—*Alnus rubra.*—So called on account of the sap, which turns to a dull red when exposed to the air, and was used by the natives as a dye for basket work, mats, etc. The habitat of this tree is the low rich valleys, where it generally grows in large groves, attaining a size from 10 inches to three and even four feet at the base, and height of 50 to 100 feet. The bark is white on the outside, smooth on the younger trees and roughened, with wart-like excrescences in the older trees. The range is principally along the sea coast of the mainland and Vancouver Island. The tree can hardly be called a handsome one, being of a rather stiff, formal character. The leaves are a dark green, often whitish on the under side, oval in shape, and falling on the approach of winter without turning color. Like some other trees of this family, it bears staminate and pistillate flowers separately, the former in the shape of what are popularly known as catkins, emitting quantities of yellow pollen in the spring. The wood, which is of a light brownish color, nearly white, resembles black walnut in grain, and is used stained to the proper shade, in imitation of that wood, for furniture, inside finishings, bannisters, etc. The natives used this wood, which is easily worked, for various purposes of domestic economy. Spoons, dishes, boxes and furniture, such as they required, and the inner bark as before mentioned, as a dye.

MOUNTAIN ALDER—*Alnus rhombifolia.*—This is a small insignificant tree or bush, generally growing along water courses on the steep sides of high mountains, taking the place often of larger trees, which have been destroyed by avalanches, but occurring sometimes on the low lands on margins of lakes. It seldom or never grows straight, usually in a contorted form, especially when

growing in localities where snow lies deep, and avalanches occur. The wood is soft and pliable, and the tree is therefore well-adapted to withstand the rough treatment of alpine regions. The leaf is a bright glossy green, covered with a somewhat aromatic gummy substance, which extends to the stems. The wood is worthless, and is only used for fires where no better is to be obtained.

Poplar or Cottonwood—*Populus trichocarpa*,—so called on account of the cottony material which carries the seed, is a common tree throughout the province, on low lying lands in the vicinity of water. It attains to a large size in favourable localities, three to four feet in diameter being common, and attaining a great height in dense forests, along river banks, and on low islands. The wood is very little used, being white and soft, without any great quality to recommend it. The principal use it has been put to is for the manufacture of excelsior, for which purpose it is well adapted. It has also been used for boxes, being very light, but the objection to its use for this purpose, I am informed, is that it turns dark after being sawed. Probably this difficulty could be overcome by allowing the wood to season in the log, or by other methods. It, also, I am informed, makes excellent pulp for paper. The bark turned inside out is used by the Kootenay Indians in the construction of their peculiarly shaped canoes. The young buds exude a brown gummy substance, very aromatic, and hence the tree is frequently known as Balm of Gilead. The leaves, which are somewhat cordate, or heart-shaped and pointed, attain a large size, on young trees, from 10 to 11 inches long, and 7 inches broad, bright green on the upper sides and white on the under sides; these leaves, when shaken by the wind, give a very curious appearance, and suggest a white-flowered tree. On older trees the leaves are much smaller. Growing in the open, this is a handsome tree, much more so than the stiff-growing Lombardy Poplar, which is so frequently planted in our grounds.

Aspen-leaved Poplar—*Populus tremuloides*.—So called on account of the tremulous effect of the leaves, which become agitated with the least breath of air. I know of no pleasanter sound than the rustle of these leaves, when, after crossing a hot, treeless prairie, one finds oneself by the side of a stream shaded with this beautiful tree. It probably is more wide in its distribution than any other tree, occurring as it does from the Atlantic to the Pacific, and forming the principal source of wood supply in Manitoba, Alberta, and Saskatchewan, where the groves, or forests, are designated "bluffs." In some parts of our own province also, it constitutes the principal wood for fences and fires. The bark is usually smooth and white, the leaves nearly round and slightly pointed; the wood is soft and decays

quickly; it, however, even in its green state, makes excellent firewood. Its habitat is usually on the margins of streams and low-lying land, but it also occurs on the high lands, both of the mainland and islands. It usually attains a size of six to twelve inches, but is often larger, and from twenty to seventy-five or a hundred feet high in this province. The sap, which is stripped from the wood in the spring, by the natives for food, by means of a bone implement made from the rib bone of a deer, is quite sweet and of rather a pleasant flavour. The ribbon-like strips of sap are sometimes laid crosswise of each other, dried in the sun and kept for future use.

Willow, known botanically under the generic name of *Salix*, is a genus which has not been well worked out, and I therefore will not trouble you with details which probably are of no practical interest. The largest of the willows in this country is that known as Hooker's Willow (*Salix Hookeriana*). It occurs commonly on Vancouver Island and the lower mainland, often near water, but it is quite ubiquitous in its habits. It often attains a size of 12 inches at the butt, but never any great height. The wood resembles the variety used in England to make cricket bats, and would probably answer the purpose well. The habitat of the genus *Salix* is almost invariably near water or wet land; it comprises a large number of species, some of which are tiny plants, barely an inch high. The latter occur only on high mountains near the snow line.

Western White Oak—*Quercus Garrayana.*—Sometimes called *Quercus Jacobi.* The range of this tree is altogether confined to Vancouver Island and Gulf Islands, not a single specimen occurring on our mainland, but it appears in the adjacent States of Washington and Oregon, extending to California. Patches of it occur on the southern end of Vancouver Island and for about one hundred and fifty miles north. In some places it attains a size of from three to four feet in diameter with good straight trunks, from which logs can be obtained from ten to twenty feet in length. It is likewise a highly ornamental and shade tree. The wood resembles English oak in appearance, having a beautiful grain, but it has never been much used, principally I believe on account of the difficulty of seasoning it properly, or rather the necessary room and capital for storing it away for several years. It is used to a limited degree by cabinet makers for ornamental furniture and other purposes of that kind. The bark is usually whitish in appearance, deeply scored in the older trees, affording excellent shelter for the eggs of the Oak Tree Looper, which, during the last two years, devastated the oak forests in the vicinity of Victoria. The leaf bears a considerable resemblance to that of the English Oak. The acorn, prepared in a peculiar

manner which it is unnecessary to describe particularly, is used as an article of food by the natives further south.

ARBUTUS OR MADRONA—*Arbutus Menziesii.*—This is quite a common tree on Vancouver and Gulf islands, and on some parts of the coast line on the mainland. It is a striking looking tree with its red bark and evergreen leaves, most ornamental for large grounds. As a rule it does not attain a great size, especially when growing on exposed rocks, and headlands, but trees a foot in diameter are common, although as a rule twisted and crooked. When growing in forests, however, it grows fairly straight, and sometimes attains a large size. On the Alberni road, in the vicinity of Nanoose Bay, many fine specimens are to be seen. When travelling in company with Dr. Fletcher and the Rev. Mr. Taylor, some time ago, I took the measurement of one tree which was ten feet five inches in circumference. I am not aware that the wood of this tree has been put to any particular use, it is hard, fine and close grained, takes a good polish, but is apt to warp and check if cut before being well seasoned. By the natives it was used for gambling sticks and rollers, the latter being in the form of discs some two inches in diameter, which are divided into two parts and concealed in a kind of oakum made of cedar bark. I cannot describe the game, but the discs are rolled over a mat, one of the discs being, I believe, the king. The laurel-shaped leaves of this tree are a beautiful bright green, remaining on the tree for two years, so that there is a constant succession of evergreen leaves. The flowers are borne in dense compound racemes, whitish yellow, with a strong odor of honey, which they evidently produce in large quantities, as bees frequent the trees in great numbers. The fruit, a beautiful red, somewhat roughened on the surface, resembling small strawberries, is greatly relished by grouse and other birds in the autumn.

DOGWOOD—*Cornus Nuttallii.*—A highly ornamental tree with immense white flowers is fairly abundant throughout the islands and the coast of the mainland. It often attains a size of twelve inches in diameter, and a height of thirty feet or thereabouts, and has a fine-grained, hard and pinkish wood, which takes a good polish, not used to my knowledge, except in isolated cases, for ornamental work. The fruit is borne in dense spherical heads of 30 or 40 drupes, which turn red as they ripen and form an article of food for birds of various kinds, including grouse. The leaves are of dull green, turning to a dull red when touched with frost. The bark is smooth and somewhat white—a tree well worth cultivating, but rather difficult to transplant.

BUCKTHORN—*Rhamnus Purshiana.*—Sometimes called Bearberry, and from that often wrongly called Barberry. Is not an uncommon tree on the islands of Vancouver and the Gulf, and on

the coast of the mainland. It attains a size of about a foot in diameter, but is more frequently smaller. The wood is of a light yellow color, close-grained and hard. Not used, except for ornamental purposes. The bark, which is the medicinal Cascara Sagrada of commerce, has been collected in large quantities in the adjoining States, where, on account of the wasteful methods practised, the tree is fast disappearing, and frequent enquiries have been made as to its occurrence in this province and the chances for obtaining a supply of the bark. I have discouraged all enquirers as I am of opinion that such matters should be strictly supervised and if possible, made a source of revenue. The bark is white and smooth, the leaves a beautiful dark green, the fruit black, about the size of a pea, and much affected by wild pigeons.

Crab Apple—*Pirus rivularis*, with a synonym of *Malus rivularis* grows commonly in swamps on the mainland, to the westward of the Coast Range, on Vancouver Island and the Gulf islands. It seldom attains a larger size than nine inches, the wood is hard and close grained, and is principally used for rollers in mills and for like purposes. The bark is dark and somewhat roughened, the leaves resemble those of the domestic apple, somewhat smaller, the flowers are white, resembling apple blossoms, and sweet-smelling. The fruit is intensely acid, and makes good jelly. The natives use it cooked, mixed with oolachan grease, and in that form it is considered a great delicacy. Crab stocks are sometimes used for grafting apples upon, and succeed very well, when good healthy stocks are used.

White Thorn—*Crataegus rivularis*, and possibly another variety, is found in most parts of the province, growing to a size of six inches, and from twelve to fifteen feet high. The wood is not used for any purpose; it is an excessively thorny tree with a white bark, the leaves a bright green, flowers white in corymbs, and very ill-smelling, something like bad fish. Prof. Sargent, the American authority on forestry, has been working on this genus, and makes out 115 varieties. Pears may be grafted on the White Thorn, but I found in one instance, that Bartletts, although attaining a fine size, quite lost their identity, and were quite useless.

Birch—*Betula papyrifera or B. occidentalis.*—There is some confusion as to the proper designation of our large western variety. Its range is principally on the mainland, some few specimens occurring in scattered localities on Vancouver Island. In some places it grows to quite a large tree, two to two and a half feet through, but generally it does not attain a larger size than 8 to 10 inches. The bark is quite white, on the outside, and was used by the natives of the interior in the construction of canoes, baskets, etc.; the wood is white, but has not been used for any particular purpose but fire-wood. It makes a fine orna-

mental tree, and is well worth cultivating. There are other varieties, one with dark brown bark, growing on the margins of lakes and streams, not so large as the first named, and another, a mere bush.

CHERRY—*Prunus emarginata.*—The range of this tree is principally on Vancouver Island and the lower mainland, although smaller specimens occur in parts of the upper mainland. In the first-named sections, it ordinarily attains a size of from six to twelve inches, and probably forty feet high. The bark, a reddish brown color, was used by the natives for fastening the feathers to their arrows when they used those weapons for shooting aquatic animals, as the water does not affect it as is the case with sinew, which was ordinarily used; it was, and is now, also used in the ornamental part of basket work, mats, etc. Growing in the open and when covered with its white blossoms or red fruit, it forms an ornamental tree. The fruit is, however, inedible, being very bitter and astringent. A prototype of *P. emarginata*, resembling it in every particular, occurs at Nelson, and probably in other parts, the fruit of which is acid, without any trace of bitterness, and is used for jelly-making. The only other congener of this genus is the Choke Cherry, (*Prunus demissa*) a mere bush. It is plentiful in the upper country, and occurs in isolated patches on Vancouver Island.

That the homestead lands of the United States are nearly exhausted is shown by a Bill which went into effect July 1st, which makes provisions for homesteads on forest reserves. To most Canadians this will seem a retrograde measure, though the conditions are so different in the two countries that what may be considered a necessity in the United States need not be thought of in Canada. With the exeption of certain counties in California and South Dakota, the new regulations apply to all forest reserves. They provide that where lands comprised in a forest reserve are chiefly valuable for agriculture and may be occupied for agricultural purposes, without injury to the forest reserve, and which are not needed for public purposes, they may be opened up for entry in accordance with the provisions of the homestead laws and the new Act. The Act goes so far as to provide that even when the land is covered by merchantable timber, it may be opened for settlement upon strong evidence of its value for agricultural purposes, both as to production and accessibility to a market.

THE DOMINION FOREST RESERVES ACT.

The establishment of a number of Forest Reserves upon Dominion Lands by the Forest Reserves Act passed at the last session of the Dominion Parliament is the result of a movement which began about the year 1893. At that time the Minister of the Interior took up the question of Forest Reservations, and a report thereon was made by the Crown Timber Agent at Winnipeg.

In his report he had the following statement in regard to the reservation of timbered lands and districts: "The problem "for consideration, as to the best course to pursue in order to "set aside and maintain a proper proportion of the timbered "lands, is one of varying difficulty. A careful adjustment "between the present needs of the population for wood material, "and the needs of future generations, and of a forest cover for "hydrologic purposes appears desirable. It may be discussed "under two heads.

"First, the best plan to adopt as regards unsettled lands "not suitable for agriculture.

"Second, the maintenance and preservation of such smaller "areas of wood as are to be found on the sections in localities "more favorable to agriculture, and which are or will eventually "become, the property of settlers in such localities.

"Upon the first branch of the subject I may say, primarily, "there is a widespread and general desire among the farming "community and settlers in the country that the greatest pre-"caution should be taken to preserve such tracts of bush land, "and that it would be advisable to withdraw from settlement "any large areas of land obviously unsuited to agriculture, "and maintain them permanently in timber, under proper "regulations, instead of allowing them to be stripped of all "merchantable timber in a wasteful and improvident manner, "and then abandoned as waste lands.

"The reservation of such areas would render necessary "a transfer and exchange for others, of such sections as have "been set apart and accepted by the different railway companies "under their land grants. Upon this point I may say that I "am of the opinion that if all the wooded districts in the country "had been entirely retained in the hands of Crown their adminis-"tration could have been effected with much greater facility "and success. The disadvantages of the present system are "many and obvious.

"As has been pointed out in previous communications "upon this subject, the question of the preservation of the tim- "bered districts is one of far reaching potentiality. All exper- "ience goes to prove that in this and every other country from "which information and reports have been gathered, that the "most serious and disastrous results to agriculture, have in- "evitably followed the deforestation of the timbered lands.

"I wish therefore to state here briefly that I am of the "distinct opinion that in localities which are reliant solely upon "a certain area or block of bush land for their supply of neces- "sary wood, that such area should be maintained, preserved, "and guarded as and for wood reservations, for the use of the "people for all time; and also because of the unfavorable in- "fluence their destruction and removal would undoubtedly "exercise upon the climatic conditions of the country."

The agent submitted several recommendations in regard to reservations in the Province of Manitoba, and it was finally decided that the policy of setting apart reserves should be adopted. The first reservations made were Turtle Mountain Reserve in Southern Manitoba, and Riding Mountain and Lake Manitoba West reserves in Northern Manitoba, which were set apart by order of the Minister of the Interior on the 13th of July, 1895.

Other reservations were made from time to time, but as these reserves were set apart merely by order of the Minister, lands could be withdrawn therefrom by the same authority and it was considered advisable that a more permanent character should be given to the reservations. With that end in view it was decided by the Government that the reserves should be set apart by Act of Parliament. This has now been done and no lands can now be withdrawn from the reserves except by special Act of Parliament.

The purposes for which the reserves are established are to protect the headwaters of the streams and so ensure a constant water supply; to provide a supply of wood for the settlers, and to serve such additional beneficial purposes as may be brought about by the influence of large areas of forest, protecting the country from winds or other adverse climatic influences.

Of the reserves situated in Manitoba, the Turtle Mountain Timber Reserve covers a district of somewhat elevated land covered mainly by aspen and balsam poplar. It also includes a number of lakes and will serve the double purpose of being a pleasure resort and a source of supply for the wood and smaller timber required by the settlers. This reserve has been somewhat severely cut and part of it has been burnt. One serious difficulty in protecting it has been the fact that fires frequently came from south of the international boundary along which

Norway Spruce Wind-break protecting a Peach Orchard.

the reserve is located, and over which the Forest Ranger has no control.

The Riding Mountain, Duck Mountain and Porcupine Hills reserves, in the northern part of Manitoba, are all of the same general character. The land is high and broken with ravines. These tracts formed a part of the best wooded portion of the Province of Manitoba and have been lumbered over for a number of years. The principal species of trees are spruce, aspen and balsam poplar, white birch, tamarack and Manitoba or ash-leaved maple.

Some of the lands within these reserves are still held under timber license, and the timber limits are being operated at the present time. Part of these reserves, especially the Riding Mountain and Duck Mountain reserves, have been burnt over, the fires coming in mainly from the west side. There are however still considerable areas of mature green timber in these reserves. They will be a very important factor as the source of supply for timber for the settlers in these localities, and will also serve the purpose of protecting the headwaters of the streams. In fact the greater part of the streams flowing through the Province of Manitoba have their headwaters within these reserves.

Lake Manitoba West Reserve was timbered with spruce, poplar and tamarack. It has been largely denuded of timber.

Porcupine Reserve No. 2 is located in the Province of Saskatchewan and has been mentioned as a separate reserve but is contiguous to the one in Manitoba and is of practically the same character.

Moose Mountain and Beaver Hill reserves in Saskatchewan contain mostly aspen and balsam poplar. They are located in the prairie country and therefore are very important for the supply of the districts in which they are located. The settlers come from long distances to obtain wood for fuel and construction purposes from these reserves. They will also be very useful as summer resorts.

In the Province of Alberta there is a reserve at the western end of the Cypress Hills. This is in the middle of what is generally known as the semi-arid district of the West. There was considerable timber in the valleys of the western slopes of these hills, but it has nearly all been cut off although there is still a mill operating in this district. The timber is mainly *Pinus Murrayana*, and if it is given proper protection there will, so far as present indications show, be no serious difficulty about the natural reproduction of the forest.

The Cooking Lake Reserve in the same Province is situated southeast of Edmonton and includes a tract of lake and rough land. The land is not at all suited for agricultural purposes

but there has been considerable settlement in the vicinity and fires have run through most of the reserve. The timber is spruce and poplar.

The Kootenay Lakes Forest Reserve is on the eastern slope of the Rocky Mountains near the international boundary. The area is small and its chief value is as a park. There has been considerable prospecting for petroleum in the vicinity of this reserve.

In the Railway Belt in British Columbia most of the reserves established by the Act are in the Kamloops District which is the dry belt of British Columbia. This is the central portion of the Province and the rain coming from the ocean is precipitated on the mountains lying between the coast and the interior, with the result that the rainfall in the Kamloops District is small. These reserves have therefore been established mainly for the purpose of conserving the water supply. The hills covered by these reserves rise to a height of something like 6000 feet, and are generally too elevated to be of use for successful farming operations. Their influence on the flow of the streams is however very important for agricultural operations in the valleys below, as, in order to ensure successful agriculture, it is necessary to depend to a greater or lesser extent on the application of water to the land by artificial means. The principal species of trees found in these reserves are the Douglas fir and black pine (*Pinus Murrayana*).

The Donald Forest Reserve lying farther east in the Province of British Columbia is not so important for water supply but is in a splendid timber and scenic district.

The Governor of West Virginia writing in support of the proposed establishment of the Appalachian Forest Reserve and the White Mountain Forest Reserve says: "In all mountain countries the destruction of the forests has been a destruction of the country. 'After the timber the flood.' The soil hardens like a slate roof and the water runs off. It is the amount of water which enters the soil, not the precipitation, which makes a region a garden or a desert. The soil is destroyed, the streams dwindle to nothing, or at times are irresistible torrents spreading devastation and terror along their courses. . . . . In a denuded country the streams are yellow, the soil carried to the sea, navigation impeded thereby, water-power imperilled, food fish and other aquatic life killed and scenic beauty destroyed."

DISPOSAL OF TIMBER ON THE DOMINION FOREST AND GAME RESERVES.

The praiseworthy action of the Dominion Government in setting aside 5310 sq. miles as permanent forest reserves encourages the hope that the same progressive forestry will be followed not only in the protection but in the utilization of the forests on these reserves.

That large areas of public property should be given to speculators or even legitimate lumbermen for all time to come for the paltry consideration of a bonus based on the present value of the timber in a local and changing market seems hardly in keeping with good husbandry.

According to the system in vogue the Government sells, not only the present stand, but all succeeding stands so long as the limit holder pays the small ground rent of $5.00 per sq. mile. The bonus may be looked upon as a speculative price paid for the control of public lands for an indefinite period and it is safe to say that it seldom, if ever, reaches the value of the present stand. A case has recently come under observation where a limit of 18 sq. miles was sold for $176.04 and from which the limit holder says he cuts approximately 4,000,000 ft. B.M. per sq. mile or 72,000,000 ft. in all. Making all possible allowance for meadow land, burned-over land, muskegs, etc., he must have bought the timber for less than 1 c. per 1000 plus of course the royalty of 50c. per 1000. This lumber he sells at about $15.00 per M.

The most objectionable feature of the present system is, however, the long tenure of the land granted to the licensee. With the rapid rise in the price of wood it seems only reasonable that the people of Canada should receive at least a share of this increase in value instead of having the timber sold at a 50 to 100 year old market price. Under the present system a limit holder may not be required to cut a stick and the growth of the timber and value accretion will more than pay the interest on the small initial investment and the ground rent. Such a limit holder would come under the class of speculators who are essentially non-producers and are a drawback to the industrial welfare of the country.

What we would suggest as a reform in the method of disposal of Crown Timber is the sale of timber on the stumpage basis with a limited time in which to remove the crop. From the standpoint of a forester a system such as outlined below would

not only be more effective in the preservation of the forests but be eminently more just to the people of Canada whose property is being sold.

In the first place no timber should be sold until it is mature, then it should be removed with as little delay as possible. Before being placed on the market the timber should be measured by the forestry department and a working plan formulated, for no set of rules can be suitable for all of the varying conditions found in Canadian forests. It might be advisable especially where the forest is chiefly for protection to mark all the trees to be cut. After measurement the timber could be advertised for sale stating the size of the block, quantity and conditions of the timber to be cut and the regulations regarding diameter limit, height of stump, disposal of debris, etc., which may be necessary.

The blocks should be small, rarely if ever over one township but in order not to discourage the erection of mills, operators should be assured that more blocks would be placed on the market when the timber on the first becomes exhausted.

The time allowed for removal should of course vary according to the size of the block and accessibility of the timber but in order that the Government receive what it should of the increase in value, the periods should not be more than ten years. At the end of that period the timber remaining uncut might be again put on the market or held by the Government as the sylvicultural conditions suggest. In this way the revenue from the forests would be adjusted at least every ten years and be somewhat commensurate with the true value of the timber. At the same time the period should not be so short that the limit holder would be forced to cut when the market is dull, and he deserves a share of the unearned increment for his risk.

A reserve bid might be held by the Government in order to prevent the depression of the price below the actual value by lack of competition, and the licensee should be required to deposit bonds to the extent of say 30% to 40% of the value of the timber as estimated in the working plan, in order to ensure fulfilment of contract. The balance of the payments to be made annually as the timber is cut.

It would seem advisable that the Government, as landlord, should build and own permanent improvements such as the main trails, important dams and drains. In case of a change of licensees at the expiration of a lease disputes as to the value of temporary improvements could be decided by the Minister of the Interior.

The only Federal tax that the limit-holder should be required to pay is one-half of the cost of guarding his limit from fire in order that he may be interested in having this service effective.

If the timber is sold on the stumpage basis it will be necessary that every log be scaled and marked by Government scalers and a heavy penalty should be imposed for taking logs out without the Government mark. By this means the Government would have reliable first-hand information as to the cut and would not have to depend on the statement of the buyer.

The right to cancel the license at any time for non-fulfilment of contract, carelessness with fire, etc., should be reserved.

We would advocate the expansion of this system to the management of the limits already sold especially those within the forest and game reserves, giving the limit-holders ten years in which to prepare for the change and if necessary compensating them for any loss sustained by the change.

There is no doubt that the sale of timber on a stumpage basis with a limited time for its removal would be of great benefit to the country and we believe also that the lumbermen would find it advantageous since they would know that they were bidding on and would pay only for what they cut. The risk of loss from fire or encroachment of settlers would be removed and they would be working on a simple direct business proposition.

Effective administration in 1905 reduced the burned area on national forest reserves in the United States to one-fourth of what it was in 1904. The forest reserves came under the administration of the Forest Service, February 1st, 1905, and the new administration and regulations have worked wonders in the safe-guarding of the forests. All the reserve officers, except forest guards, are civil-service employees. Their salaries range from $720 to $2,500. Every forest supervisor is authorized in person or through a subordinate to hire temporary men, purchase material and supplies and pay for their transportation from place to place to extinguish a fire. Forest rangers are required to report monthly, and at the end of the year the supervisor submits an annual fire report to the Washington office.

THE SCOTCH PINE (PINUS SYLVESTRIS) IN CANADA.

By W. T. Macoun, Horticulturist, Experimental Farm, Ottawa.

At the Central Experimental Farm, Ottawa, there are four European trees which are more prominent than any other exotic trees in hardiness and vigor, and which appear to thrive equally as well as native species. These are the Norway Maple (*Acer platanoides*), the European Larch (*Larix Europæa*), the Norway Spruce (*Picea excelsa*), and the Scotch Pine (*Pinus sylvestris*). Every spring the bare ground, and even the lawns, are covered with seedlings of the Norway Maple springing up where the seed has fallen during the previous autumn, showing how rapidly this tree would establish itself were it permitted to do so. The European Larch succeeds almost equally as well on the high land as in low places; in sandy soil as in clay soil, and is one of the most rapid growing trees on the Experimental Farm. The Norway Spruce is the most rapid growing evergreen which has been tested and also succeeds well in a great variety of soils.

The Scotch Pine, or Northern Pine (*Pinus sylvestris*), to which we wish to draw especial attention in this article, also succeeds well in soils varying from heavy clay loam to sandy loam. It is a rapid grower and very hardy and may prove a useful species for more extensive planting in Canada.

The Scotch Pine is a native of northern Europe and northern and western Asia, and for timber purposes is to European countries what the White Pine is to Canada. The timber is largely exported from Europe to England and is known in commerce under a variety of names, among the principal being Northern Pine, Red Fir, Yellow Fir, Dantzic Fir, Riga Fir, Swedish Fir and Norway Fir, many of these names originating from the ports of shipment. This species of pine is, however, very variable, both in general appearance and in the character of the wood, and marked differences are found in the timber from different parts of northern Europe.

The Scotch Pine is more nearly related to our native Red Pine (*Pinus resinosa*) than to the White Pine (*Pinus Strobus*), although it bears little resemblance to either. The leaves of the tree are bluish green, from two to three inches in length and are more or less twisted. They grow in pairs. The cones, which are about two inches long, are borne either singly or in clusters of two or three on short stalks. The timber is yellowish or

whitish, sometimes slightly tinged with red, is soft and readily worked. Owing to the variability of this species, care should be taken when buying seed, as the ease with which seed can be procured from the dwarf or scrubby forms makes it more profitable for those who gather it to get it from such sources, and the trees grown from such seed are not likely to be as good as those from tall, straight trees.

Of the recognized brands of Scotch Pine timber which are exported from Europe the Dantzic Fir is the best. It is grown principally in Prussia and Prussian Poland and the neighboring borders of Russia. The trees in these districts reach a height of 70 to 100 feet. The timber is used for much the same purposes as the White Pine and is employed in the construction of buildings, for flooring, rafters, joists, etc. It is used much in ship building, in the construction of bridges, and is also used for railway sleepers.

The Riga Pine is another form of *Pinus sylvestris*, taking its name from the port of shipment in Russia and produced in the interior of Russia. It is a more upright-growing tree than the Dantzic Fir and usually makes a timber freer from knots. It is, however, not so generally sound at the heart as the Dantzic, and hence is not so good for planks and boards. It is, however, but for this defect, almost equal to the Dantzic Fir and it is said that in ordinary specifications for building either Dantzic or Riga may be used, showing that they are regarded as of about equal value.

Timber inferior to the Dantzic and Riga Firs is produced in Sweden and Norway, and a considerable quantity is annually exported from the former country to England, and some also from the latter. These are known as Swedish and Norway Firs. The Scotch Pine, or Scotch Fir, as it is known in Great Britain, is produced there in limited quantities, but of good quality. In some parts of the United States the Scotch Pine has succeeded very well and is now being planted there in large numbers for timber purposes.

In 1887 when tree planting was begun at the Central Experimental Farm, Ottawa, the Scotch Pine was among the species which were planted in the nursery there, and in the following year 424 trees were planted in two blocks. Part of these trees were planted 10 by 10 feet apart and part 5 by 5 feet apart. The trees when planted were about 18 inches in height. The soil was sandy loam mixed with a little gravel and rather wet. The plantation, with the trees 5 by 5 feet apart, was cultivated until 1892, while where the trees were 10 by 10 feet apart cultivation was continued for two years longer. In the autumn of 1905 the trees 5 by 5 feet apart averaged 29 feet in height, with a diameter of 4¼ inches, four feet six inches from the ground; and those 10 by

10 feet apart, a height of 27 feet, with a diameter of 5½ inches. The trees planted the closer distance are straighter than those planted further apart, and at the wider distance there has been much greater injury to the tops of the trees by wind. The branches of the trees 5 by 5 feet have died to a height of 12 to 15 feet, while those 10 by 10 feet apart are dead for only 9 to 12 feet.

In 1888, after the plantations in the forest belts were made, 636 trees of Scotch Pine remained in the nursery. These were left undisturbed until 1893, when they were thinned out to an average distance of 2½ feet in the row, the rows being 3 feet apart. Further thinning was done from time to time of the trees which became suppressed by the stronger growing specimens. In the autumn of 1905 these trees averaged 30 feet in height, with a diameter of 3 5-6 inches four feet six inches from the ground. The trees in this plantation are very straight with a much smaller proportion of injured tops than in either of the others. The branches have died to a height of 20 to 25 feet. These trees are growing in light, gravelly well drained soil.

In 1888 a number of Scotch Pine were also planted in a mixed plantation of evergreen and deciduous trees, 10 by 5 feet apart. The soil in this plantation is mostly clay loam. The trees averaged in the autumn of 1905, 27 feet 8 inches in height, with a diameter of 7 inches.

White Pine (*Pinus Strobus*) planted in light sandy loam soil with gravel in 1889 when 8 to 10 inches in height, 5 by 5 feet apart, averaged in the fall of 1905, 28½ feet in height, and 4¼ inches in diameter, and those 10 by 10 feet apart 28 feet in height and 6⅓ inches in diameter.

It will be seen that in soil very suitable for White Pine the growth has been about the same as that of Scotch Pine. There are no plantations of White Pine on clay loam at the Experimental Farm, but the individual trees which are growing on clay loam do not show the vigour of the Scotch Pine. It is this adaptability of the latter species to so many conditions of soil and moisture that would make it appear to be a desirable species for planting, especially in soils not very suitable to White Pine.

An interesting feature of the experiments with Scotch Pine at the Central Experimental Farm is the growth of volunteer seedlings among the older trees. If there is any one thing which shows the adaptability of a species to its surroundings it is its reproduction from seed. No other exotic conifer has so far reproduced itself in this way at Ottawa. The Scotch Pine began to fruit in 1896, eight years after planting, and seedlings 6 years of age are now growing under and near these trees. Where the conditions have been most favourable, these seedlings are very abundant.

Reproduction of White Pine in mixed hardwood forest—from 3 or 4 seed trees to the acre.

The Scotch Pine is proving quite hardy at Indian Head, Sask., and may prove a very useful tree for the prairie provinces. The following quotation from a letter received from Mr. Angus MacKay, Superintendent, Experimental Farm, Indian Head, gives his experience with this tree. "The Scotch Pine on the Farm are very hardy and doing extra well. The 3 oldest are 30 feet high and the largest of the 3 is 31 inches around 2 feet from the ground. These were planted in 1889, but I do not know how old they were at the time (probably three or four years old). You will understand that in the early years the seasons were very dry, and little or no growth was made during that time, Lately, they are growing equal to any other variety and surpassing several."

The value of this tree for timber purposes in Canada remains to be seen, but owing to its rapid growth in so great a variety of soils it should prove useful for many purposes. The fact that it fruits so early and heavily may be an indication of a short life here, but some of our native trees which reach a large size and a great age here fruit early also.

As an ornamental tree, the Scotch Pine is not nearly so valuable as the native White Pine, not being so attractive in colour of foliage, nor as graceful in form. It is a spreading grower and as the leader is frequently destroyed by wind when the tree is grown as an individual specimen it becomes still more spreading. The Riga Pine, a variety of the Scotch Pine, is much more graceful, being more upright in growth and apparently not suffering so much from injury by wind.

The August issue of *Forestry and Irrigation* contains statistics on the timber used in the anthracite coal mines of Pennsylvania. Reports were received from 83 per cent. of the anthracite tonnage of the United States and from these the remaining 17 per cent. was computed. The results of the tabulation show that 121,565,000 feet board measure of sawed timber and 52,440,000 cubic feet of round timber were used during 1905. The total value of the round and sawed timber combined was $5,310,000. Of the species used for round timber, yellow pine furnishes one-half. Oak ranks second. For sawed timber, hemlock holds first place in quantity, with yellow pine ranking second.

THE TAMARACK GROWTH IN THE EASTERN TOWNSHIPS OF THE PROVINCE OF QUEBEC.

THOMAS W. FYLES, D.C.L., F.L.S.

It is a law of nature that no particular growth of plants shall hold possession of the land in perpetuity. Sooner or later destructive agents will break in upon the scene. Insect depredators, drought, fire, storm and flood—*these*, and the axes of the lumbermen, make clearances for occupation by the settler, or for Nature's re-planting. In the latter case we find that the new growth is, generally speaking, different from the old. The following affords a curious exemplification of this fact:—

In 1842, when the Ashburton Treaty was made, a strip, 60 feet wide, was cut along the border, through the tamarack swamps that extend from Canada into New Hampshire and Maine. This strip is now filled up with a new growth; but the forester knows directly when he strikes the line, for he finds a belt in which the poplar (*Populus tremuloides*), the red cherry (*Prunus Pennsylvanica*), and the Moosemissie (*Pyrus Americana*), are growing—the seeds of the first having been carried by the wind into the Boundary, when newly cleared; and those of the last two, by birds.

Thirty years ago it was a fine sight to look, from an elevation, upon the vast area of swamp land, extending through Bury, Lingwick, Hampden, Ditton, and far away. Tamaracks from two feet to two and a half feet in diameter, were the lords of this forest-land. Today: I have the authority of Mr. Ayton Cromwell and Mr. C. C. Lusk, of Cookshire, and Mr. C. H. Ward, of Bury—all experienced foresters—for stating, that not a single first-growth tamarack is to be found in the whole section. And like testimony comes to me from Mr. John D. Johnson, of St. Thomas, and Mr. E. W. Brewster, of Compton, in regard to the districts with which they are respectively acquainted.

How was the destruction brought about? By an agent seemingly insignificant and wholly unexpected—a four-winged fly, belonging to the order, HYMENOPTERA, and named by Hartig, *Nematus Erichsonii*.

This fly is only about eight-tenths of an inch in expanse of wings, and four-tenths in length of body. Its color is black; but it has a broad orange-red band round the abdomen. Its wings are clear, with dark veins, and a conspicuous costal spot on *stigma*.

In the larval stage—which is the destructive stage—the species is a green caterpillar of no great size, having a black head. When it is "full-fed," it creeps into some retreat, and spins a compact, brown cocoon, about half an inch in length.

It was in the pupal stage, probably, and amongst the roots of young plants of Norway Spruce, that the species was brought to the nurseries of Massachusetts, about the year 1880.

The first notice of the arrival of the Nematus in Canada was given by myself, and will be found on the 17th page of the Report of the Ent. Soc. of Ont. for 1883.

When the creatures came to us, they came in their strength—"In numbers numberless." The Nematus Raid, as it was called, was a phenomenon that they who witnessed are not likely to forget. That creatures seemingly so insignificant, brought unwittingly from a country so far away, should, by force of numbers, be able to strip the vast forest of tamarack of its verdure, and leave the trees in a dying state was truly marvellous!

I last saw the creatures in activity about ten years ago, in a grove of young tamarack near the old St. Henri Road, in Levis County. The trees were about twenty feet high; and here and there amongst them was a small colony of Nematus larvæ. The grove mentioned has lately been felled, and the land it occupied turned into a pasture.

The Nematus larvæ had a preference for the finest growths. The smaller trees of the time were not at first so badly treated by them; and these lingered on, making brave efforts at recovery; but even these have, for the most part, now succumbed. Probably the drought of 1903 gave the finishing blow to them.

Mr. E. B. Brewster tells me that half a mile from Compton Village, there is a tamarack swamp about a mile long and one-eighth of a mile wide. The largest trees in it are ten or twelve inches in diameter. Of all the trees in the swamp, probably 75 per cent are dead, and about 15 per cent. shew some signs of feeble life in tufts of sprouts from the stem. The only apparently healthy trees are on the borders of the swamp, and form a mere narrow fringe to it, one or two trees deep.

Of the dead trees in this swamp, some are only "rampikes" denuded both of branches and bark. To others the branches still cling. Here and there, among the dead trees, a few balsams (*Abies balsamea*)and cedars (*Thuja occidentalis*) are springing up.

When I visited the swamps in Bury in 1891 the rot had struck into the dead trees for two or three inches. For an account of this visit, and a calculation of the damage done by the Nematus see the Report of the Entomological Society of Ontario for 1891, page 28.

When the Rutland Railway into Canada was in contemplation, dead tamarack trees lay so thickly in the swamp half way between Alburgh and Noyan that they had to be hauled out of the way, before the survey for the line could be effected. This was in the fall and winter of 1898-9. The authority for this statement is Mr. Alanson Vosburgh, *per* Miss May G. Johnson, of Miranda, P.Q.

In the part of Bury where I saw Maddock's gang getting out the knees for vessels, in 1891, the land has been brought under cultivation.

A few notes to tell further of the kinds of trees that are springing up in place of the tamarack may be desirable.

In the Ditton Swamp, which is about three miles long and a mile broad, the tamaracks, young and old, are all dead. Spruce is taking their place.

In the Spalding Hill Swamp, in Eaton Township, cedar, poplar and some young tamarack are growing.

In the Harrison Neighbourhood, in Bury Township, in parts where the soil is sandy, white birch and a few balsams are growing; on wet clay, the poplar appears.

In Long Swamp, which extends through Newport, Hampden, and over to Lingwick, spruce and balsam are growing.

To those who would see a tamarack swamp in its infancy, I would recommend a visit to "The Gomin" which lies to the west of Bergerville, about 4 or 5 miles from Quebec. In the early summer it is all aglow with rhodora, sheep-laurel, orchids and pitcher plants. When I first saw it, in 1886, it was a broad expanse of sphagnum, unoccupied, save on its outskirts, by any larger plants than those I have mentioned. I re-visited the swamp on the 10th of July last, and found that it was dotted all over with young tamarack from a foot to fifteen feet high. On the borders of the swamp near the cultivated land there were tamaracks twenty-five feet high or more.

Doubtless, if left undisturbed, the growth on this tract will, in process of time, become a forest. And so—

"The old order changeth and giveth place to new."

The State Fire Warden estimates that in the State of Washington 42,000,000,000 feet of standing timber has been destroyed by fire, and only 30,000,000,000 logged off. Forest fires, according to this estimate, have destroyed twelve billion more feet of timber than has been cut and sold.

A NEW LOG RULE.

In the last issue of the Forestry Quarterly there appeared a new log rule called by the author, Dr. J. F. Clark, the International Log Rule.

This rule is undoubtedly the most nearly accurate that has yet been proposed and it is to be hoped that it will soon become generally adopted. It is almost incredible that the Doyle and Scribner Rules should have been kept in use so long since they are so glaringly inaccurate, especially for the smaller sizes of logs. When first brought out they were approximately correct for the sizes of logs and methods of milling then in vogue, but now, when smaller logs are used and greater economy exercised in milling they under-scale frequently 100 to 140 per cent.

The International Rule was first worked out mathematically and after allowances had been made for taper, shrinkage in seasoning, saw kerf, and crook it was tested at a mill in the Ottawa Valley on a large number of logs, just as they happened to come to the mill.

As the following table shows, the error of this rule is negligible while those of the other rules used were very serious.

Over-run (+) or under-run (−) of Saw Cut, as compared with scale by

DIAM OF LOGS.	NUMBER OF LOGS.	DOYLE.	SCRIBNER.	CHAMPLAIN.	INTERNAT'N'L 1-8.
6 –8	28	+143%	+33%	10.3%	+2.6%
7 –9	54	+115%	+35%	+8.8%	+2.3%
8–12	101	+ 72%	+34%	+7.1%	+0.0%
10–17	104	+ 45%	+23%	+4.7%	−1.1%
18–20	90	+ 24%	+14%	+6.7%	+0.5%
21–24	126	+ 18%	+14%	+5.2%	+1.1%
25-33	31	+ 10%	+ 9%	+3.3%	−0.5%

The formula upon which this rule is based is $(D^2 \times .22) - .71\ D$. The measurement is made at the small end of the log and the content is figured on the basis of an 8 ft. log in order to prevent the injustice of disregarding the large amount of material which can be cut from the slabs on a long log.

It includes all square edged boards which have a content of 2 feet board measure or over which can be cut from sound logs; in other words, boards which do not fall below the following dimensions:—

3 inches wide and 8 feet long.	5 inches wide and 5 feet long.
4 " " " 6 " "	6 " " " 4 " "

THE INTERNATIONAL LOG RULE.

Formula: $(D^2 \times .22) - .71D$ for 4-foot sections.
Taper Allowance: ½ inch per 4 feet lineal.
Standard scale for saws cutting a ⅛-inch kerf.

Dia.	Length of Log in Feet.													Dia.
	8	9	10	11	12	13	14	15	16	17	18	19	20	
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	5	5	5	3
4	.....	.....	5	5	5	5	5	5	5	10	10	10	10	4
5	5	5	5	5	10	10	10	10	15	15	15	15	20	5
6	10	10	10	15	15	15	20	20	20	25	25	30	30	6
7	15	15	15	20	20	25	25	30	30	35	35	40	45	7
8	20	20	25	25	30	35	35	40	45	45	50	55	60	8
9	25	30	30	35	40	45	50	50	55	60	65	70	75	9
10	30	35	40	45	50	55	60	65	70	75	85	90	95	10
11	40	45	50	55	65	70	75	80	90	95	105	110	115	11
12	50	55	65	70	75	85	90	100	105	115	125	130	140	12
13	60	65	75	85	90	100	110	120	130	140	145	155	165	13
14	70	80	90	100	110	120	130	140	150	160	175	185	195	14
15	80	90	105	115	125	140	150	160	175	185	200	215	225	15
16	95	105	120	130	145	160	170	185	200	215	230	245	260	16
17	105	120	135	150	165	180	195	210	225	245	260	275	295	17
18	120	135	155	170	185	205	220	240	255	275	295	310	330	18
19	135	155	175	190	210	230	250	270	290	310	330	350	370	19
20	150	170	195	215	235	255	275	300	320	345	365	390	410	20
21	170	190	215	235	260	285	305	330	355	380	405	430	455	21
22	185	210	235	260	285	315	340	365	390	420	445	475	500	22
23	205	230	260	285	315	345	370	400	430	460	490	520	550	23
24	225	255	285	315	345	375	405	440	470	500	535	565	600	24
25	245	275	310	345	375	410	445	475	510	545	580	615	650	25
26	265	300	335	370	405	445	480	520	555	595	630	670	705	26
27	290	325	365	405	440	480	520	560	600	640	680	725	765	27
28	310	350	395	435	475	520	560	605	645	690	735	780	825	28
29	335	380	425	470	510	560	605	650	695	740	790	835	885	29
30	360	405	455	500	550	600	645	695	745	795	845	895	950	30

Dia.	Length of Log in Feet.													Dia.
	8	9	10	11	12	13	14	15	16	17	18	19	20	
31	385	435	485	540	590	640	695	745	800	850	905	960	1015	31
32	410	465	520	575	630	685	740	795	850	910	965	1025	1080	32
33	440	495	555	610	670	730	790	850	905	970	1030	1090	1150	33
34	470	530	590	650	715	775	840	900	965	1030	1095	1160	1225	34
35	495	560	625	690	755	825	890	955	1025	1095	1160	1230	1300	35
36	525	595	665	735	800	875	945	1015	1085	1160	1230	1305	1375	36
37	560	630	705	775	850	925	1000	1075	1150	1225	1300	1380	1455	37
38	590	665	745	820	895	975	1055	1135	1210	1295	1375	1455	1535	38
39	620	705	785	865	945	1030	1110	1195	1280	1365	1450	1535	1620	39
40	655	740	825	910	995	1085	1170	1260	1345	1435	1525	1615	1705	40
41	690	780	870	960	1050	1140	1230	1325	1415	1510	1605	1700	1795	41
42	725	820	915	1010	1100	1200	1295	1390	1490	1585	1685	1785	1885	42
43	760	860	960	1060	1155	1260	1360	1460	1560	1665	1770	1870	1975	43
44	800	900	1005	1110	1215	1320	1425	1530	1635	1745	1855	1960	2070	44
45	835	945	1055	1160	1270	1380	1490	1600	1715	1825	1940	2050	2165	45
46	875	990	1100	1215	1330	1445	1560	1675	1790	1910	2030	2145	2265	46
47	915	1035	1150	1270	1390	1510	1630	1750	1870	1995	2120	2240	2365	47
48	955	1080	1205	1325	1450	1575	1700	1830	1955	2085	2210	2340	2470	48
49	1000	1125	1255	1385	1510	1645	1775	1905	2040	2170	2305	2440	2575	49
50	1040	1175	1310	1440	1575	1715	1850	1985	2125	2265	2400	2540	2680	50
51	1085	1225	1360	1500	1640	1785	1925	2070	2210	2355	2500	2645	2790	51
52	1125	1275	1420	1565	1710	1855	2005	2150	2300	2450	2600	2750	2905	52
53	1170	1325	1475	1625	1775	1930	2085	2235	2390	2545	2705	2860	3015	53
54	1220	1375	1530	1690	1845	2005	2165	2325	2485	2645	2810	2970	3135	54
55	1265	1430	1590	1755	1915	2080	2245	2410	2580	2745	2915	3085	3250	55
56	1315	1480	1650	1820	1985	2160	2330	2500	2675	2850	3025	3200	3375	56
57	1360	1535	1710	1885	2060	2240	2415	2595	2770	2955	3135	3315	3495	57
58	1410	1590	1775	1955	2135	2320	2505	2685	2870	3060	3245	3435	3620	58
59	1460	1650	1835	2025	2210	2400	2590	2780	2975	3165	3360	3555	3750	59
60	1510	1705	1900	2095	2290	2485	2680	2880	3075	3275	3475	3680	3880	60

From a large number of measurements it has been found that the average taper does not vary greatly with different species or in different localities, and in this rule a taper of 1 inch in 8 feet has been allowed.

The loss from saw kerf varies of course with the size of the saw, but as his standard Dr. Clark has taken 1-8 inch as the width of the kerf. He also allows 1-16 inch as a factor of safety for shrinkage in seasoning.

It is possible, with very little difficulty, to make corrections to suit local conditions of taper, crook, kerf, or defects. The allowance for rot is left as it should be to the judgment of the scaler.

Coming as it does from a forester who is familiar not only with the mathematical side of the question, but with practical lumber and milling operations, the introduction of this rule is a step towards a reform which is daily becoming more imperative and it should receive the careful consideration of all those who are interested in the exploitation of the forests. We especially recommend it for the consideration of those who have charge of th esale of Government timber.

Timber owners in the State of Washington have raised a fund for protection against fire. No state appropriation was made and the principal lumbermen got together and subscribed $8,133, which was placed at the disposal of the State Board of Forest Commissioners, and the State Fire Warden to be used in preventing and fighting fire during the dry season. The chief menace to the forests in Washington has been the operation of engines not equipped with proper meshing, as required by law. An attempt will be made this year to have the law strictly enforced. The netting of spark arresters used in coal burning engines should be not less than three mesh No. 12 wire to the inch, and the netting of spark arresters on wood burning engines should be not less than six mesh No. 16 wire to the square inch.

Many of the mill companies in Washington have asked the Forest Commissioners to appoint their woods foremen forest rangers, to serve without compensation from the State. These men have full authority in the fighting of forest fires in their various districts.

80-year old Spruce growing too densely to do well in Riding Mountain Forest and Game Reserve.

White Spruce grown mixed with Aspen and Balm in Riding Mountain Forest and Game Reserve.

AN ACT RESPECTING FOREST RESERVES.*

BILL No. 47.

Whereas it is expedient that reserves of Dominion lands in the provinces of Manitoba, Saskatchewan, Alberta and British Columbia should be made in order to protect and improve the forests for the purpose of maintaining a permanent supply of timber, to maintain conditions favorable to a continuous water supply, and to protect, so far as the Parliament of Canada has jurisdiction, the animals, fish and birds within the respective boundaries of such reserves, and otherwise to provide for the protection of the forests in the said provinces: Therefore, His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. This Act may be cited as the Dominion Forest Reserves Act.

2. All Dominion lands within the respective boundaries of the reserves mentioned in the schedule to this Act are hereby withdrawn from sale, settlement and occupancy under the provisions of the Dominion Lands Act, or of any other Act, or of any regulations made thereunder with respect to mines or mining or timber or timber licenses or leases or any other matter whatsoever, and after the passing of this Act no Dominion lands within the boundaries of the said reserves shall be sold, leased or otherwise disposed of, or be located or settled upon, and no person shall use or occupy any part of such lands, except under the provisions of this Act or any regulations made thereunder.

3. The said reserves are hereby set apart and established and shall hereafter be and be known as Dominion Forest Reserves, for the maintenance and protection of the timber growing or which may hereafter grow therein, and for the protection, so far as the Parliament of Canada has jurisdiction, of the animals and birds therein, and the fish in the waters therein; but subject to such regulations as may be made under the provisions of section 4 of this Act.

4. The said reserves shall be under the control and management of the Superintendent of Forestry, or such other person as is from time to time in charge of forestry for Canada, subject to the direction of the Minister of the Interior; and the Governor in Council may make regulations, not inconsistent with the provisions of this Act, for the maintenance, protection, care,

* Passed by House of Commons, 1906.

management and utilization of such reserves, and of the timber and minerals therein, and, so far as the Parliament of Canada has jurisdiction, of the animals and birds therein and the fish in the waters therein, and for the prevention of trespass thereon.

ii. Such regulations shall be published for four consecutive weeks in the CANADA GAZETTE, and shall thereupon have the same force and effect as if herein enacted, and the said regulations shall be laid before Parliament during the first fifteen days of the then next session thereof.

5. The Minister of the Interior may appoint forest rangers for the purpose of carrying out the provisions of this Act, and every such ranger shall, for the purpose of this Act, have within the district for which he is appointed all the powers of a justice of the peace.

6. Every such ranger shall, before acting in that capacity, take and subscribe before a judge or notary public, or the Superintendent of Forestry or other person in charge of forestry for Canada, an oath in the words following:—

"I, A. B., a forest ranger in and for the district or territory described in my appointment, do solemnly swear that, to the best of my judgment, I will faithfully, honestly and impartially fulfil, execute and perform the office and duty of such forest ranger according to the true intent and meaning of the Dominion Forest Reserves Act, and of all regulations made or to be made thereunder; so help me God."

7. The Governor in Council may exchange for any land within any such reserve, the title to which is not vested in the Crown in the right of Canada, available Dominion lands situated outside the boundaries of such reserves, and where necessary, may make compensation upon such exchange, and a copy of every order in council authorizing such exchange shall be laid before Parliament during the first fifteen days of the then next session thereof.

8. Where a road allowance within the boundaries of any such reserve has been vested in the Crown in the right of the province in which it is situated, or has passed under the control of the executive authorities of the province, such road allowance may, with the consent of the Lieutenant Governor of the province in Council, be included in and form part of such reserve and may be closed by any fence which may be erected for the enclosure of such reserve, or any part thereof.

9. Notwithstanding anything in this Act, the Governor in Council may cause to be established through and over any such reserve such roads as are necessary for the convenience of the public, and nothing in this Act or in any regulation made there-

under shall prevent the proper use of such roads by bona fide travellers or by others requiring to cross such reserve in the pursuit of their ordinary business or calling, but nothing in this section shall operate to withdraw such roads from the reserve.

10. During the construction of any railway passing through Dominion lands, the Minister of the Interior may appoint such forest rangers as he deems necessary for the protection from fire of the forests along or adjacent to such railway, and it shall be the duty of every such ranger to enforce the provisions of this Act and any regulations made thereunder, and of any other Act either of the Parliament of Canada or of the province in which such lands are situated, when and in so far as such acts or any regulations made thereunder relate to the prevention of fires and are in force in the district for which such ranger is appointed; and for such purposes and within a tract of five miles on either side of such railway every such ranger shall have all the powers of a justice of the peace, and one-half of the expenses incident to and connected with such fire ranging shall be a debt due to the Crown from the person constructing such railway and shall be payable upon demand of the Minister of the Interior, and may be recovered at the suit of the Crown in any court of competent jurisdiction.

ii. The Governor in Council may make such regulations as he deems necessary or expedient to give full effect to the object and intention of this section.

11. The Governor in Council may secure from the holder of any title to or interest in any land within the limits of a forest reserve a waiver in writing of the exemption of such land from the provisions of any regulations made under this Act for the prevention of trespass and the protection of game, and, where necessary, may make compensation therefor, and from the date of such waiver, and to the extent therein agreed upon, this Act and the regulations made thereunder shall apply to such lands.

12. Except as hereinafter otherwise provided, this Act shall not apply to lands within the boundaries of any reserve set apart and established under the provisions thereof the title to which is not vested in the Crown in the right of Canada at the date of the passing of this Act, and shall not apply to any lands within such boundaries which at that date are held under lease or are subject to a license to cut timber or to any other right or interest therein or affecting the same, so long as such lease or license remains in force or such right or interest continues to exist; Provided that nothing contained in any lease or licen heretofore granted shall be deemed to prevent the opera on

of this Act or any regulation made thereunder with respect to the protection of game, the prevention of fires and the preservation and reproduction of timber; and provided further that when any land upon which a lease or license to cut timber has been granted does not contain, or has become denuded of, merchantable standing timber, such land may thereupon be withdrawn from such lease or license upon notice to the lessee or licensee, and such land shall thenceforth be subject to all the provisions of this Act and of any regulations made thereunder

13. Neither the Governor in Council nor the Minister is authorized or empowered for the purposes of this Act to expropriate, purchase or acquire for compensation any right or interest held under license to cut timber.

ii. In the event of the Governor in Council or the Minister being hereafter authorized or empowered for the purposes of this Act to expropriate, purchase or acquire any such right or interest, the compensation payable therefor shall not be assessed or determined, either judicially or by agreement, at any larger or increased amount by reason of the land covered by such right or interest being situate in any forest reserve created under the authority of this Act.

14. Any person violating any provision of this Act or any regulation made thereunder shall, in addition to any civil liability thereby incurred, be liable, on summary conviction, to a penalty of not more than one hundred dollars, and in default of immediate payment of such penalty and of the costs of prosecution such person may be imprisoned, with or without hard labour, for any term not exceeding six months.

SCHEDULE.

The Dominion Forest Reserves set apart and established under the provisions of section 2 of the Dominion Forest Reserves Act, and the boundaries of each of such reserves.

PROVINCE OF BRITISH COLUMBIA.

1. The Long Lake Dominion Forest Reserve, in the railway belt, in the province of British Columbia, consisting of the west half of township 17, range 18; township 17, range 19, except sections 5, 6, 7, 8, 17, 18, 19 and 20 of the said township; the west half of township 18, range 18; township 18, ranges 19 and 20; the south half of township 19, range 19; township 19, range 20, all west of the 6th meridian, and containing 190 square miles, more or less.

2. The Monte Hills Dominion Forest Reserve, in the said railway belt, consisting of the north-west quarter of township 16, range 14; the north half of township 16, range 15; sections

24, 25, 26, 27, 34, 35 and 36 in township 16, range 16; the west half of township 17, range 14; township 17, range 15, and the east half of township 17, range 16; all west of the 6th meridian, and containing 106 square miles, more or less.

3. The Martin Mountain Dominion Forest Reserve, in the said railway belt, consisting of sections 4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20 and 21 of township 19, range 13; and sections 1, 2, 3, 10, 11 and 12 of township 19, range 14; all west of the 6th meridian, and containing 18 square miles, more or less.

4. The Niskonlith Dominion Forest Reserve, in the said railway belt, consisting of township 21, ranges 14 and 15; the east half of township 21, range 16, except that part included in Kamloops Indian Reserve; township 22, range 14, west of the 6th meridian; and containing 124½ square miles, more or less.

5. The Tranquille Dominion Forest Reserve, in the said railway belt, consisting of township 22, ranges 18 and 19; that part of township 23, range 18, included in the said railway belt; township 23, range 19; that part of township 24, range 19, included in the said railway belt; all west of the 6th meridian, and containing 149 square miles, more or less.

6. The Hat Creek Dominion Forest Reserve, in the said railway belt, consisting of township 18, range 26; township 18, range 27, except the south-west quarter of the said township; that part of the north half of township 18, range 28, within the said railway belt, not included in the Indian Reserve; the west half of township 19, range 25; the east half of township 19, range 26; township 19, range 27; the easterly first tier of sections in township 19, range 28; that part of the south-west quarter of township 20, range 25, not included in the Cornwall Ranch; the south-east quarter of township 20, range 26; the west half of township 20, range 27; the easterly first tier of sections in township 20, range 28; section 4 of township 22, range 27; that part of the west half of township 21, range 27, within the said railway belt and not included in the Indian Reserve; all west of the 6th meridian; and containing 206 square miles, more or less.

7. The Donald Dominion Forest Reserve, in the said railway belt, consisting of that part of township 28, range 22, which lies north and east of the Canadian Pacific Railway; that part of township 29, range 23, which lies north of the Canadian Pacific Railway; that part of township 29, range 24, which lies north of the Canadian Pacific Railway; the west half of township 29, range 22; all west of the 5th meridian, and containing 72 square miles, more or less.

8. The Larch Hills Dominion Forest Reserve, in the said railway belt, consisting of that part of township 21, range 8, which lies south of Salmon Arm and west of Mara Lake; that part

of township 21, range 9, south of Salmon Arm, except sections 5 and 6; all west of the 6th meridian, and containing 25 square miles, more or less.

PROVINCE OF MANITOBA.

9. The Riding Mountain Dominion Forest Reserve, in the province of Manitoba, consisting of township 18, range 16; of township 19, ranges 16, 17, 19 and 20; of township 20, ranges 17, 18, 19 and 20; of township 21, ranges 17, 18, 19, 20, 21, 22 and 23; of township 22, ranges 18, 19, 20, 21, 22, 23, 24, 25 and 26; of township 23, ranges 24 and 25; of township 24, ranges 26 and 27; of township 25, ranges 26 and 27; the following sections in township 18, range 17, namely, sections 1, 13, 24, 25, 26, 35, and 36, and the east half of section 12; in township 18, range 19, sections 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36; the north-east quarter of township 18, range 20; in township 20, range 21, sections 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36; the north half of township 20, range 22; all of township 23, range 26, except section 6; in township 25, range 25, sections 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, and those parts of sections 31, 32 and 33 which may not be included in the Gambler Indian Reserve, probably one and a half square miles; the west half of township 24, range 25; in township 23, range 23, the following sections, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 and 30; in township 23, range 22, sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24; in township 23, range 21, sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, and the south half of 22; all of that portion of township 23, range 20, lying south and east of the Vermilion River, excepting sections 36 and that part of section 35 lying east of the said river; in township 23, range 19, sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30; in township 23, range 18, sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 29 and 30; in township 22, range 17, sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, and the west half of sections 1, 12 and 13; in township 21, range 16, sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, 33, and the south half and north-west quarter of section 14; all of township 20, range 16, except the north-east quarter of section 36; all of township 19, range 18, except the south-west quarter and the west half of the south-east quarter of section 3, and the east half of the south-east quarter of section 4: all of the above being west of the first

principal meridian, and containing in all 1,535 square miles, more or less.

10. The Turtle Mountain Dominion Forest Reserve, in the province of Manitoba, consisting of all of township 1 in ranges 20 and 21, and sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 28, 29, 30 and 31, and the west half of section 27, township 1, range 19, and sections 1, 2, 11, 12, 13, 14, 24, 25, 36, and the east half of section 23 and the south-east quarter of section 26 in township 1, range 22: all west of the first principal meridian and containing 109¼ square miles, more or less.

11. The Lake Manitoba West Dominion Forest Reserve, in the province of Manitoba, consisting of township 21 ranges 11, 12 and 13; township 22, ranges 12 and 13; township 23, range 13; and that part of township 23, range 12, not included in the Ebb and Flow Indian Reserve No. 52: all lying west of the first principal meridian and containing 248 square miles, more or less.

12. The Spruce Woods Dominion Forest Reserve, in the province of Manitoba, consisting of all of township 9, range 15; sections 1, 2, 3, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35 and 36, in township 9, range 16; sections 4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20 and 21, in township 10, range 15; sections 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27, 28, 29 and 30, in township 10, range 16; sections 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36, in township 8, range 15; all lying west of the first principal meridian and containing 110 square miles, more or less.

13. The Duck Mountain Dominion Forest Reserve, in the province of Manitoba, consisting of township 27, ranges 24, 25 and 26; township 28, ranges 24, 25 and 26; township 29, range 23, except the easterly tier of sections, and ranges 24, 25, 26, 27; township 30, range 23, except the easterly tier of sections, and ranges 24, 25, 26, 27; township 31, ranges 23, 24, 25, 26, 27; township 32, ranges 24, 25, 26, 27; township 33, ranges 24, 25, 26, 27; township 34, ranges 24, 25, 26; township 35, range 24; sections 19, 20, 29, 30, 31 and 32 of township 26, range 24; north half of township 26, ranges 25 and 26; east half of township 35, range 25; west half of township 33, range 23; west half of township 28, range 23; all west of the 1st principal meridian and containing 1, 251 square miles, more or less.

14. The Porcupine Dominion Forest Reserve No. 1, in the province of Manitoba, consisting of townships 41 and 42, range 27; townships 40, 41 and 42, range 28; the northerly four tiers of sections in township 39; and townships 40, 41 and 42, range

29; all west of the 1st principal meridian, and containing 322 square miles, more or less.

PROVINCE OF SASKATCHEWAN.

15. The Beaver Hills Dominion Forest Reserve, in the province of Saskatchewan, consisting of township 26, ranges 9 and 10, west of the second principal meridian, containing 72 square miles, more or less.

16. The Pines Dominion Forest Reserve, in the province of Saskatchewan, consisting of all of township 47, range 2; all of township 46, range 2, except sections 5 and 6; sections 25, 26, 35 and 36, in township 45, range 2; sections 4, 5, 6, 7, 8, 9, 10, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, and 33, in township 45, range 1; sections 5, 6, 7, 8, 9, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, 33, and 34, in township 46, range 1; sections 5, 6, 7, 8, 9, 17, 18, 19, 20, 21, 27, 28, 29, 30, 31, 32 and 33, in township 47, range 1; sections 1, 2, 3, 4, 10, 11, 12, 13, 14, 15, and those parts of sections 5, 8, 9 and 16, lying east of the north branch of the Saskatchewan river, in township 48, range 2: all lying west of the 3rd principal meridian and containing 145 square miles, more or less.

17. The Moose Mountain Dominion Forest Reserve, in the province of Saskatchewan, consisting of all of township 10, range 4; all of township 10, range 3, not included in the White Bear Indian Reserve No. 70; sections 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 27, 28, 29, 30, 31, and those parts of sections 7, 8, 9, 10, 11 not included in the White Bear Indian Reserve No. 70 in township 10, range 2; sections 1, 2, 3, 4, 5, 6, 9, 10, 11, the south half of section 7 and the south half and north-east quarter of section 8, in township 11, range 3; sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and the west half of section 12 in township 11, range 4; sections 1, 2, 11, 12, in township 11, range 5; sections 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 35 and 36, and those parts of sections 4, 9, 16 and 21 which were not included in the old Indian Reserves Pheasant's Rump No. 68 and the Ocean Man No. 69, in township 10, range 5; sections 24, 25, 26, 34, 35, 36; the north half and south-east quarter of section 23; the north half and south-east quarter of section 27, and that part of the north-east quarter of section 28 and of the east half of section 33, which were not included in the old Ocean Man Indian Reserve No. 69, in township 9, range 5; sections 19, 20, 21, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36, in township 9, range 4; sections 19, 20, 21, 28, 29, 30, 31, 32, 33, and those parts of sections 22, 27 and 34, not included in the White Bear Indian Reserve No. 70 in township 9, range 3: all west of the 2nd principal meridian and containing 163 square miles, more or less.

18. The Porcupine Dominion Forest Reserve No. 2, in the province of Saskatchewan, consisting of townships 39, 40, 41 and 42, range 30; townships 39, 40, 41 and 42, ranges 31 and 32; all west of the first principal meridian, and containing 360 square miles, more or less.

PROVINCE OF ALBERTA.

19. The Cooking Lake Dominion Forest Reserve, in the province of Alberta, consisting of township 52, range 19, west half; township 52, range 20; township 53, range 20; township 54, range 19, sections 18, 19, 30 and 31; township 54, range 20, sections 2, 3, 4, 5, 9, 10, 11, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35 and 36; township 51, range 21, section 7; all lying west of the fourth principal meridian, and containing 114 square miles, more or less.

20. The Cypress Hills Dominion Forest Reserve, in the province of Alberta, consisting of the south half of township 8, range 3, west of the fourth principal meridian.

21. The Kootenay Lakes Dominion Forest Reserve, in the province of Alberta, consisting of the west half of township 1, and the south-west quarter of township 2, range 29, west of the fourth meridian; the east half of township 1, and the south-east quarter of township 2, range 30, west of the fourth meridian, containing 34,560 acres, more or less.

A brief reference was made last month to the Act to encourage the planting of forest and fruit trees in the State of Iowa. The Bill provides that on any tract of land in the state the owner or owners may select a permanent forest reservation not less than two acres in continuous area, or a fruit tree reservation not less than one nor more than five acres in area, or both, and that upon compliance with the provisions of the Act the forest reservation shall be assessed on a taxable valuation of one dollar per acre, and the fruit tree reservation on a taxable valuation of one dollar per acre for eight years. In all other cases where trees are planted upon any tract of land, without regard to area for forest, fruit, shade or ornamental purposes, or for wind-breaks, the assessor shall *not* increase the valuation of such property because of such improvement.

FOREST LAND TAXATION.

To anyone who has anything to do with "Woodland Taxation," the very able and carefully worked up article on that subject in the October number of this journal could not fail to interest and instruct.

In this connection it is interesting to note that up to the present day even such taxation is on an agricultural basis in many of the most civilized parts of the world, and not in such proportion as is suggested by Dr. Judson Clark. The countries in which this is the case are notably Germany, Austria and Great Britain. Of the others I cannot speak from experience, but I believe it is true of France as well. In Great Britain this is one of the obstacles in the way of promoting rational forestry in the place of beautiful but profitless arboriculture. The mitigating feature of the rate, however, is that it was made in the seventeenth century when land values were low in Europe so that today it is not very much felt. Saxony, of all countries, the most unexpected, with its modern forestry organization and fully developed manufacturing industries, still continues on this basis, but happily the rate was fixed in 1636. This, of course, only refers to private lands and estates.

The state forest, on the other hand, is treated quite differently, the timber being sold either standing or after being cut down, and no areas are leased for a term of years, so that no rent is payable. In Austria, Hungary and Roumania, such leases occur, but no rental is payable, only royalties on the quantity of timber cut. The same principle has been applied in India, where a royalty on each different size and quantity allowed to be felled is paid. Here in West Africa, even when areas are leased for five or seven years, the same rule applies. Some years ago, before a forestry department was started, before any foresters were in the country, a rental of $15 per mile was payable, besides $2.50 per tree to the chief on whose land the trees were felled and a Government royalty of the same amount. As soon as a Forestry Department was formed, in 1902, with a forester, Mr. A. N. Thompson, of Indian experience, at its head, the law was altered and stands at present as follows:—

A commuted royalty on each tree of about 12 feet girth, varying from $5 to $15 according to the variety, is paid. Mahogany and cedar being the most valuable, are liable to the highest royalty, whereas ebony, walnut (no relation of *Juglans nigra*, Canadian or American black walnut) and the common woods of the country pay the least. No rental is payable, but the chiefs

owning the land, get $2.50 for each tree felled. These regulations vary from year to year, according to the place where cutting is being done. The same system is also followed in Siam.

As an incentive to replanting "cut over" areas in some parts of the Black Forest, not only are plants supplied free of charge or money premiums given for planting, but also remission of all land taxation is granted for twenty years, for the land planted, which means that it is tax free, until it yields a small return again, which it does by that time in the locality referred to.

At the present time a method of getting forest preservation practised, and with it a certain amount of forestry, would be to remit all taxation of land under forest or woodland on farms for ten years and then after that tax it on the 17-100 basis.

Those people who notoriously made no attempt at preserving any woodland on their farms might be made to pay double the prevailing rate. If such a law were handled in a liberal spirit, and not too harshly, much might be done to promote rational woodcraft on the farm. Half the fees made by taxing the non-forestry-inclined-farmers might be given to those who undertook extensive planting operations in the older settled portions of the country. This refers primarily to the Province of Ontario. The land office might co-operate with the Forestry Department in gathering this information as to the planting done each year.

It is to be hoped that others will continue the discussion of this subject of Forest Taxation so that some practical action may be taken as an answer to this most important question bearing on the forestry problem in Canada. Upon it turns largely the future of the forest, and for that reason its importance cannot be overrated.

A. HAROLD UNWIN,
Assistant Conservator of Forests.

Benin City, W. Africa, April 19th, 1906.

15.

EXTRACT FROM REPORT OF THE ROYAL COMMISSION ON THE UNIVERSITY OF TORONTO.

INSTRUCTION IN FORESTRY.

"The distinctively State character of the University entails upon it obligations in respect of all the great provincial interests in which higher education is an important factor. This is eminently true of instruction in forestry. The value to the country of scientific work in forestry has been already recognized upon this continent, but in Canada little has been done to apply systematically the lessons taught equally by sound economic theory and practical experience. It is surprising that Ontario, with its rich areas of timber, has hitherto failed to set up a school of forestry in its own University for the double purpose of providing technical training for young men in an important branch of science, and of benefiting in the conservation of its forest wealth by their knowledge and skill. It would be difficult to mention a case in which the State's duty and interest go more completely hand in hand. In the United States forestry is now an department of the Federal Government's service and is presided over by the Hon. Gifford Pinchot, with whom the Commission has held a conference. Dr. Pinchot has practically created the Forestry course in Yale University, and from that fact and from the knowledge required by his official position in Washington, he is a competent authority upon the whole question. The Commission also consulted, during its visit to Ithaca, Prof. Fernow, who was the founder of the School of Forestry maintained for a time by Cornell University, and who is justly esteemed for his knowledge of forestry."

"There is no doubt that a great work in forestry can be done in this Province by the University, provided it receives the co-operation and encouragement of the Government. The Agricultural College has already provided for instruction in agricultural forestry, which meets the needs of farmers with wood lots to care for and develop. The larger problem is that which touches the immense Crown domain urgently calling for the application there of the newest discoveries in forestry and for the training of skilled men to conduct experiments on a large scale in order to test methods of reforestation and the conservation of valuable timber. It would, in our judgment, be a lamentable error if the direct value of a Forestry Department in the University to the Province in its administration of timber areas were not ascertained."

Log Road in the Riding Mountain Forest and Game Reserve,
near Dauphin, Man.

Saw Mill in the Riding Mountain Forest and Game Reserve,
near Dauphin, Man.

"According to the best sources of information to which we have had access, a single chair of Forestry in the University would effect little. One professor could give theoretical instruction, but he could not produce foresters capable of practising their profession. For this field-work is essential. This requires a staff, not of necessity a large one, but adequate to the scope of the work to be done. The Cornell School of Forestry, discontinued owing to a dispute with the State of New York, was a complete University faculty. The Yale School is also a faculty with three full professorships, those of Botany, Civil Engineering and Lumbering, with many instructors who lecture on different kinds of work in the woods. The laboratory equipment cost about $20,000. At Yale the students must be graduates in Arts. We realize that a beginning may be made without incurring at first all the expenditures of a complete faculty. The University courses in Botany, Chemistry and Engineering could be utilized for the instruction required in these branches and this could be supplemented by a forestry staff of three possessing the special knowledge demanded to carry on both inside and field work. The possession by the Crown of timber lands where practical instruction and experiments could be carried on simplifies the situation, and we recommend that the closest co-operation compatible with the end sought should exist between the University authorities and the Department of Lands. It should likewise be kept in view that the private owners of timber lands have a direct interest in the supply of trained men produced by such a school, and in the results of the experiments made. In the United States the National Lumbermen's Association is subscribing a fund of $150,000 to endow courses of instruction at Yale. Similar action in Canada should be encouraged. We are strongly of the view that the people of Ontario will endorse the action of the Government in creating a School of Forestry, by means of which the scientific treatment of our forests can be effectively carried out."

REVIEWS.

The Determination of Timber Values, by Edward A. Braniff. Reprinted from U. S. Department of Agriculture Yearbook for 1904.

This little pamphlet will be of inestimable service to all lumbermen in estimating the value of growing timber, as by means of the tables furnished by Mr. Braniff little difficulty will be experienced in determining what trees can be cut most profitably. Until recently there was scant data upon which to base such estimates, but Mr. Braniff's experiments were made with such care that his estimates may be depended upon to be as nearly correct as they could be made. They were made, not with single logs, but with whole trees, and the total number from which the output was traced was considerable. The logs composing each tree were sawn one after the other and the lumber graded and tallied as it came from the saws. It was found that there was a very considerable difference in the value per thousand feet of lumber taken from large and small trees. For example, yellow birch thirteen inches in diameter at the stump averages $9.32 per 1,000 feet for all the wood used, while from trees thirty-one inches in diameter the average was $17.75, a difference of $8.43 per 1,000 feet, accounted for partly by the presence in the high diameters of the high-priced grade "firsts and seconds red." Sugar Maple was found to increase in value from $9.75 for a 13-inch tree to $13.58 for a 28-inch tree, and beech from $8.29 for a 13-inch tree to $9.68 for those of twenty-four inches. The practical value of these experiments lies chiefly in the fact that they make clear the unprofitableness of cutting small trees, and except when the land must be cleared it is plain that lumbermen are working directly against their own interests when they permit indiscriminate cutting.

Summary Report of the Geological Survey of Canada for 1905.

The explorers and geologists sent out by the Geological Survey have exceptional opportunities for noting the distribution of trees and the extent and probable value of forests in little known regions, but the report just issued contains fewer notes of this kind than usual as few of the members of the Geological Survey worked last season in districts in which there are valuable forests.

Mr. R. A. McConnell spent part of the season of 1905 in the basin of the White River, one of the principal western tributaries of the Yukon. He found a sparse forest, the chief trees being black and white spruce, aspen, balsam poplar and birch. As a rule the forest is sparse and ceases at about 4,000 altitude. A short time was also spent on Windy Arm, Tagish Lake. The forest is scanty, but there is a supply of rough lumber within easy distance of the mining camps suitable for ordinary mining purposes.

Between Lake Winnipeg and Hudson Bay, Mr. W. Stewart Dobbs travelled by the usual route from Norway House to God's Lake and then examined the country along the Shamattawa and Pekano Rivers. He found almost everywhere that the forest had been burnt over within the last ten years, and many fires were noted in 1905. Mr. Dobbs reports that these frequent burnings are almost always due to the carelessness of Indians. Several unextinguished camp fires were put out by members of his party. He recommends the establishment of a Forestry Department for the region and believes that with a little training the Indians would make good forest rangers.

Mr. W. McInnes worked in the vicinity of Trout Lake, Keewatin, and about the headquarters of the Attawapiskat and Winisk Rivers. The timber over most of the area explored was found to be of small size, though along the banks of the Winisk River and south of that river, there are considerable areas of spruce, poplar and white birch reaching diameters at the stump of from one foot to fifteen inches.

The Geological Survey of Canada, Annual Report Vol. XIV. A. P. Low, Director.

Volume XIV of the Geological Survey, the publication of which has been so long delayed owing to structural alterations in the Printing Bureau, has at last made its appearance and, in all respects but one, is of essentially the same character as in former years. That is to say, it contains several reports that have been published many months ago and which, for no reason whatever, are bound together to make a volume. We do not believe that the Sudbury man who wishes to read Dr. Barlow's bulletin on nickel is at all keen on saddling himself with Dr. Adam's views on the wells in the Island of Montreal. And it seems exceedingly improbable that, say a Montreal Brewery Company, interested in deep boring in Hochelaga county, feels it necessary to peruse Mr. McConnell's views on the Nasina series in the Klondike district. This volume, however, is, we understand, the last but

two of the series, the new Director having decided that Vol. XVI will be the last of the series.

The feature that differentiates Vol. XIV from its predecessors is, undoubtedly, the Index. For the first time since these volumes have been published, has a really adequate index been issued with the work and any one who has need to consult scientific books knows what a void a reliable and complete Analytical Index can fill.

The compiler of the Index to Vol. XIV is Editor to the Geological Survey and has now in preparation an Index of the Survey's publications since 1885. We have been permitted to inspect the manuscript of this general Index and can assure our readers that it is compiled with an amount of care and conscientiousness very rare in Government contract work. No trouble has been spared to make the work a reliable reference to the resources of the Dominion as expounded by the Survey officers, and though forestry has not received any more attention than any other branch of the work, it was naturally to forestry that we turned.

Every tree, plant or flower in Canada is assigned to the district or districts in which it is found, so that one has only to look up each particular tree in the Index to know exactly in what locality it flourishes. It has occurred to us that it would be of great service to our readers if we were to print, from time to time, extracts from this work, showing the exact distribution of the common trees in Canada. A very great many references, for example, are assigned to "Spruce"—too many, by far, for us to print in this issue, but the list is divided into the various kinds of spruce, from which we cull, as an illustration, the white variety. It must, however, be mentioned that the work is not yet completed and that the subjoined list does not, therefore, purport to include every district in which white spruce is found.

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Saguenay County.....169, 175, 193 L, Vol. VIII.

SASKATCHEWAN

YUKON

Mr. R. D. Craig, Inspector of Forest Reserves, has just returned to Ottawa from the west for a short time.

The Forestry Branch is this year making a detailed survey of the Riding Mountain Forest Reserve with a view to determining the amount of timber on the reserve, the rate of growth of the various species, and general sylvicultural and economic conditions. The Riding Mountain is still quite well forested with white and black poplar, spruce, larch, birch and some jack pine, Manitoba maple, ash, elm, and oak. Fires have done a great deal of damage in the past and of late years. Galician and halfbreed squatters have encroached upon the forest and set many destructive fires in order to remove the timber which they think is the cause of the land being withheld from homestead entry. The land is not suitable for profitable agriculture, but is excellent for forestry purposes.

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Forestry Association Convention trip to Mr. Gilley's limit near Vancouver.

Canadian Forestry Journal.

VOL. II. DECEMBER, 1906. No. 4.

CANADIAN FORESTRY CONVENTION.

VANCOUVER, B.C., 26TH AND 27TH SEPTEMBER, 1906.

The Canadian Forestry Convention held in Myers' Hall, Vancouver, on the 26th and 27th of September, was successful, both in the large number in attendance and in the enthusiasm and interest which it awakened. No province of greater forest wealth or more magnificent possibilities than British Columbia, no pleasanter or more beautiful place than the City of Vancouver could have been chosen for the holding of the Convention, and no welcome could have been warmer than that given to the delegates by the city and the Lumbermen's Association.

The arrangements made by the local committee were thorough, so that the work of the Convention was carried on smoothly.

The Convention owed much to the kindly interest and support of His Excellency the Governor-General and Lady Grey, and the co-operation of the Provincial authorities was also heartily given.

At the opening of the Convention, Mr. John Hendry, President of the British Columbia Lumber and Shingle Manufacturer's Association, welcomed the delegates, and then called Mr. E. Stewart, President of the Canadian Forestry Association, to the chair, who responded in a few words to the kindly welcome. The President then called upon His Excellency the Governor-General to open the Convention. He was received with cheers and said:

"It is, I consider, a very high privilege, to be allowed to open this forestry convention," he said after his introduction,

"which has assembled on the invitation of Mr. Hendry, representing the Lumbermen and Shingle Manufacturers of British Columbia. This convention has been called together for the purpose of considering what steps shall be taken to discover and to apply to the forests of British Columbia the best methods of forest management. At the beginning of this year, a similar convention was held at Ottawa, under the presidency of the Federal Prime Minister, Sir Wilfrid Laurier, who convened it. I attended all the meetings of the convention, which lasted for three days, and I can bear witness to the fact that from the beginning to the end of that interesting convention, the papers and discussions averaged a singularly high order of merit, and that the interest of those attending the convention never flagged. The reason for this continued and sustained interest was this: We were dealing with a subject which all of us recognised to be of vital importance to the well-being of Canada. (Applause). We realised that the forests of Canada are the reservoirs that feed the rivers, on the even and continuous flow of which the agricultural prosperity of Canada depends. We realised that the reckless and wanton deforestration of other lands had converted territories at one time prosperous and populous, into stretches of barren wilderness, and we also realised as we listened to the papers and discussions, that in her forests Canada possesses an asset of priceless value and that if we can only apply to their management those principles and methods which have been shown to give the best results in other countries, we may look forward to deriving from our forests a continuous and increasing revenue, without destroying our capital. (Applause). The world's demand for timber is steadily increasing, the thoughtless improvidence of other countries having depleted timber resources which were considered almost as inexhaustible as those of British Columbia itself. I cannot commend to you too strongly the importance of studying now, before it is too late, those methods and principles of forest management which the experience and research of other nations may indicate to be the best. At Ottawa we were very greatly assisted by Mr. Pinchot, the head of the Forestry Department of Washington. I had hoped that Mr. Pinchot, whose admirable primer on Forestry ought to be on the bookshelf of everyone who cares about trees, might have been present here to-day. President Roosevelt is a warm friend of Canada, and takes a great deal of pleasure in helping Canadians to promote the welfare of their own country. Mr. Pinchot has kindly sent as his representative, Mr. Price, whom we are fortunate to have among us to-day, and I am sure that I am only voicing your sentiments when I say that you are grateful to the Government of the United States for sending Mr. Price to assist us in the work of this convention." (Applause.)

HON. JAMES DUNSMUIR,

Lieutenant-Governor, who was the next speaker, said:

"Your Excellency, Mr. Chairman, ladies and gentlemen,—It is with the greatest pleasure that I welcome the delegates of the Canadian Forestry Association here to-day, who have assembled from all parts of the Dominion in this city of Vancouver to discuss a subject that is in this Province second to none in any other portion of the continent. (Applause.) Many of you are visiting this coast for the first time, and cannot fail to be impressed with the widespread development that is going on throughout the West in which the lumber industry plays a very prominent part. Graced by the presence of His Excellency, the Governor-General, and surrounded by every evidence of prosperity, you are met in a vigorous city that is springing up as if by magic. Surely there is no better place for the inauguration of your labors. (Applause.) I feel sure that in His Excellency the Governor-General, the Forestry Association will have a friend who knows, from his extensive travels throughout the Dominion, how enormous are the extent and values of our forests, and undoubtedly his influence will be most favorably directed. (Applause.) Allow me to congratulate the Association on the great work it has already accomplished in awakening the public interest in forestry, and let me assure you, gentlemen, that you have my sincere good wishes. I trust that your deliberations will bring forth results that will be beneficial, not only to British Columbia, but to Canada as a whole." (Applause.)

PREMIER MCBRIDE

said it was indeed a great privilege to be invited to be present at the meeting of the Association and to take some part in the opening proceedings. He was interested because it was essentially a business concern. "Your conventions," he said, "are not given to those formalities which are experienced in the West from time to time in public gatherings of this kind. It is more than an ordinary privilege to take part in the opening proceedings, and as a Canadian resident of British Columbia, I am proud to be on the platform side by side with the representative of King Edward VII. The Association, so far as it has been successful in finding the eye of the representative of the King in Canada, is a most fortunate body indeed. I listened with a great deal of interest to the words of the President when he referred in flattering terms to the work of Lord Grey's predecessor, Lord Minto, and he had also listened to His Excellency's words at the meeting in Ottawa not so very long ago, pointing conclusively to the fact that this subject is engaging a great deal of attention in this Dominion of ours. In regard to the meeting place, I feel satisfied

that no quarter of the Dominion could have been taken in preference to Vancouver and in British Columbia.

"It is no vain boast of the Canadians who live in the West to say that the timber wealth of this Province is illimitable, and that there is no place in the known globe where the timber can compare in quantity or in quality with the huge forests of British Columbia. (Applause.) It has been to those who have charge of the business of the country a serious matter when they come to consider just how far reaching their responsibility with regard to the timber industry really is. His Excellency has sounded a note of warning. He has spoken of countries where wanton waste has resulted in deforestration, and he told us that we must be careful in this Province not to repeat the same experience. The warning is well-timed. I find in my intercourse with lumbermen that very great surprise is occasioned among those engaged in the industry in the East at the wasteful practice which prevails here of allowing a great deal of valuable timber to lie and rot in the woods, which, down in the interior and eastern parts of the continent, would be considered a marketable commodity. The first duty of British Columbians is the preservation of the forests, and the economical operation of the lumber industry. (Applause.)

"Up to date British Columbians have been trying to do the very best they can with the resources at command. It must be remembered however, that the superficial area of this Province is much greater than the area of the Province of Ontario, or that of Quebec, or of all the maritime provinces put together. When it is considered that a mere handful of taxpayers has the responsibility of attending to this immense area, I think it must be admitted that the Province has done remarkably well. But the Province is not satisfied with what it has done. (Applause.) The people were quite sensible of the situation which stares them in the face. They know that the tremendous forest fires which rage in the summer and fall mean the destruction of thousands of dollars' worth of valuable timber. We know that away beyond the zone in which Vancouver finds herself, away down in the interior of the Province, the same waste goes on, and we realize that the responsibility rests upon us to deal with the problem as soon as it is possible to do so." (Applause.)

After acknowledging the ready co-operation which the Provincial authorities receive in this direction from the Dominion authorities in the same field, Mr. McBride said it was a matter for great congratulation that such a spirit of co-operation was manifest in the Province between employers and employed in the lumber industry. To-day, he said, the mills of the Province were running, he believed, at their full capacity. They had orders that would keep them so employed for months to come,

and he considered that it was fortunate to find all parties concerned in the operation of these industries meeting on common ground, and standing side by side, and doing so well for themselves and for their country.

The President's Address was given by Mr. E. Stewart. It was an argument for the importance of the forests of British Columbia in particular and of Canada in general, and quoted from European authorities to show that they were feeling the shortage of the wood supply, and were looking to Canada as one of the principal sources to meet the shortage. This address is reproduced elsewhere in this issue.

Mr. Overton W. Price, Associate Forester for the United States, was introduced and gave a splendid outline of the work which is being done by the Forest Service of the United States. The principle on which the service is working was thus described:

"What the service has accomplished and its capacity for further accomplishment is due, in my judgment, more than to anything else, to working always under the principle that the forest is for use—to meeting forest problems not by paper work but by practical study on the ground; and to its trying to get forestry into effect not merely by propaganda, not by a policy of arbitrary interference but by co-operation. This is what has kept us out of the rut of ineffectual officialdom—and it has been said that the only difference between such rut and the grave is the length and the breadth."

A telegram from Hon. Walter Scott, Premier of Saskatchewan was read, in which he expressed the interest of his Government in the Convention and his regret at being unable to attend. A communication was also read from Mr. G. Spring-Rice, who had been appointed to represent the Province, but had been detained.

Hon. F. J. Sweeney, Surveyor General of New Brunswick, speaking for that Province, stated that:

In New Brunswick the principal revenue came from Crown timber lands and that frugal care had to be taken of them. For that reason all through the legislation ran the thread of protection of the forests. The principal enemy was fire. He was of the opinion that education in this matter should start in the schools and that more attention should be given to conservation of forests, for this Canada of ours would be a small place indeed without its timber resources. In New Brunswick game wardens are made fire wardens also to some extent, and road superintendents and all employees of the Provincial Government are instructed to look out for and check forest fires. Scalers also give a patrol system which is effective. He said that forest fires followed the advent of the railway, and when the G.T.R

was constructed across New Brunswick legislation was passed that each survey party should take extra precautions. He trusted that this convention would be of great assistance in the preservation of our natural inheritance.

HIS HONOUR G. H. V. BULYEA, LIEUTENANT-GOVERNOR OF ALBERTA

said the addresses had been profitable to him and he hoped to get more information as to how to preserve the timber resources. In his province, lying east of the mountains, there was a considerable extent of forest, north of the Saskatchewan River, but at present the two Prairie Provinces had to get their lumber from British Columbia. The question of preservation was of vital importance to the people here, for if the price of lumber went higher it meant much to them. He thanked the President for his invitation, and said he came for information. He confessed he had practically no knowledge of the lumber interests, but he appreciated the fact that every protection should be given to the forests.

Hon. W. H. Cushing also represented the Province of Alberta.

A Resolution Committee was appointed as follows:

RESOLUTION COMMITTEE.

John Hendry, Chairman; F. W. Jones, R. H. Alexander, Hon. F. J. Sweeney, William Pearce, Aubrey White, H. M. Price, J. Hillyard Mitchell, James Leamy, Hon. R. F. Green, R. H. Campbell, Hon. W. H. Cushing, E. H. Heaps, W. H. Rowley, D. C. Cameron, G. D. McKay, G. O. Buchanan.

SUB-COMMITTEE, B.C.

F. W. Jones, Chairman; E. H. Heaps, R. H. Alexander, D. C. Cameron, Hon. R. F. Green, G. D. McKay, G. O. Buchanan, Jas. Leamy.

AFTERNOON SESSION.

This Session was devoted mainly to the Province of British Columbia. The first paper, entitled "Timber Conditions of British Columbia—with relation to Extent, Revenue and Legislation," was by Hon. R. F. Green, Commissioner of Lands and works, and gave an able statement of the position of British Columbia in regard to forest wealth and the administration of the timber.

Mr. R. H. Alexander of Vancouver, gave a paper on "Lumbering Conditions on the Coast of British Columbia."

Mr. F. W. Jones, President of the Mountain Lumbermen's Association of British Columbia, read a paper on "The Lumbering Industry in the Mountains." After sketching the development of the lumber industry in the mountains, in which the Mountain Association had an important part, and predicting a bright future for it, Mr. Jones went on to say:

"We are all in sympathy with the objects of the Canadian Forestry Association; that we are all members of that Association, that a great many of our members are here to-day, and that all the rest would be here if they could possibly have got away.

"In the mountains, reforestration is not a live issue at present, but our interest is to establish some better system of preserving and managing what the Almighty has given us and stopping the enormous destruction of standing timber by fire. We want better laws for dealing with fires; some attempt at a 'Fire Ranging System,' in the interior of B. C. by the Provincial Government; more definite regulations covering the difference between agricultural and timber lands; a campaign of education under the auspices of the Forestry Association, as to the importance of preserving standing timber (even small growing trees which will not be fit to log for some years), putting down fires, and keeping squatters out of timbered areas and places where young timber is coming on; and an amendment of the Provincial regulations providing for such tenure and terms on timber licences, that the lumbermen will be able to pay some attention to Forestry principles, in carrying on their operations.

"Next to fire, the greatest enemy to the proper management of the Forest resources of this Province, is the manner in which they are administered, particularly in the way of the title given to timber licences, and the rentals charged.

"The present regulations would seem to have been invented for the purpose of forcing the clearing of each limit as rapidly as possible, in order that it may be abandoned at the earliest date.

"Practically all the timber land in the interior, outside of the Dominion Belt and lands given to railways, is held under special licence. Each special licence consists of not more than 640 acres and for this an annual rental of $1.15 is charged, in addition to the dues of 50 cents per thousand, when the timber is cut.

"In neither case is there any provision whatever for renewal after the expiration of the 16 or 21 years period, as the case may be.

"Now the natural result of the very high rental, the uncertainty of tenure, and the possibility of a sharp increase in the rental of the 21 year licences at any time the Government needed

money, is that the timber must be cut as quickly as possible. No operator can afford to hold it to give the thrifty young timber a chance to come to maturity, and, therefore, the timber marketable at the present time is cut off, the limit is thrown up, and sooner or later the fire gets the timber that has been left standing, which under conservative management, would have been more valuable to the holder and to the Government, than that which has been logged.

In the first place there should be a regulation that these licences will be renewable from year to year so long as merchantable timber remains thereon, coupled if necessary, with a regulation requiring holders of more than a limited number of licences to manufacture a certain proportion.

"Then there should be some kind of a graduated scale of rentals. I do not suggest an immediate reduction of the rental, because the Government of the Province must have money—they want it for fire ranging, if for nothing else—but suppose for the first five years, a rental of $125 per square mile were collected, for the next five years, if the holder had erected a mill, and was manufacturing a reasonable amount of lumber, and was holding these licences to give a permanence to his operations, let the rental be fixed at $50 per annum; for the third five years, reduce the rental to $25, and continue that rate thereafter, so long as timber remains and a sawmill is operated. By this scale each mile of timber would produce $1,000 for the Government in rentals during the first fifteen years, and a revenue of $25 per annum after that period.

"Lumbermen in the interior, who now contribute much the larger half of the special licence fees of the Province, under some such plan as here outlined, would add to their holdings, the Government would get a greater revenue for the next few years, more timber would be taken up, and once taken up, there would be the owners in addition to the fire rangers we hope to have appointed, to assist in protecting it against fire; a greater permanence would be given to lumbering operations, and better than all else, from a forestry point of view, the millmen or loggers would be able to so plan and carry out their cutting as to conserve the forest resources of the country—young growing timber would become a valuable asset to the country instead of being neglected and allowed to be destroyed.

"This suggestion is recommended to the attention of this Convention, and if, after discussion, the principle of it is approved, as I hope it will be, no doubt the Government will strongly recommend it to the attention of the Provincial Government.

"Personally, I look for many good results to the forestry interests of this Province from this Convention. The discussions

which are taking place, and the publicity which will no doubt be given them by the press, will help along the cause. And if we can at last get the Government of the Province to awaken to the importance of our forest resources (except when collecting fees and taxes) we may all feel as though we had made two blades of grass, where only one grew before."

Mr. Jones then dealt at considerable length with the Fire question and submitted a draft resolution on the subject.

Mr. Aubrey White, Deputy Minister of Lands and Forests for Ontario, stated that:

"In the appointment of fire rangers in Ontario they had been careful to eliminate the chances of political profit. They wanted the men who understood the conditions best, and for this reason he proposed to leave the appointment of the fire wardens to the lumbermen, the Government to pay half and the lumbermen to pay their half. After starting in this manner with 10 fire wardens the number had grown to between 700 and 800 scattered throughout the province, and this year they would spend $90,000 in fire protection and the lumbermen would spend between $70,000 and $80,000. There was some danger of fires starting in Ontario, and when the railway was built to Parry Sound they made an arrangement with Mr. Booth to appoint fire wardens, and it worked so well that they did not have a single fire.

"They had now put upon their statute books a law that when a railway company was constructing a line of railway through a timbered country, they could appoint as many guardians as they pleased, the Government paying half and the railway company paying half, and the cost of extinction of fires was met in the same way.

"There was of course, a trouble between settlers and lumbermen as to the location of land, so that when a man applied for land they sent an inspector and on his report they gave or withheld the grant. He agreed with President Roosevelt that for the settler who wanted to make a home on the land he had the greatest respect, but for those who wished to denude it of its timber and then leave it they would make it as hard as possible, and this was a policy he would recommend to the people of British Columbia."

Mr. W. H. Rowley, Manager of the E. B. Eddy Coy., of Hull, P.Q., spoke strongly in favor of educating the children in schools to properly value a tree. The question of the preservation of the forest wealth for the people of Canada, was, he considered, a matter that this convention should take up, and in connection therewith moved the following resolution:—

"Since an Omnipotent Providence has placed within the confines of the Dominion of Canada, the most of the best green trees on earth, and has thus given to Canadians an heritage above ground, that is easier of access and is worth all the mines and minerals stored in the bowels of our earth, and all the fishes with which our lakes and seas are swarming, therefore

Be it Resolved, That the Federal Government be again urged to prohibit the exportation from Canada, of saw logs, blocks and pulp wood, in order that the full benefit of the conversion and manufacture of this raw material may accrue to the advantage of the Canadian Saw Millers and Pulp and Paper Makers, rather than that our saw logs, blocks, and pulp wood be longer allowed to be exported to the disadvantage of the Canadians, but to the advantage and great profit of our commercial competitors to the south of us."

After discussions by Hon. R. F. Green, Aubrey White, Mr. McKinnon, Duncan Ross, M.P., R. H. Alexander, H. M. Price and D. W. Higgins, the motion was put to a vote and declared lost.

Evening Session.

In the evening a banquet was held which was largely in the nature of a reception to His Excellency the Governor General, and was presided over by Mr. John Hendry.

The toast of "The Forest Interests" was responded to by Hon. Wm. Templeman, E. Stewart and Overton W. Price. Hon. Wm. Templeman said that it was a unique occasion since 21 years ago the spot on which they now were was covered with a dense forest growth. Here to-night were present captains of industry, people representative of the great commercial life of Canada. He referred to the time when Ontario was covered with virgin forests, most of which have now disappeared. Some would say that British Columbia was the greatest producer of lumber. This Province had perhaps the largest area of timber of any province, yet the time had come when the rapid depletion should be stopped, and the forests made a permanent source of revenue. He made reference to the great extent of forest wealth which might be converted into pulp. This one feature had impressed him and the great necessity of conserving the forests. This, however, was only a small instance. As a result of the recent convention of the Forestry Association at Ottawa, legislation was passed creating a forest reserve in the two new provinces of the Middle West. This was one great step toward the conserving of the timber resources. He expressed his strong sympathy with the objects of the association.

In a splendid and witty speech His Excellency replied to the toast of his health, dealing with matters of general interest. He spoke particularly of the questions of market and labour which are of pressing importance in British Columbia at the present time.

"The Allied Interests" were proposed by His Honour, Lieutenant Governor Dunsmuir, and responded to by Mr. Flummerfelt, Mr. F. W. Cockshutt, President of the Canadian Manufacturers' Association, Mr. W. K. George and Mr. R. P. McLennan, President of the Vancouver Board of Trade.

Mr. Campbell Sweeney proposed "The Press" which was responded to by Hon. F. L. Carter-Cotton and Mr. L. D. Taylor.

THURSDAY, 27TH SEPTEMBER.—MORNING SESSION.

The first paper, presented by Dr. Judson F. Clark, Forester for the Province of Ontario, was entitled, "Forest Revenues and Forest Conservation" and was an argument for a change of policy in disposing of timber. He said:

"Present lumbering methods are devastating the Canadian forest. Why is this? Lumbering is the business of removing the mature timber, and this should improve the forest. It has done so elsewhere for centuries. Not in Europe and Asia alone, but in many places in North America. Why does it not do so on the Canadian timber limits? There are, indeed, isolated examples of improvement by lumbering even here which show the possibilities, but the exceptions to the rule but emphasize the failure of the present policy as a whole.

"It is my belief that the fatal weakness of the present system of disposing of Provincial timber is to be found in the fact that the provisions of the agreements entered into by the provinces as sellers and the lumbermen as purchasers place a minimum on destructive lumbering. In other words, the terms of sale which have found general acceptance make it to be in the financial interest of the operators to despoil rather than to conserve the forests.

After discussing the methods in practice at present, Dr. Clark outlined the policy he would suggest as follows:—

"Preparatory. A first step in the preparation for a sale of timber should be to make an estimate of the quantities of the different kinds to be sold for publication with the advertisement of the sale. An estimate of the value would also be made, this latter for the use of the Forest Department in determining their reserve bid.

Advertisement. The advertisement in the case of large sales should be published at least a year in advance of the auction, that ample opportunity may be given for completing business arrangements looking to purchase, and for the exploration of the tract by prospective purchasers.

The advertisement should state the location and area of the tracts offered, the approximate stand of the different kinds of timber, and the time and place of auction. Intending purchasers should be invited to apply for information regarding the rules and regulations governing the cutting and removal of the timber, the manner of payment and other details.

Cutting Regulations. The cutting regulations should be prepared with special reference to the individual tracts offered for sale, and would be governed by local conditions.

In general they would include:

The designation of the timber to be cut, and, conversely, specifically prohibit the cutting of timber not offered for sale—for example, immature timber under a set diameter limit.

Provision for care in the felling and in the removal of the timber.

Provision for the prevention of waste by limiting the height of stump, by prescribing the use of the saw where practicable, and by providing for the utilisation of inferior materials.

Provision regarding the disposal of the debris—such as lopping tops, burning brush, etc.

The time limit for the final removal of all timber sold.

Specifications as to measurement of timber logged.

Adequate penalties for violation of cutting regulations, as for example payment at double the regular purchase price for any merchantable timber left in the woods by the loggers.

Time and manner of payment.

Provision for a bond to insure the faithful performance of the contract by the purchaser.

Method of Sale.—By public auction, bids being asked on the amount to be paid per thousand feet when the timber is cut.

Ground Rent.—To prevent speculative purchase by others than bona fide operators a fairly high ground rent per mile might with advantage be provided for. The payment on account of ground rent for any particular year might be made to apply on the stumpage dues account for the same year. This would throw the whole weight of the ground rent taxation on the purchaser who failed to operate, and would at the same time provide automatically for release from taxation, immediately that he actively undertook to carry out his obligations.

Unit of Area.—The square mile forms a desirable sale unit. This would give lumbermen of limited capital and jobbers an opportunity to do business on the public forest lands, and if the

number of miles which any one concern may purchase be unlimited no injustice will be done the largest operators."

"Forest Reserves" was the title of a paper by Roland D. Craig, Inspector of Dominion Forest Reserves, who said:

"For several years the Dominion Government has withheld portions of its timber land from settlement, but it was not until the passing of the Forest Reserves Act last Session, that they were definitely and permanently set aside for forest purposes. These Dominion forest and game reserves are situated in Manitoba, Saskatchewan, Alberta and in the Railway Belt in British Columbia, and cover in all about five and a half million acres.

The objects in setting aside these reserves are to protect and improve the forests for the purpose of maintaining a permanent supply of timber, to maintain conditions favorable to a continuous water supply, to protect the animals, fish and birds within the reserves, and to ameliorate the climate.

The lands so reserved are withdrawn from sale, settlement, occupancy or other trespass, which may interfere with the objects of the reserves.

It is not, however, the purpose to prevent the use of timber which is produced, but its exploitation shall be under the direction of the Superintendent of Forestry, and conducted in such a way that the perpetuation of the forest shall be assured.

The reservation of the land for forest purposes, does not in any way interfere with the development of mines within their boundaries, but on the contrary, the supply of timber being produced in the vicinity will greatly facilitate mining operations.

The value of maintaining forests at the headquarters of streams used for irrigation and water power is most important, and this is the chief object of those reserves which have already been set aside in British Columbia.

It is absolutely necessary, if the country in the interior of British Columbia and on the east slope of the Rocky Mountains, is to develop along agricultural lines, that a forest cover may be maintained on the watersheds to protect and regulate the streams which will bring wealth and prosperity to an otherwise unproductive waste. If the forests are removed it will cost millions of dollars to build dams and reservoirs to control the spring freshets and conserve the water for the use of the crops, and in the end they will not be so effective as a good forest cover.

Not least among the objects of these reserves is the preservation of game in the forests and the fish in the waters within the reserves. By maintaining the forests about the headwaters of the streams, the spawning beds of the salmon and other fish will be protected. It is lamentable to see the rapidity with which

our magnificent game-animals, such as the moose, elk, and caribou are being destroyed, and we hope to be able to afford them such protection in these forests and game reserves that they shall not have a similar fate to that of the buffalo."

Mr. R. S. Cook of Prince Albert, speaking as one charged with the care of the vast timber interests of Saskatchewan, had a word to say. In his province they had immense tracts of timber north of the Saskatchewan River, and when travelling over these he was struck by the enormous waste from fires. They cut about 50,000,000 feet at one mill in Prince Albert annually, but this amount was a trifle compared to that wasted by fire. He thought it would be a good thing if the services of the Northwest Mounted Police were enlisted in fighting fire, because the Indians stood in awe of a Mounted Policeman. In the northern part of Saskatchewan he had seen more timber destroyed by fire in a year than would supply the whole southern part of the province and Alberta with the lumber they needed.

Hon. F. J. Sweeney, Surveyor-General for the Province of New Brunswick, said that they provided for reforestration on Government reserves in his province by allowing the lumbermen to cut no trees less than ten inches in diameter three feet above the ground. They provided against fires by appointing fire rangers and assigning to them districts which they were supposed to visit at certain periods. In addition to this they also prohibited hunters from going into the woods during the close seasons which corresponded with the warm weather. They had also framed laws in connection with the public domain to prevent settlers or squatters going on land that was useful for timber but unfit for purposes of settlement. When a settler made application for land, they had it examined by an inspector, who reported upon it before it was allotted.

Mr. Lindmark (Revelstoke) called attention to the necessity of doing something for the prevention of fires. A great danger lay in the cuttings left on the ground. In his camp they had taken to gathering the cuttings together in the fall and after placing a guard round them had burnt them. This served two purposes. First, it lessened the danger of fire, and secondly, it cleared the ground for the growth of young plants. The convention should prove a stimulus to the adoption of better methods of forestry. As an instance of one improvement it had brought about, he mentioned that last year they had asked that all log-scalers should be made Deputy Fire Wardens. The Government had adopted the suggestion and he gave instances to show that it had been of great service in checking fires. He also hoped in time that they would have a School of Forestry in B.C., as they had in his native country, Sweden, where it had been of

inestimable service in training the young to appreciate and preserve their forest wealth.

Mr. White (Pembroke) said he questioned whether the suggestion that the debris should be burned would be of any value in the East. Burning in the fall would simply destroy the moss and lichen, which might check the fires and would still leave the trees to burn.

Mr. Overton Price said that

In the United States

fire protection was still in the experimental stage. They would be willing to give up everything else to be assured of absolute protection from fire. In the Eastern States they had tried the practice of gathering together the tops of trees and burning them, but it proved quite costly and on the Pacific Coast where the forests were large would be quite impracticable. He did not know that even in the Middle West and on the Atlantic Coast the burning of tops was a success, because they were still liable to fire, the only difference being that they would have a flash fire from burning the trees and there would be less heat than if the underwood had been left. It was a question to him whether the money would not be more wisely expended in appointing more firemen.

Mr. Craig: "How about forest sales in the United States?"

Mr. Price said timber lands were advertised and sold by tender for five years. To make sure that the young trees would be preserved and only the mature timber taken away they marked the trees that were allowed to be cut.

Hon. Mr. Sweeney: "That is only a sort of pruning of the forest."

Mr. Price: "No hardly that. I am afraid we allow too much of the timber to be taken off as it is.

Mr. White (Pembroke): "Old style lumbering, I suppose." (Laughter).

Mr. Knechtel, Forester of the State of New York, being called upon supported Dr. Clark's advice about the preservation of forests. He instanced the Black Forest in Germany. At first it was being destroyed by careless lumbering but for the past 200 years reforestration and lumbering had been carried on there together successfully. What the Germans had been doing could be done here.

Mr. Peter Lund (Cranbrook) agreed with Mr. Lindmark that the forest preservation methods adopted in Sweden could not be surpassed, and it would be well for the Association to obtain some of their literature. For a number of years he had

been engaged in railway construction, and consequently in forest destruction, but he had joined the Association about a year ago, and though trees to-day looked more beautiful to him than formerly, he felt the need of better local organization. They could have meetings here and there, and get literature and have discussions on the methods of forestry. Every man, woman and child in British Columbia should be taught the necessity of preserving the forests.

Mr. Overton Price, in answer to a query, explained the methods of giving publicity to forestry information in the United States. They had formerly issued large bulletins, but these were not read, and now instead they issued short circulars which were distributed among 20,000 lumbermen in the United States. In addition to this they had a press bureau which employed a number of newspaper men, who went and obtained information and then put it into palatable shape and they got as much as possible into newspapers and magazines.

Mr. H. B. Gilmour spoke of the necessity of lumbermen starting on their limits at the right place, Whenever a fire started on the bottom of a mountain it always climbed to the top, and if lumbermen would always locate their camps in the highest places there would be much less danger from fire than now.

Mr. W. H. Higgins said he had been much interested in the proceedings and he hoped that the Government would rise to the occasion and help them to preserve what was given them. Regarding the burning of tops and cutting, he found that the growth of young timber for about three years made a hotter fire than what had been cleared away. In regard to making the camps in the highest place as suggested by Mr. Gilmour, it sounded very well in theory, but in practice he would not like to try it. He had himself been a sufferer from fire and knew what it was, and in this respect he related his own experience. He trusted that the deliberations of the convention would result in profit to them all,

The following resolutions were submitted by the Committee on Resolutions and passed:—

WHEREAS the destruction of large areas of the Forest wealth of Canada by fire is still of yearly recurrence be it

RESOLVED, That it is incumbent on the Governments of the Provinces of the Dominion to legislate at the earliest opportunity still more stringently against the use of fire in timbered portions of the various Provinces during the summer months and further and of equal importance, to provide means for efficiently carrying out the provisions of the Statutes that may be passed.

RESOLVED, That the attention of the proper authorities be directed to the necessity of a strict and rigorous enforcement of the law relating to the prevention and control of prairie fires, as such fires, in addition to being particularly destructive in relation to the production of forage, have proved exceedingly disastrous in their effect on the growing timber as well as preventing the extension of those timber areas which, though small, are valuable both for shelter, beauty and future forest supply.

RESOLVED, That this meeting of the Canadian Forestry Association desires to re-affirm the resolution passed at the Canadian Forestry Convention held at Ottawa in January last regarding the reservation of the forests required for the protection of streams furnishing a supply of water for irrigation and for the prevention of destruction by floods, and specially desires that speedy action should be taken in the direction indicated by the resolution referred to and that this matter be brought to the attention of the proper authorities at as early a date as possible.

RESOLVED, That in order that our Forest resources may be so handled as to become as nearly as possible a permanent source of timber supply it is important that regulations governing the leases should provide for a tenure under such conditions as will encourage the adoption of the best Forestry methods in all lumbering operations.

RESOLVED, That this meeting of the Canadian Forestry Association desires to bring to the attention of the proper authorities the desirability of taking steps to promote Forestry through the schools and educational institutions.

RESOLVED, That the Association strongly endorse and recommend to the Provincial Government the request of the British Columbia delegates for action on the following points:—

That a thorough system of fire ranging be established. That under the supervision of one or more chief wardens, the timbered areas of the Province be divided into districts, in each of which two or more salaried rangers be employed during the six summer months, with authority to make arrests for violation of the laws relating to fires, to take immediate action and enforce help to put out such fires as may occur, also to issue or refuse permits to set out fires during the dry season, and to supervise such fires where necessary, on account of the possibility of danger.

That the following suggestions made by the Associated Boards of Trade in Convention at Cranbrook on the 1st of February, be endorsed and again recommended to the authorities.

1st. That the Provincial Government secure for the place of Chief Fire Warden, a man of zeal and enthusiasm, who being

retained in the service for a term of years, would evolve a system of protection suited to the special circumstances of the country.

2nd. That the provision be made, whereby land owners and holders of timber leases, and licences, pay a part of the expenses incurred in the prevention and suppression of fires.

3rd. That the interests so contributing, be given a voice in the selection of local wardens.

4th. That arrangements be made with the railways whereby trains with tank cars and proper outfit, and gangs of men, shall at a short notice be available for fighting fires, along or near railway lines.

5th. That men called out by fire wardens be paid as soon as discharged.

6th. That the origin of all bush fires be strictly investigated, and offenders rigorously prosecuted.

That the Bush Fires Act be amended so as to make it an offence to set out fires for any except domestic purposes, from the 1st of April to the 30th September, without a permit from the Fire Ranger, which permit, if issued, shall require the permittee to have on hand the necessary help and appliances to control the fire.

Also to make it an offence under said act for anyone to permit a fire to leave his property, or start a fire at any time and permit it to run at large.

That the system adopted in Ontario requiring fire patrol along railways during summer months be recommended for the Province of British Columbia.

That the sections of the Bush Fires Act applying to locomotives be made applicable also to engines used in logging operations.

That section six of the Bush Fires Act be amended to make it applicable all the year round.

RESOLVED, That an appeal be made to the Federal and Provincial Governments and the larger interests which will be beneficially affected by the extension of the Forestry interests for liberal financial assistance towards carrying out to the fullest possible extent the aims and objects of this Association.

WHEREAS the clearing of small areas by settlers in the midst of timbered sections of the different Provinces, fire being the means usually adopted, is a fruitful cause of the yearly destruction of great quantities of timber be it

RESOLVED, That in the opinion of this Convention no homestead or pre-emption should be granted on land more valuable for timber than for agricultural purposes, and that this

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Convention urge on the proper authorities to make the necessary classification of the lands at the earliest possible date.

Votes of thanks to His Excellency the Governor-General, to His Honour the Lieutenant Governor and to the various Associations and persons who had assisted in the work of the Convention, especially to the press for their full and interesting reports of the proceedings.

The local committee in charge deserve all praise for the success of the Convention, and it was a matter of regret that the Chairman, Mr. C. M. Beecher, was unable, through illness, to attend. The Convention placed on record a resolution of sympathy with Mr. Beecher. Great credit is due to the Secretary, Mr. R. H. Alexander, upon whom fell the burden of carrying out the details of organization, for the completeness with which the arrangements were made.

It is with regret that the Forestry Journal learns that Ontario has lost the services of Dr. Judson F. Clark, who has resigned from the position of Forester to accept the management of a large timber company in British Columbia. In Dr. Clark, Ontario had not only a scientist of more than usual ability, but a practical forester with a wide experience. In his many addresses and writings Dr. Clark has shown himself a master of forest economics, and though the principles which he has advocated in forest management have been criticized as being too highly ideal for the present political status of Canada, we are pleased to see that they are being adopted in Ontario in the recent timber sales.

It was understood that Dr. Clark was to have charge of the Forestry College to be established at Toronto University and his removal to British Columbia will be a serious loss to the development of that institution. We are glad, however, that he is bettering himself so decidedly financially, and it is not to be wondered at that the Government could not retain his services.

Though not in the public service we feel sure that the cause of forestry will still continue to receive Dr. Clark's attention, and we shall be able in a few years to see a practical demonstration of the principles of forestry in British Columbia.

WOODLOT TAX EXEMPTION.

Under the terms of a bill introduced at the 1906 session of the Ontario Provincial Legislature by Mr. J. P. Downey, M.P.P., and subsequently passed, complete exemption of woodlands from taxation is now possible under certain conditions. This exemption depends, in the first instance, on the passing by any township council, of a By-law to allow this exemption, which may be either total or partial. Not more than twenty-five acres owned by any one man may be exempted.

What is Woodland?

The term "woodland," used in the act, is defined in the act. Such woodland must bear the following numbers of trees of the following diameters:

100 trees over 8 inches in diameter, or
200 " " 5 " " " "
300 " " 2 " " " "
400 trees of all sides.

No land, however, is to be considered woodland if stock is allowed to graze in it.

Varieties of trees allowed.

The varieties of trees which are to be allowed are as follows: Coniferous (*evergreen*) trees: White pine, Norway pine, hemlock, white spruce, Norway spruce, tamarack, cedar.

Hardwood (or broadleaved) trees; oak, ash, elm, hickory, basswood, tulip (or whitewood), black cherry, walnut, butternut, chestnut, hard and soft maples, sycamore, beech, black locust and catalpa.

How Exemption is to be Secured.

After the passage of such a by-law as that described above, the owner of any woodlot who wishes to secure exemption from taxation on it, is to make application to the township clerk before February 1st. The township assessor is then to examine the woodlot, and, if he finds that it fulfils the conditions mentioned in the act, the exemption may be granted. Such exemption ceases if grazing is allowed in the woodlot, or if the lot is cut over.

ADDRESS OF THE PRESIDENT, MR. E. STEWART, AT VANCOUVER FORESTRY CONVENTION.

I shall not on this occasion weary you with any lengthened remarks on the subject of Forestry in general, interesting and inviting as that subject is. Neither shall I quote any figures to show the extent of the existing woodlands of Canada as I have done on other occasions, suffice to say that this country does possess a heritage in her virgin timber, the extent and value of which very few countries of the globe can equal, and I need not say that British Columbia, in this respect, is unrivalled by any Province of the Dominion.

Recognizing this fact, and with the belief that our people did not appreciate the value of, and were negligent in conserving its forests, this Association was organized a few years ago.

The aims of its founders were to enlist the active co-operation of the people in every Province in the subject, and not only of every Province, but of those living in the un-organized districts of the wilderness regions of the far North. They also saw the necessity of the cultivation of at least a limited number of trees on the prairie lands of the Northwest, if those regions were ever to contain the real homes of a contented people, and not remain merely grain ranches.

The result has shown that the most enlightened members of the community in every part of Canada recognized that the movement was worthy of their support and the attendance here to-day shows that this Province of British Columbia is not behind any of her sister Provinces of the east in her appreciation of the importance of the subject.

Gentlemen, the fact is, the people of Canada have, in the years gone by, utterly failed to appreciate the value of their possessions. Their horizon has been too circumscribed. In too many instances the undeveloped wealth, the natural resources, not only in timber but in minerals, in fisheries, as well as in agricultural lands, have scarcely been imagined.

We should be very slow in pronouncing any district as worthless. Who, only a few years ago would have imagined the Yukon to contain the mineral riches which the succeeding years have revealed there? Within this generation the United States purchased the whole of Alaska for a less sum than has been realized in one season from a single mining camp in that territory, and I venture to predict that future years will afford similar results from regions at present known only to natives of this country.

But I am supposed to confine my remarks in some degree at least to the subject in hand, and permit me to say that utility of forest growth is too frequently regarded only for the monetary value of the product it produces, in other words the timber product. Valuable as this is, it is by no means the only, perhaps not the main or chief benefit it confers. Imagine what would be the condition of this Province if by some dreadful catastrophe the whole forest covering of those hills and valleys were swept out of existence.

The spring floods would then descend the mountain sides in such force as to carry away the gravel from above and deposit it over the now fertile valley land. Such floods as you have occasionally experienced on the Fraser and other streams, would become of annual occurrence. This prodigal waste of water would be followed shortly after by summer droughts rendering agriculture unprofitable if not impossible.

The miner would soon find it unprofitable to continue his operations, owing to the want of timber and water, both of which are necessary for his work. This is no fancy picture of what would be the result. It can be seen to-day in the lower Alps in eastern France as well as in certain parts of every country bordering on the Mediterranean Sea, and in other parts of the world.

Every one who has come over the mountains on the Canadian Pacific Railway, must have been struck with the great destruction that forest fires have caused along the route. The greater part of this was done during the construction of the road, but even since then, the annual loss during the dry summer months, continued until a few years ago, when a system of patrol was established along the railway belt by the Dominion Government. The result of having such a system speaks for itself, suffice to say that during the past five years since the present system was established, very little valuable timber has been destroyed. If we compare the loss before this work was begun with what little has taken place since, or with what has occurred on any similar area of unguarded territory, I believe it will be found that the cost involved has repaid itself a hundred fold, and I hope that the public of this Province will stand by the Provincial Government in any efforts it may make in the same direction. I am glad to know that a beginning has already been made by a small appropriation by the Provincial Legislature for such a service, but it should be increased at least ten fold to be at all effective over such a wide district. But the Government can only act so far as the public will permit as represented by the members of the Legislature.

The people of this Province should not only commend, but demand immediate action to lessen, as far as possible, the annual

loss from these destructive fires. It took nature hundreds of years to create those valuable forests. Will you allow them to be destroyed in a day and deprive posterity for a century to come of their inestimable benefits?

Owing to those immense ice fields of the higher altitudes, this Province is furnished with an abundance of water at the source of supply. The forest covering on the mountain sides aids in forming a natural reservoir by which a continuous flow is maintained. Allow it to be destroyed and you will do your part in creating a mountain desert.

Mention has been made of reforestation. Fortunately, in this Province nature, unaided, is doing that for you. A visit to almost any of those districts which have been burnt over a few years ago, will show you a splendid reproduction of the original varieties rapidly growing up to take the place of the original forest. You will see in most cases a splendid growth of young cedar and fir coming on. Nature, with the munificence which characterizes her operations everywhere in this favored land, seems in this instance, to be putting forth extra efforts to reclaim lost ground and all she asks is that you will not prejudicially interfere with her operations.

The costly work of artificial tree planting need not be attempted. Keep the fire out of this young timber and there is no reason why future generations may not be as abundantly supplied as you are to-day. It is neither good forestry nor good business to leave unutilized the product of the forest. As President Roosevelt pertinently says, the product of the forest is for use. And as this Province has a very large percentage of land unsuited for agriculture, but admirably adapted for the growth of timber, it follows that forestry here is a matter of great importance.

From what I have been able to learn of British Columbia, and I have had an opportunity of seeing a good deal of it, I am more than ever impressed with the vastness of its natural resources. Its fisheries, its timber and its minerals, almost overwhelm the imagination. Its future place as a producer of the economic minerals, will undoubtedly be foremost, but here again the timber is a necessity.

It was stated by an authority at the American Forest Congress that the mines of the United States consumed more timber than the railways, enormous as is the consumption of the latter. This being the case, it is apparent that those who are most interested in the success of the mines should not be indifferent regarding the forest.

The time was when the lumberman of the country looked with suspicion on the forester. Probably this was quite as

much the fault of the forester as that of the lumberman, and arose from a misunderstanding, the lumberman having the impression that the forester, if he had his way, would prejudicially interfere with his operations, and the forester blaming the lumberman for destroying the forests.

Now it is scarcely necessary to say that no intelligent forester would be so unwise as to prevent the utilization of full grown timber. His mission is rather to use his influence in such a way that a permanent production may be constantly maintained. But nothing serves so well to unite people as a common enemy, and that was not wanting in this case. The ubiquitous forest fire, to which I have already referred, and which I believe has destroyed in Canada, ten times as much timber as the lumberman has ever cut, furnished the rallying point. So alarming was this destruction in every Province, that every citizen, worthy of the name, became interested, and the authorities were urged to adopt a protective service. Never was a more reasonable request made. The public, in most cases, are the owners of the timber, it being principally on unsettled lands still held by the Crown, and even where timber berths have been sold to individuals, the Government still receives a royalty on the cut. It was pointed out that no city or town would think of doing without a fire service for the protection of buildings, which if burnt, could be rebuilt within a year or so, whereas, if a forest is destroyed it takes a century to replace it. In this movement for protection the lumberman became a forester. Again with the permanent tenure of timber berths, the intelligent lumberman is not satisfied to ignore the growth of young timber that is coming on to take the place of what he has removed, and the day has now arrived when I believe very many of our lumbermen are beginning to so work their limits that the ground, which has for ages been producing timber, one crop succeeding another, may continue to afford him a continuous supply.

We should not forget that the most reliable statistics show that the world's supply of timber is fast diminishing, while the demand is enormously increasing. Time will not permit me to quote the opinions of many of the best authorities in the world, backed by statistics on this point. I will only, however, trespass on your time to quote from an article which appears in the last July number of the "Nineteenth Century," written by Dr. John Nisbet, (late of the India Forest Service), on timber planting on waste lands in the British Isles, in which, after referring to the fact that Great Britain had heretofore been able to supply her timber through the enormous shipping facilities at her command, goes on to say that "the whole economic position has been entirely changed within the last thirty-five years, and the future outlook has, of course, thereby become profoundly affected.

Thirty-five years ago the population of the United States was only about forty-one millions and now it is over eighty millions, while that of Germany was forty millions and is now sixty-one millions. In both of these cases, the United States and Germany had thirty-five years ago, more than sufficient timber of home growth to supply all their internal requirements, but now they have become, owing to their increase of population and industries, far from self supporting, and are more or less dependent on the supplies of other countries.

"Then, the American resources seemed ample; now they have become so diminished as to have given rise to great and well founded anxiety for the future. This shortage in home grown wood must be supplied by imports; and as the great bulk of the timber required by ourselves and by these, our two great competitors is the light wood of coniferous trees, of which the chief stores are now to be found in Canada, Russia and Scandinavia, the amount we shall have to pay for this class of timber, (which constitutes about 90% of our wood imports), must be, to a considerable extent, determined by the requirements of the United States and Germany and by the price to which they will raise this raw material at the sea ports in the countries having surplus timber available for export."

He goes on to say, "that unless Great Britain can arrange some sort of preferential treatment with Canada for her timber exports, there is every probability that the annual sum she will have to pay for her national timber bill will be very much greater than at present, and how large this sum already is, seems not to be generally realized."

It is an extraordinary thing that notwithstanding the increased use of stone, cement, brick and iron for building purposes, the per capita use of timber has gone on increasing annually within recent years. In this connection the same writer says: "In 1882 the population of the British Isles was thirty-five and a half millions, and the timber exports were 18,300,000L; in 1903 the population was forty-two and a quarter millions, and they imported wood and timber to the value of 29,300,000L, thus showing a rise of over 50% in the total value of the imports as compared with an increase of only 19% in the total population."

A Committee on Forestry, appointed by the Home Government in its report in 1902, says; "The world is rapidly approaching a shortage, if not actual dearth, in its supply of coniferous timber, which constitutes between 80 and 90% of the total British imports."

With the nations of Europe looking to us for a future supply; with the ever increasing demand from South America and the Orient and perhaps more important than all, the increase in

home consumption, especially with the rapid settlement of our plains region, there can be no question that high as timber is to-day, its value in the future will certainly increase.

The intelligent lumberman is per force a forester, and I am glad to say that ever since the Canadian Forestry Association was organized the lumbermen have been among its leading spirits and the invitation of the Association by the Western Lumber and Shingle Manufacturers' here, is an evidence that they appreciate the work that the Association is endeavoring to do.

I trust that good results will follow the deliberations of this Assembly.

I know it is quite possible to have interesting discussions, and yet fail of accomplishing what should be done, and I would suggest that you appoint a Committee on Resolutions, so that a united expression of the meeting may be obtained on some very important matters, and as this meeting is in British Columbia, I think that the members of the Association will agree that it will be both profitable and fitting that Forestry matters, as they relate to this Province, should be given first place, and I would further suggest that certain amendments to your Bush Fires Act should be considered. One of the most important is to prohibit the setting out of fires in clearing land within any proclaimed fire district during certain months of the year, unless the party setting out the fire has obtained a permit from the Fire Warden of the District in question.

Another is the question of a patrol service on Provincial timber lands, to which I have already alluded.

We frequently hear it said that certain fires did not burn any timber large enough for commercial purposes, only small stuff, is the expression, but let me say that the farmer might as well consider his unripe crop valueless, as for the nation to place no value on the splendid young growth of timber that you will see, if you have an opportunity of visiting any of the surrounding country that has been swept by fire some years ago. It is only a difference in point of time, and a score of years in the life of a nation, is less than one in that of an individual.

Gentlemen, we should remember that this is an inheritance that nature is bestowing on succeeding generations, and the Government of the Country should recognize that they are Trustees of an Estate, and that their duties are not only to those whom they at present represent, but to future generations as well.

The favorite maxim of Adam Smith, that Governments exist for the protection of life and property, has to be read in its broadest and most comprehensive sense in a new country with growing, as well as undeveloped, resources.

No. 2—The Chestnut as a Sprouter.

TIMBER CONDITIONS OF BRITISH COLUMBIA.

WITH RELATION TO EXTENT, REVENUE AND LEGISLATION.

By Hon. R. F. Green, Chief Commissioner of Land and Works.

It is very gratifying for me to have the honour and pleasure of meeting such a representative gathering of patriotic Canadians as are assembled here to-day in the commercial Capital of British Columbia, for I look upon the work undertaken by the Canadian Forestry Association as patriotism of the highest quality. Your work, gentlemen, as it presents itself to my mind, is essentially a labour of love, in which self interest has no place, your sole aim being the protection and perpetuation of the forests of Canada for the use and benefit of future generations. Prior to the foundation of your Association, a few individuals, scattered throughout our broad Dominion, devoted their time and energy to the subject of forestry, but it was only after many disheartening failures that these enthusiasts succeeded in arousing public interest, and were at length rewarded by witnessing the crystalization of their ideas in the birth of the Canadian Forestry Association. It is unnecessary for me to trace the progress of the Association or to enlarge upon the good work which it has accomplished, for the results proclaim themselves from the pages of the statutes of every Province from the Atlantic to the Pacific. The earnestness, patience, and pertinacity shewn by the Association throughout its campaign for reform in the laws relating to forestry, and the methods of lumbering, cannot be too highly commended. The task undertaken is a gigantic one—the awakening of a whole people to the realization of a danger which, to the thoughtless majority, seems so remote as to be imaginary—and like all great movements for the betterment of humanity, complete success can only be achieved by such ceaseless and untiring effort as will win the weight of public opinion, and the sympathy and co-operation of the whole population of Canada, to the objects of the Association.

I have alluded to those enthusiasts on the subject of forestry, who made it a study long before forestry became a live issue in the public mind of Canada, and my thoughts are drawn to a central figure in the agitation which resulted in the formation of this Association and the subsequent good work accomplished—

Sir Henri Joly de Lotbiniere—that grand old man who may easily be granted the father of Canadian Forestry—a gentleman whom we are all proud to honour with our love and esteem. His work in the cause of forestry is of such a nature that it stands as an example to every person who professes an interest in the subject. Not content with spreading the propaganda by voice and pen, Sir Henri, with his own hands, made plantations of forest trees in Quebec and British Columbia and watched and tended their growth from the seed, thus securing practical information of great value, which he takes the greatest pleasure in sharing with all those who seek to profit from the results of his experience. Sir Henri will never need a monument if his dream of Canadian Forestry be half fulfilled, for what could be more noble tributes to his memory and his life work than the afforested prairies of Canada and the reforested timber lands of the older provinces—actualities which are made possible through the efforts of the Association which he founded. British Columbia is so very much a "wooded country"—so lavishly endowed with timber—that its people are hard to move to a sense of the importance of forest preservation—indeed the best years of the lives of many of the old timers were spent in destroying the big trees and thick underbrush which covered the soil now given to the production of bread, beef, and fruit, and it was a hard task for any man to convince those pioneers, or their descendants, that a day would ever dawn when the forests of British Columbia might be depleted—as well attempt one hundred years ago to arouse enthusiasm in forest preservation in the breasts of the men who were chopping out homes in the woods of Upper and Lower Canada, or the pioneers of Nova Scotia and New Brunswick. Sir Henri, however, after much effort, enlisted the interest of a number of gentlemen who formed the British Columbia branch of the Canadian Forestry Association, and who worked faithfully under his leadership to advance the objects of the Association.

The progress of the movement inaugurated by Sir Henri has been naturally slow, for one of the greatest stumbling blocks to the settlement of our public lands is the problem of clearing them of timber, cheaply and effectively. The cost of clearing land deters many a settler from staking a pre-emption, for labour is high and but few individuals are willing to undertake the work single handed. Speaking in round numbers the land area of British Columbia is 250,000,000 square acres, of which about 182,000,000 are forest and woodland, a large portion of which is classed as timber land. So dense are our forests and so big our trees that 20,000 to 50,000 feet, board measure, to the acre is no uncommon yield, but reducing an average of these figures to a reasonable amount we have in store a stupendous total of available timber.

Now, according to statistics, the lumber cut from 1888 to 1904, inclusive (17 years), aggregated 2,569,756,262 feet—a mere nothing compared with the grand total—and taking the average yearly cut for the 17 years, we find if that average were maintained for the next 200 years, our forests would still be far from exhausted. This is a hopeful outlook for the people of British Columbia, and the new provinces lying east of the Rocky Mountains, whose inhabitants must look to us for their supplies of lumber, but even with what seems at first blush an embarrassment of riches, we must not assume that this forestry treasure is inexhaustible. Prudently managed it will last to the end of time, but if wasteful lumbering methods (so general in the past) are persisted in, and fires allowed to run unchecked, our magnificent forest heritage might be dissipated in a generation or two.

In the Colonial period of British Columbia's history the question of forest preservation was given little, if any, consideration. What settlements existed were confined to the sea coast and the banks of the Fraser River. The great hinterland was unknown—a pathless wilderness—the home of a few scattered Indian tribes, and dotted here and there with the trading posts of the Hudson Bay Company. The policy of the Government of those days was to clear the land in and about the settlement at any cost, and the methods used were decidedly not in the line of forest preservation. The gold seekers came next, and in their eager quest for treasure, they naturally regarded the forest as a barrier to success and unhesitatingly destroyed it in order to clear the way for their mining operations.

It was not until 1874 that the Government of British Columbia took steps to preserve the forests. In that year what is known as the "Bush Fire Act" was passed. It provided that any person convicted of igniting fires in the woods during the months of June, July, August or September, and failing to thoroughly extinguish the same, should, in the case of damage resulting, be liable to a fine of $100.00, or three months' imprisonment. The same punishment was provided for persons allowing fire to spread from their own property to that of their neighbours, or to adjacent public lands. This Act was inoperative, however, except in districts of which two-thirds of the residents petitioned the Lieutenant-Governor-in-Council for its enforcement. In 1887 the "Bush Fire Act" was made general throughout the Province, and in 1896 the Lieutenant-Governor-in-Council was given power to define any portion of the Province as a fire district, and it was made unlawful to set out or start fires between the first of May and the first of October, except for the purpose of clearing land, cooking, obtaining warmth, or for industrial purposes. Provisions were made in this Act, and subsequent amendments passed providing for safeguards against the spread

of fires, and the penalties were increased to a maximum fine of $200.00, and not less than $50.00 in every case of conviction—half the fine going to the prosecutor. Convictions under the Act do not bar individuals whose property has been injured, or destroyed, from suing for damages. Railway companies are made liable for damage done through the medium of their locomotives, and it is laid down that all engines shall be equipped with approved appliances to prevent the escape of sparks and cinders. Neglect to provide such appliances constitutes an offence punishable by a fine of $200.00 in each case, as well as liability arising out of a civil action. Under the Act of 1897, every Government Agent, Gold Commissioner, Timber Inspector, Forest Ranger, Mining Recorder, Provincial Police Officer, or Constable, is constituted a fire guardian, and each of them is enjoined to prosecute every case which may come to his knowledge. Every pre-emptor of Crown lands is furnished with a copy of the Act at the time of his application. Enforcement of the law is difficult in a territory so vast as British Columbia, and in a majority of cases evidence is difficult or impossible to obtain. The miscreant who deliberately sets fire to the woods is usually careful to hide his guilt, and the hunter or prospector who leaves his camp fire extinguished, or thoughtlessly throws a lighted match, or cigarette stump, or "heel" of his pipe into the underbrush, will in every case proclaim his innocence when confronted with the serious results of his carelessness. Cases are rare in which positive evidence can be secured, and magistrates are loath to convict on circumstantial evidence, where the accused is a poor man to whom the infliction of a heavy fine would prove a great hardship. Many forest fires are also caused by lightning.

The rigid enforcement of the "Bush Fires Act" is impossible without the earnest co-operation of the people themselves. The vigilance of an army of Forest Rangers would prove inadequate to prevent the occurrence of fires without the sympathy and assistance of the community. Eternal vigilance on the part of every man, woman and child in British Columbia is necessary to prevent our woods from suffering the scourge of fire, and in order to create a general interest in the subject of forest preservation the people must be educated to a sense of its importance to the future of the country. The Canadian Forestry Association has undertaken this work of education and every assistance should be extended to enable it to make its work thorough from one end of Canada to the other. The school children should be enlisted in the army of foresters and taught that the wanton destruction of a tree is a crime against society. I would like to see a copy of the Association Journal placed in every school-house and in every home in Canada, in order to awaken universal interest in the subjects with which it deals. It is to the lumberman, however, that the

Association must look for immediate results. Their interests should prompt them to bestow the utmost care and attention to the prevention of fires, and, if they are in the business for more than temporary profits, they should be possessed of sufficient public spirit to adopt the least destructive methods of logging and so dispose of tree-tops, and other debris, as to minimize the danger of fire and to encourage the second growth by clearing the ground as much as possible. The Government of British Columbia has done and is doing all in its power to prevent forest fires, and during the present season the fighting of fire was carried out in many parts of the Province with gratifying results. The Dominion Government officials in the Railway Belt have also worked hard to the same end, and through the united efforts of the federal and provincial fire fighters much valuable timber has been saved from destruction. The campaign inaugurated by the present Provincial Government, will be vigorously prosecuted in the future to the fullest extent which our funds will permit, and we look confidently to the people of the Province to assist us in every way.

Prior to 1871, when the Crown Colony of British Columbia became a Province of the Dominion, the lumber industry was comparatively insignificant. All the lumber cut from the foundation of the Colony in 1856 was estimated at 250,000,000 feet. Indeed, strange as it may appear, a great deal of the lumber used in those days was imported, and there is one house in Victoria to-day, within a hundred yards of the Parliament Buildings, the lumber in which was brought from San Francisco. The first legislation regulating the cutting of timber was embodied in the Crown Lands Act, 1870, which provided for the granting of leases by the Governor-in-Council to an unlimited acreage for the purpose of cutting the timber, subject to such rent as might be determined by the Governor-in-Council. The ground covered by these leases was open to pre-emption but the pre-emptor was debarred from cutting timber other than for his own use. This Act was re-enacted by the Provincial Legislature in 1875, but it does not seem, however, that advantage was taken of it to any extent, as it was not until 1879–80 that any revenue was derived from timber rentals. By an amendment to the Act passed in 1888, the tenure of timber leases was fixed at 30 years and a rental of ten cents per acre was charged and a royalty of fifty cents per thousand feet on all timber cut imposed. The lessees were required to build a mill with a capacity of 1,000 feet per day for each four hundred acres covered by the lease. This Act also provided for a penalty of $500.00 or thirty days' imprisonment for cutting timber from Crown lands without authority. Since 1892 no leases have been granted of timber limits without the limits being offered to public competition and the lease was

granted to the person offering the highest cash bonus. The rentals were increased in 1895 to fifteen cents per acre, and again in 1903 to twenty-five cents per acre, subject, however, to a reduction to fifteen cents per acre upon the lessee proving that he had a mill appurtenant to his lease, capable of cutting at least 1,000 feet per day for each 400 acres included in his lease in actual operation, and cutting that amount at least six months in the year. By the Act of 1888, the Chief Commissioner of Lands and Works was empowered to grant special licenses, valid for one year, to cut timber from Crown lands. The area covered by the license was limited to 1,000 acres, and the fee paid for the license was $50.00. Subsequently the area was reduced to 640 acres, to be taken up in one block with the boundary lines running to the cardinal points, and the fees have been increased to $140.00 per annum for licenses covering lands west of the Cascades, and $115.00 per annum for licenses east of this range. The Act of 1888 also authorized the issuing of Hand Loggers' Licenses—all timber cut under license being subject to the royalty of fifty cents per thousand. The Hand Loggers' license was a personal one, and only gave authority to the person named therein to cut timber as a hand logger. The fee was $10.00 per annum and the logger had the right to cut timber from any Crown lands that were not held as timber limits under lease or license.

When the present Government assumed office, there were thus three methods by which a person could obtain the right to cut timber from Crown lands, namely, under lease, under special license, and under hand loggers' license. It was deemed advisable to simplify this state of affairs, and in 1905 the provisions of the Land Act authorizing the granting of timber leases were repealed, so that now the right to cut and carry away timber can only be granted by way of a license. The lumbermen, however, complained that they were much handicapped in their business and the industry retarded by reason that special licenses were not transferable, and only renewable at the discretion of the Chief Commissioner and not as a matter of right; that such a license gave no stability of title and that capital could not be secured under such conditions. The Government considered their complaints to be well founded, and by the Act of 1905 it was provided that licenses then existing should be transferable, and the holders thereof could elect to have their licenses made renewable for sixteen successive years at the same fees per annum as were then paid therefor, namely, $140.00 or $115.00, as the licenses covered lands west or east of the Cascade Mountains. The royalty payable on timber cut under such licenses was increased to 60 cents per thousand feet. The same Act provided that all special timber licenses thereafter issued should be transferable and renewable for 21 successive years. This legislation

has completely removed all complaints about the lack of stability of title under the license system. Millmen can now enter into large contracts and carry on their business with greater security knowing that they can have their licenses renewed from year to year. Capital can now be secured and the result of this legislation has altogether proved most beneficial both to the lumberman and the lumber industry, and therefore to the people as a whole.

One of the most important features of recent legislation in British Columbia respecting the timber industry is that which was passed with a view of having British Columbia timber manufactured by British Columbia people in British Columbia. The shipping of British Columbia logs to the other side of the boundary line had reached formidable proportions, and our lumbermen were forced to look idly on, whilst their rivals from Puget Sound took their raw material from British Columbia, converted it into all kinds of lumber and supplied the settlers of Alberta, Saskatchewan and Manitoba with British Columbia lumber at prices with which our millmen could not compete. This state of affairs worked a double wrong to the Province, for it not only deprived our lumbermen of all chance of profit on their investments, and our workingmen from earning a livelihood, but threatened the depletion of the most valuable timber lands along the coast for the benefit of American millmen. The first step taken to put an end to this state of affairs was in 1901, when the Legislature enacted that all timber cut from leaseholds must be manufactured in the Province, otherwise the lease would be cancelled. This enactment has been kept on the Statute book, and in addition in 1903, a tax was imposed on all timber cut and not subject to the payment of royalty, that is on all timber cut from lands for which Crown Grants were issued prior to April, 1887, varying, according to the size and grade of the timber from $1.00 to $4.00 per thousand feet, board measurement, on spars and saw logs; from .01 to 2½ cents per lineal foot on piles and poles under 11 inches in diameter; and from $2.00 to $4.00 per thousand feet, board measurement, on piles and poles over 12 inches in diameter.

Then again at the last Session of the Legislature an Act, known as the "Timber Manufacture Act," was passed whereby all timber cut from ungranted lands of the Crown, or from lands thereafter granted lying west of the Cascades, must be manufactured or used in the Province and authorizing any such timber, or any steamboat towing the same, to be seized and detained when it shall be made to appear that it is not the intention that such timber is to be used or manufactured here. The action taken by the Legislature to compel timber cut from our Crown lands to be manufactured at home has been hailed with satisfaction, and the effect has been most beneficial. It may in a way

be said to be the turning point in the history of our lumber industry. Previously our lumber companies, handicapped by the competition of Washington millmen manufacturing our logs and sending back the finished product to Canada free of duty, were barely able to make ends meet, and in some instances the local mills were actually losing money. This has now all been changed. Capital, which had held back—hesitating to embark in a business in which the chance for success was problematical—hesitates no longer. New mills equipped with the most modern machinery have been and are being established. A number of American millmen, realizing that they can no longer depend on British Columbia for a supply of raw material, have come to the Province and started manufacturing here on an extensive scale, and many others are following them. The great influx of settlement on the prairies on the other side of the mountains has given a great impetus to the industry which has rapidly recovered lost ground, and which to-day, viewed from every standpoint, stands upon a most satisfactory basis.

A perusal of the output during the past few years will shew this. You will find a statement of this output on page 15 of Bulletin No. 21, copies of which are before you, and it will not be necessary for me to weary you with many figures. You will note that in 1888 only 25 mills were in operation. To-day there are 150 mills all working overtime and unable to fill the orders that are pouring in. In 1888 the output was 31,868,884 feet. In 1903 it was 317,551,151 feet. In 1904 it increased to 325,271,-568 feet, and in 1905 to 450,385,554 feet. The output for the first six months of the present year was 235,387,000 feet—considerably over 50% of the total cut for the preceding year—indicating that 1906 will eclipse all former years in the volume of business in lumber.

But whilst the lumber industry is a most important one in British Columbia in relation to the development and progress of the Province, it is no less important in relation to the provincial revenue. In the fiscal year 1879–80, which was the first year any revenue was received from timber, the amount received was $1,263.41. In 1889–90 it amounted to $24,670.57. In 1899–00 to $136,330.00, and in 1904–05, the last fiscal year for which reports have been issued, the revenue received amounted to $486,516.46, being one-sixth, or nearly 17%, of the total revenue of the Province. It will thus be readily seen how important it is from a Government standpoint, that everything possible be done to encourage and foster an industry from which so large a proportion of the provincial revenue is derived.

With regard to the prospects of the pulp and paper industry there is much to be said. The supply of pulp wood, recognized as such, is enormous, and if the opinion expressed by Professor

Macoun be verified, that is that the Douglas fir is a paper making wood, there is practically no end to the possibilities of the business. If the waste of the fir could be converted into a merchantable pulp it would prove a boon to the lumbermen, and would go a long way towards removing one of the most prolific causes of forest fire, in the way of turning to use tree tops and other waste product which is now allowed to accumulate in the woods. Some years ago the Legislature granted power to the Lieutenant-Governor-in-Council to enter into agreements with and grant concessions of wood pulp lands to companies desirous of embarking in the enterprise. Several tracts of land were set aside in reserves to allow these companies to prospect for and locate areas of pulp wood, and select water powers for the operation of their plants. After selection, leases were granted on special terms which included the establishment and operation of pulp and paper mills, within certain time limits. Several companies took advantage of the law and considerable work has been done in cruising, surveying, and other necessary preliminaries. So far, however, the actual work of manufacturing has not been reached, although some of the companies have begun the erection of buildings and the installation of machinery. The chances for profitable business in pulp and paper making on this coast are unsurpassed, as the shipping facilities are cheap and adequate, rendering the markets of the world open to the trade. The Oriental countries afford a splendid market, and now with the trans-isthmian railway across Mexico completed, and the establishment of a steamship line from our ports to those of western Mexico, the whole of the Atlantic sea-board is thrown open to our trade in paper, pulp, and, in fact, to every product of the Province. The Panama Canal is, as yet, a dream of the future, but the trans-isthmian railway is a reality, and our shortest, cheapest, and most desirable freight route to the Atlantic.

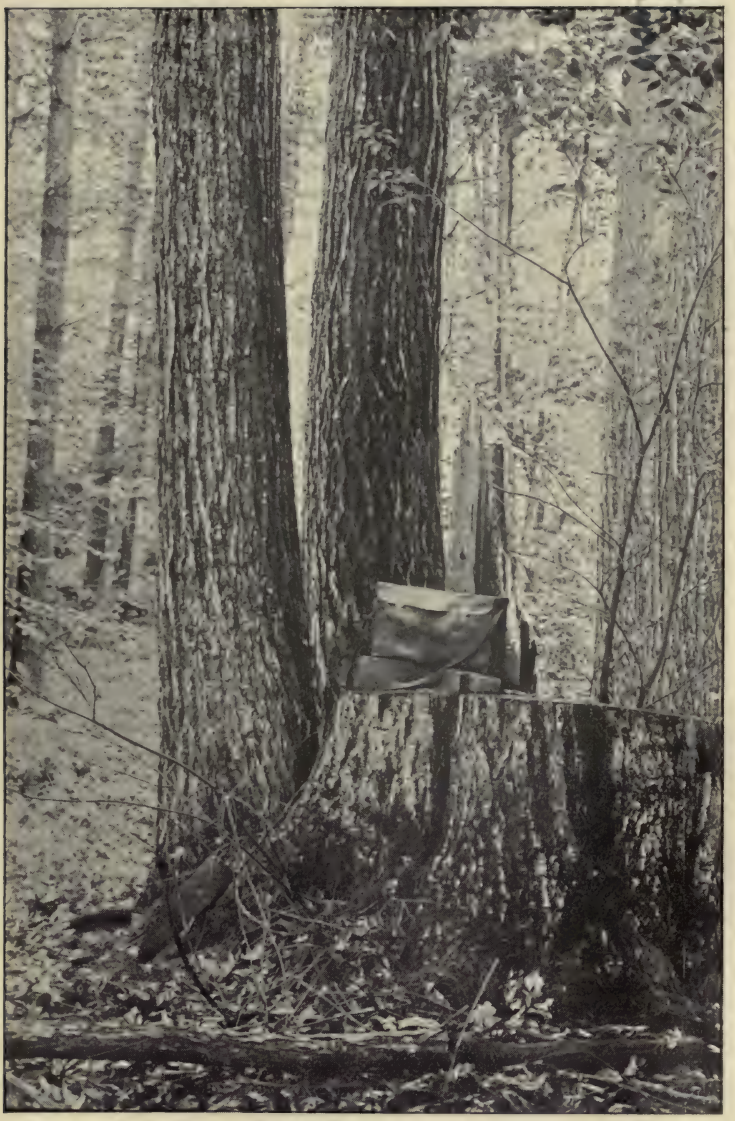
One word in conclusion with reference to legislation. I feel sure the provincial lumbermen will agree with me in saying that the terms imposed by the Government of the present day are not onerous, or greater than the industry should bear considering the requirements of the Province. In this age conditions change rapidly—and particularly so in a new and rich Province like British Columbia, which is on the threshold of a great expansion. But no matter how great the development and progress the future may have in store for us, it must, to a very considerable extent, depend on the development and progress of the lumber industry; and, no matter how conditions may change, or what changes in legislation such altered conditions may demand, no Government can ever afford to enact any legislation that will, in any way, check or embarass, or in any way interfere with the development of the lumber industry on

which the progress of the Province so much depends, and from which the Government derives such a large proportion of its revenue.

THE CHESTNUT AS A SPROUTER.

The Chestnut (*Castanea dentata*) is almost unrivalled as a sprouter, and this marked and valuable characteristic is well illustrated by the accompanying reproduction of photographs furnished by Prof. Judson F. Clark, all taken in Southwestern Ontario. In No. 1 the sprouts are about 12 years old. No 2 shows three fine trees, 14 to 18 inches in diameter, springing from one stump. These would make excellent ties or telephone poles. No. 3 illustrates sprouting from a living tree. The stump of the mother tree, which was cut a few years ago, is about five feet in diameter and the sprouts are about 15 to 18 inches in diameter. The chestnut, on account of its straight splitting and desirable quality when used in contact with the soil, is in great demand for fence posts and similar purposes.

Henry John Elwes and Augustine Henry are about to publish "The Trees of Great Britain and Ireland," and judging from the prospectus and the specimen illustrations which accompany it, their work will be one of inestimable value to everyone interested in Forestry or forest trees. Five years have been given to the preparation of this work, which is published privately by the authors. The first volume has already been issued, the second is in the press and the other three volumes will appear shortly. The object of this work is to give a complete account of all the trees which grow naturally or are cultivated in Great Britain, and which have attained or seem likely to attain a size which justifies their being looked on as timber trees. About 300 species of trees will be described and figured, several illustrations in many cases being necessary to show one tree. The illustrations are beautiful reproductions of photographs or paintings, many of them made specially for this work.



No. 3—The Chestnut as a Sprouter

LUMBERING CONDITIONS ON THE COAST OF BRITISH COLUMBIA.*

By R. H. Alexander, Vancouver, B.C.

Mr. President and Gentlemen:—

The subject on which I have been asked to make a few remarks might, at first thought, be considered somewhat antagonistic to that of Forestry, as the Lumber industry is occupied chiefly in the destruction of the forests rather than preserving them, but in reality the subjects are intimately connected. The Lumber Manufacturer's vocation is the conversion of the raw supplies of the forest into a marketable commodity for the use of man, and the object of the Forestry Association I take it, is to conserve the forest so as to ensure an ever recurring supply. I would like to put the importance of this to the general community by making a comparison with the farmer, who is looked upon as the backbone of the country, not that I wish to decry the importance of the wheat industry, but it appears to me that the produce of the forest is hardly looked upon in the same way. Take one acre of ground producing 20 bushels of wheat, this would equal 1,200 lbs., one acre of average timber land in British Columbia would yield 20,000 feet, weighing 3 lbs. per foot or 60,000 lbs., so that it would take the farmer fifty years to furnish as much produce for railway transportation as the lumberman does in one.

The money expended in marketing the crop of this acre of timber would also represent $200, about 30 years of the farmer's expense. The exhaustion of the forests of a country means the extinguishment of its lumber trade, hence the importance of the scientific treatment of our forests, which the Forestry Association is endeavouring to bring about.

I need hardly, when addressing a gathering of Canadians, enlarge on the importance of the lumber trade, as they are all familiar with the great role it has played in the development of the Dominion; furnishing direct employment to a large portion of its population, consuming great quantities of the product of the fields and manufacturing establishments, and besides building up a merchant marine of our own, attracting vessels from all quarters for the transportation of the product of the lumber mills and camps, and last but not least, furnishing a large proportion of the revenues of the Provincial Governments.

* Read at the Forestry Convention, Vancouver, B.C., Sept. 27, 1906.

In all of these respects the Coast District of British Columbia has largely contributed, and the improvement of general conditions on the Coast is very greatly coincident with the expansion of the Lumber Trade.

The first mills in the Province were at Esquimault and Sooke, on Vancouver Island, and were only for the requirements of the early settlers. The first mill of any size intended for the prosecution of export business was established at Alberni on the west coast of Vancouver Island about 1861 or 1862, but the business did not prove successful and was in operation but a few years when it was closed, and the machinery sold to some of the mills on Puget Sound. There was a small saw mill at New Westminster in 1862, catering to the local trade, and which shipped I think one cargo abroad. Parties who had been connected with this enterprise started the first mill on Burrard Inlet a year or two afterwards at Moodyville, which was followed by the building of the Hastings Mill on its present site in 1865, and with the erection of these mills the foreign lumber trade of British Columbia may be said to have commenced. For a number of years the foreign trade of the Province averaged from 25 to 35 million feet annually, until the Chemainus mill came into operation, since when the trade has varied from fifty to eighty million feet per annum. This year the Fraser River mill has joined the export shippers, and the foreign shipments will probably reach 85 million feet, the largest volume since the inception of the business.

Until the construction of the Canadian Pacific Railway there was no market available but the foreign, and large quantities of lumber that, under other conditions would have found a sale, used to be burned as the only way for its disposal. The advent of the Canadian Pacific Railway opened a market to the east, and mills began to multiply. It was a long time before our Douglas fir established itself, but it crept further and further east until now we have customers even on the seaboard of the Atlantic provinces, and the quantity being shipped in that direction is ever increasing. Our export trade is distributed all over the world, shipments being made to Australasia, China, Japan and occasionally to India, Central America, Peru, Chile and the Argentine Republic, the United Kingdom, France and Germany; it has even penetrated to Baltic ports, which might appear like sending coal to Newcastle, and is being used in the modern development of that ancient country Egypt, and aiding in the building of Johannesberg and the winning of gold in the Rand mines of the Transvaal.

In several of these markets however, our wood is not in general use, but only taken in the form of special sizes and lengths that cannot be obtained elsewhere, our great distance from the points of consumption and costly transportation mili-

tating against it being used in a more general way. Until recently the transportation of lumber has almost entirely been left to sailing vessels, but steam is now competing for the business, and when by this means these distant markets can be reached more quickly, we may confidently expect our trade with them to increase. With the expansion of the export trade it is interesting to note the increase there has been in the size of the vessels used. In the early days of the trade a vessel carrying over 400,000 feet was a large one, and to supply a cargo of a million feet was an undertaking so colossal as to make a mill manager stand aghast, while now it is a difficult matter to obtain vessels to carry such a small cargo, and steamers carrying 3,000,000 feet are not uncommon visitors.

Coincident with the increase in size of the vessels, has naturally been the increase in capacity, and improvement in the machinery of the mills, from the mill of early days producing 50,000 feet in which a great deal of manual labor was employed, to those of a capacity of 200,000 feet per day, equipped with all the latest machinery and labour saving devices, whilst the working day has been reduced from 11½ hours to 10.

In 1886, when the Canadian Pacific Railway reached Vancouver, the output of the Coast mills of British Columbia did not exceed seventy-five million feet, and this year, including the shingle industry, will reach 525,000,000.

In that year the revenue arising from the forest was but $3,768.00, while last year it amounted to $578,748.00. In making this comparison, however, a large share has to be credited to the growth of the lumbering business in the interior of the province, which will be referred to more particularly by a later speaker. The development of the shingle industry has also greatly assisted this result, as at the commencement of the same period of twenty years, there were only a few machines in use supplying the local requirements and finding it difficult to supplant the old hand shaved shingle; there are now 155 machines in operation, capable of turning out one billion shingles per annum, and the excellence of our manufacture has not only obtained for B. C. shingles the trade throughout Canada, but has gained them a preference in the United States.

The increase in the manufacturing of lumber of necessity required an increased production of the raw material from the forests and an improvement in the methods of logging.

In the seventies, I think the only two mills having leases of timber land were the Hastings mill and the Moodyville mill, for which they paid the Provincial Government one cent per acre without any further dues, and the revenues could not have amounted to more than about $600.00, from which it has increased as before mentioned to nearly $600,000. Whilst these

mills operated their own camps on their leases, others cut timber wherever they felt inclined, no one then placing any value on the standing timber. Oxen were the motive power used for the transport of the logs to the water, and the most important man in the camp and the one getting the highest wages was the "bull puncher," or teamster, who gained the above name from driving with a goad stick, in the end of which was inserted a brad which was liberally used, along with a good deal of strong language to make the cattle exert themselves. When moving from camp to camp, a teamster generally carried his goad stick as a sort of insignia of office, and it may be a surprise to hear that $5.00 was an ordinary price for a good hickory goad stick. The teamster's wages ran as high as $125.00 per month without any deduction for lost time, and it was a sight to see their skilful manoeuvring of a team of twelve and sometimes fourteen "bulls" in the dense woods. At this time there were also a number of what were called hand-loggers, who finding a locality where the timber grew on a slope close to the beach, with the aid of a jack screw, wedges, an axe and a crosscut saw, put in the water no inconsiderable part of the log supply. Later on the camps substituted horses and mules as being faster than oxen, but all these methods have practically been superseded by the use of steam haulers, with fully equipped railways for the main roads where the operations are of sufficient magnitude.

Until comparatively recent years, the only lumber manufactured by the mills was the Douglas fir, which I regret to say is known abroad more generally under the commercial name of "Oregon Pine." How it received that name it is difficult to account for, as the first shipments were sent abroad from Puget Sound, then Washington Territory, but the name has remained and it is most difficult to change a name which by use has became a familiar commercial term. Our B. C. product, I am pleased to say, has in many instances a preference as having a closer grain, and in Europe at least, is frequently referred to as "Columbian Pine" in contra-distinction to the other. Our other woods of commercial use are cedar, spruce and hemlock. Our cedar furnishes the material for our large shingle trade, and is in request also for finishing lumber and the manufacture of doors and sash. Spruce is not so plentiful, but the upper grades find a ready sale in various forms, while the lower furnish the material for box-making. The last wood I have mentioned is hemlock, and hitherto hardly any use has been made of it except for piles and for no other reason that I know of than its name. The hemlock of the Pacific Coast is a very different tree from that in the east, being much longer in fibre, it is somewhat harder and heavier than spruce, though less than fir; experiments with it have proved it a first class wood for interior finish and I fully believe that its use will

quickly increase when prejudice is overcome, and will be esteemed as highly as our fir is at present. From a forestry point of view, I am sure it will prove of the highest value, as it rapidly reproduces itself and flourishes well in heavy shade. A walk through our park will furnish our visitors interested in forestry with examples without number of this tree having reproduced itself amongst dense underbrush, on fallen and partially decayed trees, and even on the tops of stumps of fir trees which have been felled, and it has been described by one of the timber experts connected with the University of Washington as an "ideal tree for reafforestation on account of its ability to exist under the conditions just mentioned."

Logging operations on the coast of British Columbia will always be expensive and rapidly increase in cost from the general characteristics of this country. This generally rises sharply from the sea shore without any large area of fairly level land; this necessitates constructing roads from the shore at several different points to obtain the timber from one moderately sized limit, and it becomes a question whether there is enough timber tributary to any one road to justify its construction. As the timber within easy reach of the shore becomes exhausted, this condition will be intensified in proportion to the length of the roads necessary and only large compact areas of timber will justify the expense of building railroads many miles inland. The cost of working small areas will rapidly increase and I am therefore of opinion that the price of the raw material will have to increase accordingly. If my view is correct, it follows as a certainty that the price of the manufactured article must increase also, and this I think will be the case generally on the Pacific Coast. The rapid exhaustion of many former sources of supply of constructional timber, leaves practically but two large areas available for future supplies, these are the yellow pine region of the South and the Pacific Northwest, and when I tell you that at a Convention of Lumber Manufacturers at St. Louis, which I attended last spring, it was stated by Mr. Long of Kansas City, a recognized authority on the subject, that the standing timber in the Southern states represented but fifteen years consumption, you may realize what the future value will be of the almost virgin forests of British Columbia. In my opening remarks I referred to the Lumber Manufacturers as destroyers of the forests, but Mr. President, there is one agency which yearly takes a greater toll than the Manufacturers, I refer to fire; each year we see large areas of timber destroyed, the ultimate value of which is certainly not realized by the public. I trust that the Forestry Association will, as one of their first and most important duties awaken public sentiment to the necessity of protecting the timber supply which we possess whilst preparing for the reproduction of our forests in the future.

THE DOMINION FOREST RESERVES IN THE DRY BELT IN BRITISH COLUMBIA.

By Roland D. Craig, F.E., Inspector of Forest Reserves.

The Hat Creek, Tranquille, Long Lake, Niskonlith, Martin Mt., and Monte Hills Forest reserves, form a group which resemble each other in situation, purpose and sylvicultural characteristics. Situated in what has been known as the "Dry Belt," but what should be called the "Irrigable Belt," the chief function of these reserves is to protect the watersheds from which flow the streams which are turning a land resembling the Majara Desert into a region of fruitful valleys. The great possibilities of these fertile valleys when watered, are just beginning to be appreciated, and anything which assists irrigation cannot easily be over-valued.

Heretofore the cattle industry has been the chief source of revenue to this district, but the large ranges required in this region of scant vegetation has made it not the most profitable business, and over-stocking has resulted in serious deterioration of the grazing possibilities. It has been demonstrated, however, that by irrigation $300 to $500 per acre per annum can be secured in fruit, and now settlers are pouring into the valleys with the intention of entering this profitable business. The profit nd permanence of this industry is, however, directly dependent on the preservation of the forests on the mountains surrounding the valleys, for in the valleys there is very little precipitation, only 2 inches falling last year in Kamloops, and irrigation must be depended upon. At higher altitudes the precipitation, both in snow and rain, greatly increases, and if protected and controlled there is an ample supply of water for the land which is available for agriculture.

The value of a forest cover for catchment basins is often not fully appreciated. Dams and reservoirs may assist in controlling the run-off, but they are expensive and often unnecessary, and besides they do not protect the water from evaporation, which is one of the chief sources of loss. The forests not only retard the run-off, but prevent a large part of the loss by evaporation by excluding sun and wind. In that region too, where much of the water comes in the form of mists, which are blown along the mountain tops, the increased surface afforded by the forests arrests much of the moisture which would otherwise be lost. Persons travell-

Tranquills Forest Reserve, a source of water irrigation.

3-year old apple tree near Kamloops—the result of irrigation.

ing in a forest on a misty day will have noticed how the water drips from the leaves, while in the open very little reaches the ground. Observers will also have noticed the almost entire absence of perennial springs and small streams on bare mountain slopes, whereas wooded slopes of similar altitude and other conditions will be dotted with springs.

Kamloops valley, which lies in the midst of these reserves, has an altitude of 1600 feet, while the hills about rise to 6000 and 7000 feet. The valley and lower hills are almost treeless, except for the poplars, willows and alders which grow along the water's edge. At about 2000 feet open park-like stands of bull pine occur and increase in density with the altitude. At about 3000 feet a mixture of Douglas fir occurs with the pine and gradually replaces the pine as the altitude is increased. At 4000 feet black pine becomes prominent and between 5000 and 7000 feet forms the main stand with Douglas fir, Englemann's spruce, black and white poplar as secondary species. The supremacy of the black pine is undoubtedly due to the ability of the cones to protect the seeds from fire, and the density of the black pine reproduction following a fire makes it difficult for other species to compete with it. Most of the black pine stands are young and are evidently replacing the fir and spruce. The bull pine being more tolerant of drouth, succeeds over its competitors at lower altitudes. There is very little undergrowth in these forests and the ground is covered with needles.

Compared with the Coast these reserves do not contain the best quality of timber, but it will be useful for mining supplies and fuel and some for saw material. Very little cutting has yet been done on the area reserved. The quality of the timber is largely due to fires which seem to have run almost everywhere, and have injured to a greater or less extent, even those trees not actually destroyed. Many trees die after a fire, even though the bark is not burned, on account of the heat injuring the tender cambium layer under the bark. Ground-fires decrease the vegetable matter in the soil and remove the mulch of needles which protects the soil moisture, so that the vigor of the tree is decreased.

The chief causes of the fires have been the railway, cattlemen, prospectors, campers and Indians. During construction and since, many fires have been started along the C.P.R., which have destroyed the timber in the vicinity, but now the officials realize the injury to the road from the loss of freight and spoiling of the scenery caused by fires, and are endeavoring to prevent further devastations. Cattlemen are in the habit of burning the forests annually, in order to increase the grazing area and to improve the grass. This short-sighted practice has been very costly to the forest and irrigation interests and must be stopped.

Prospectors sometimes burn the forests in order to expose the underlying rock. Carelessness with camp fires has been the cause of some fires and the Indians are accused of setting fire to round up game and to improve the feeding ground for the deer.

There are still numbers of deer and some bear in these mountains, and in places there are beaver, which at the end of the closed season in 1910, will stand considerable exploitation. One of the finest trout lakes in British Columbia is in the Long Lake Reserve and many of the small lakes and streams in the district abound in Dolly Varden and Rainbow trout, attracting anglers from all parts of the world.

The area under reserves in this region should be considerably increased in order that the watersheds may be adequately protected, and then with a sufficiently large force of rangers to guard these reserves, they will be of inestimable value to the surrounding district.

FOREST RESERVES AND PUBLIC HEALTH.

With industrial development and its accompaniment of crowded cities and strenuous business applications, the need of mankind to return to the great out-of-doors for rest and health is increasing. Never before were the forests more appreciated for the invigorating life they afford than at present. Not many years ago people who would spend their holidays camping out in the wilderness would have been ridiculed. Now, however, thousands seek the sylvan solitudes in the summer, enduring many discomforts and often privations in order to get back as near as possible to the natural life. The forest reserves which are being established throughout Canada, will preserve for future generations these recreation grounds. In the fight against tuberculosis, the establishment of isolated sanitaria where the patients can enjoy an out-door life, is one of the chief means of combat. It would seem that the forest reserves, situated as they are away from settlement, should provide ideal sites for these sanitaria and that the Government should offer every encouragement for the use of the reserves for this purpose.

A DAY'S WORK IN RIDING MOUNTAIN.

By H. Claughton-Wallin, F.M., Forest Assistant, Forestry Branch.

When approaching Gladstone, on the Canadian Northern Edmonton Line, the traveller will notice how the flat treeless prairie is gradually disappearing and being succeeded by a wooded country. As the train carries you further towards Dauphin, the trees increase in size and variety. There are among the poplars, scattered oak, elm, ash and Manitoba maple, and also here and there an old shaggy lopsided spruce, looking lonely, as if it was wondering why on earth it was left there to struggle for existence among so many strangers.

On your left you see a bluish wall a few miles distant following you for several hours. Coming from the east, with your head full of talk about the level prairies of Manitoba, you are surprised. Being a person fond of nature as it was before man tried to improve it, and having thoughts for something else than the prosaic "How to invest your spare money to the best advantage," your interest is aroused.

It is not that the scenery is in any way startling. Had it been, for example, in Quebec or British Columbia, you would never even bother to lift your eyes from your paper to look at that blue mountain wall. But it being situated in Manitoba your interest is, as was said before, awakened.

In your mind you see yourself there in the wilderness, following an old Indian bridle path through the beautiful forest, drinking the refreshing cold water from some little mountain stream and now and then getting a glimpse of a majestic moose or a graceful elk.

Well, those were the thoughts running through my mind, and the only thing to regret is that my fellow passengers on the Edmonton Express did not have the same good luck as I, to spend a whole summer up there in the Riding Mountain.

The writer had received instructions from the Forestry Branch of the Interior Department to proceed to the Riding Mountain to conduct a valuation survey on the Dominion Forest Reserve situated there, and at the end of May I arrived in Dauphin. To those of my readers to whom this name is not familiar, I may say that Dauphin is one of Manitoba's most progressive towns situated on the Canadian Northern line from Manitoba to Edmonton, twelve miles north of the boundary of the Riding

Mountain Timber Reserve. This town was to be our headquarters.

After all arrangements had been made about the "grub," and about the—for some of the fellows it looked just as necessary—mail, etc., the party started for the mountain, all expecting interesting work and a pleasant summer. If we were disappointed or not I will leave to the reader to decide after reading this article.

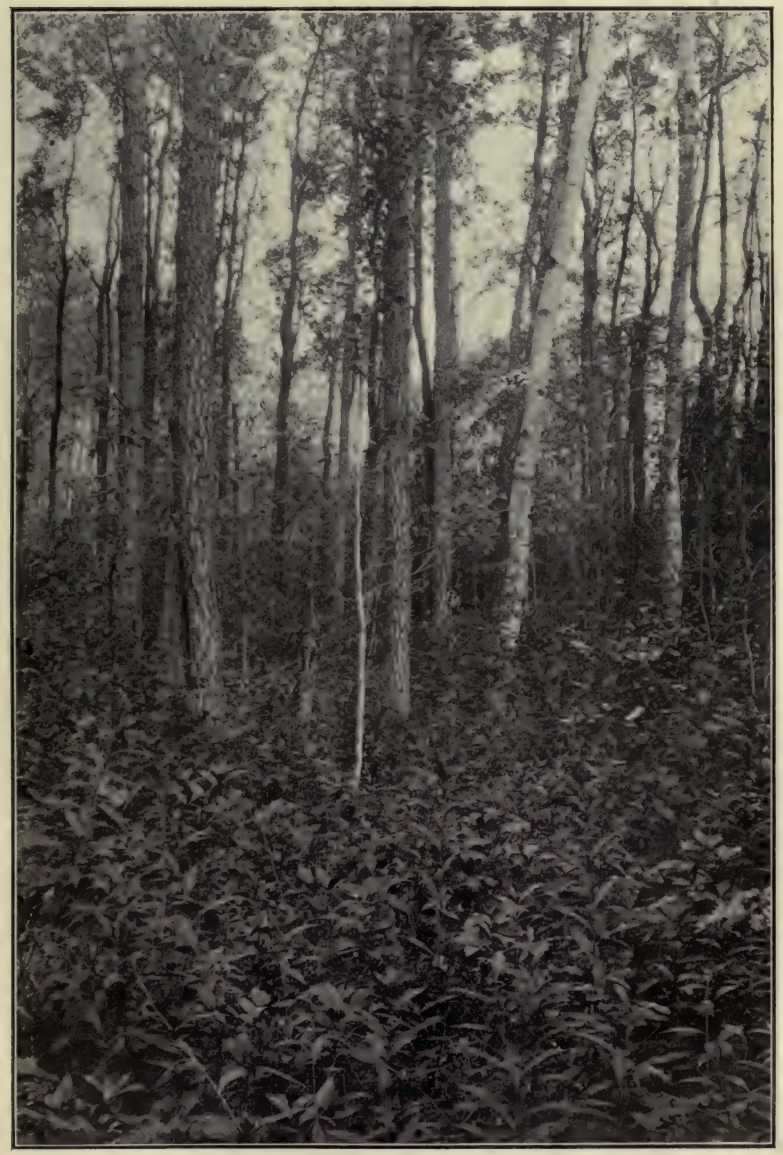
About twelve or fifteen years ago the timber reserve, consisting of about forty-three townships, was visited by immense forest fires devastating considerable areas. Where before had been valuable spruce timber the fire left it a wilderness. The grey tree stems stand there for a time till insects, fungi and storms have played their parts and felled them to the ground, where they in places form an almost impenetrable chaos—in truth a sorrowful sight! These fires were however, confined mostly to the western parts of the mountain, though the east was far from left intact. But still tracts of good forest are left in these eastern parts, and it was there the valuation survey was conducted last summer.

The first thing that caught my eye was the richness of vegetation. Following a winding trail up the mountain side you will find poplars, oak and ash, mingled with Manitoba maple, elm and birch. Coming higher up on the second plateau, white and black spruce, larch, poplars, birch and also balsam seem to gain ground and leave the other varieties behind. Jack pine is found in the southeastern part of the Reserve. There are in some of the valleys groves of Manitoba maple. When I first wandered into one of them I was surprised to find, at the foot of almost every tree, a basket shaped thing, made of a single piece of birch bark. On looking more closely I noticed in the trees a cut in which was placed a little piece of wood sloping downwards. Here is where the Indians come in the spring to tap the maples for sap of which they make syrup.

The undergrowth is quite dense, mostly consisting of hazel and mountain maple.

The scenery is very picturesque, deep ravines from the bottom of which you can hear the rushing of some rapid river or creek, beautiful little lakes lying there in the stillness of nature, the home for one or two families of the white-breasted northern diver, or a little colony of ducks, and serving, on a hot summer day, as a place of refuge from flies and mosquitos for the aristocrats of the forest, the proud moose and elk.

Now, may I ask you, my readers, to forget the worries of life and come and spend a few days in the camp of the forest survey party. It is the month of August and you will find our



Black and White Poplar in the Riding Mt. Forest Reserve.

tents pitched at Lake Audy. Well, early in the morning you will be suddenly disturbed in your slumber by a cheerful: "Get up here, six o'clock, weather is fine, not a cloud. Get a move on!" That is George, our cook, whose head never fails to appear in the tent door at this time, Sundays excepted. After a few minutes there is another call: "Ain't you up yet? Pancakes is getting cold." Everyone has a soft spot for George's pancakes. I believe he had to start to make them at five o'clock; so up you get, a dip in the lake, on with some clothes, and you are ready for the breakfast. At seven o'clock there is nothing left on the table except the hardware, and out we go to work; one party of four on a valuation survey, and another party to take stem analyses. Let us follow the former party. There are two men on the chain, the head man carrying a compass to maintain a straight course, the rear end man keeping the tally. The other two fellows go one on each side of the chain, calipering the trees to a distance of 16½ feet from same, calling out their variety, diameter 4½ feet from the ground, and how many logs they can get from each tree, to the tallyman, who puts it down on a printed form. On the back of this he makes note of everything that is particular to the stand he is going through, location, situation, soil, ground cover, undergrowth, variety of trees, density, silvicultural conditions of the stand, reproduction, etc. Insects and fungi are collected and damage they do is studied. These lines all run parallel at different distances depending on the type of the forest and how careful an estimation you wish to obtain.

But what is all this racket about? Oh, Dan, the teamster's dog, which is following the party, has got hold of a wolf. He bites and shakes it, but poor Dan's teeth are not very sharp and not much harm is done. Disgusted, he lets go his hold and quick as lightning the wolf has got him by the nose. There is a yelp and the wolf is caught in Dan's grip again. But the result is no better. This time, however, he is careful not to open his jaws and with the help of Gus, who is "found carrying concealed weapons," the poor wolf is passed into eternity.

And the surveying party continues its march, through good timber, over big brulés and muskegs, crossing rivers, wading through sloughs, tumbling down a deep ravine only to have to climb up again on the other side the next minute. But everyone is cheerful and if the sloughs become too deep there is always Parker's "It's a gay life, boys!" which means that you are not going to be a quitter.

Seven o'clock finds us all at supper table. The stem analysis party tell their experience, how they have been occupied finding out age and annual growth, height, merchantable length, etc., of different trees, and how they saw a big bull moose on a cutting biting off the tops of young trees, showing a most alarming dis-

regard for forestry; and fresh tracks of bear had been found on the trail just outside camp.

What is more pleasant than an evening in camp, especially on a lake full of fine pike? When too late for fishing there is always a vacant place for you at the camp fire. The pipes are lighted, good yarns are following each other, and for hours you sit there listening, till suddenly you find yourself alone Throwing a piece of wood on the dying fire you manage in the upflaming light to look at your watch. Midnight! All the fellows in bed. And with lingering steps you go to follow their example. From the lake there comes the weird cry of the loon and back in the forest the wolves are howling.

Much more could be said about a forester's interesting work and his pleasures; about rainy days and millions of mosquitos. But what true woodsman would mind the latter when he knows that they are the evils of the early summer and that better days are coming?

There are farmers in every section of the older provinces who regret their lack of foresight in the early days of settlement, when trees were cut down heedlessly and indiscriminately on their lands and burnt on the spot or sold as cordwood in the neighbouring towns leaving them, as many are to-day, with little or nothing to occupy them in the winter season, and without shelter for their live stock at a time when pasture in the old days was still accessible for weeks longer on the approach of cold weather than it has been of later years.

The influence of the forests of Canada upon the streams and lakes has long been a problem with our people. The floods at Montreal have cost the city hundreds of thousands of dollars besides interfering with business and affecting the health of the citizens. It has been well known for years that the almost sudden downpour of water and cakes of ice in the spring, as compared with early days, was due to the denudation of the forests in the upper reaches which prevented the too rapid thawing of the ice and snows on the inland lakes and streams, the feeders of our great rivers. —*The Canadian Journal of Commerce.*

TREE PLANTING AND NURSERY WORK AT INDIAN HEAD.

BY NORMAN M. ROSS.

The season now closing has been a most favorable one for general nursery and tree planting work. The crop of seedlings grown for distribution, though not quite so large as that raised last year, owing to a very dry spell of weather in August, which practically stopped all growth, is a very good one, the seedlings being particularly strong and vigorous. All the permanent plantations and belts have made wonderful growth, the new wood on the cottonwoods and willows averaging at least 4 feet—the maples not quite so much.

This year about 5 acres of permanent plantation was set out in native white spruce and Scotch pine; the former were raised from seed in our own nurseries and when planted were 4 years old, having been 2 years in the transplanting beds. The young plants were from eight inches to one foot in height and very strong and healthy. Of the Scotch pine 75% were grown at Indian Head and were 4-year transplants, 25% were imported from France as 3-year transplants. It will be interesting to notice which lot of plants come through the winter best. Up to the present date these evergreen plantations have done very well, on the whole not more than 15 to 18% of the young trees having died. As they are very slightly protected it is expected that a considerable number may not survive the winter should the snowfall be light. Last year about 500 Scotch pine from France were set out in mixture with native spruce and tamarac. The winter was not very favorable for young evergreens, as there was practically no snow cover. In early spring, owing to very severe winds and bright sun, many of the young trees were browned up and did not recover. However, 60% came through and have made a very good stocky growth this season. This winter, as the plantation has made considerable headway, much more snow will be held on the ground and very little loss should occur from winter killing.

The native white spruce in the nursery, which were planted in spring of 1904 in mixture with native larch, are now well established, and this season many of the young trees made a growth of over two feet. The tamarac however, is evidently too strong for the spruce and will overgrow them completely in a year or so more. The growth that the tamarac has made is wonderful. When planted in 1904 the seedlings were not more

than 1½ feet high and about the diameter of a lead pencil or perhaps less. Several are now over 6 feet high. The growth is exceptionally strong and vigorous, the young trees measuring on the average at the ground about 1¼ inches diameter. This plantation was set out on very rough backsetting, without the slightest protection of any kind. After transplanting not 1% died and there was no loss at all from winter killing. Those planted in 1905 were equally successful. From present indications this variety will become of great importance for prairie planting, owing to its hardiness, rapidity of growth and the many valuable uses to which the wood may be put.

It is unfortunate that up to the present we have not been able to secure any seed from the native larch. The seedlings are got from the natural swamps and therefore cannot be obtained very generally. However, it is hoped that we may be more fortunate in collecting seed in the future. The natural reproduction in places is so thick that very heavy seed years must occasionally occur.

The question of collecting seed is of considerable importance where trees must be raised in sufficient numbers to meet the demands of the present tree planting work. From 2½ to 3 million trees will be required annually from now on. This season, owing to late spring frosts, no maple or ash seed in any quantity can be found in Manitoba or Saskatchewan. In order to be safe in a poor seed year, we have always tried to keep at least a year's supply of seed on hand, unfortunately however, last season was also a very poor one for maple seed, and only enough could be obtained for this year's sowing, consequently great difficulty has been experienced in arranging for a supply for next spring. We have been fortunate enough in obtaining a sufficient quantity in North Dakota for our own use and possibly may have a little for distribution. In the past a considerable number of Dakota cottonwoods have been sent out. These are imported from North Dakota, where the seedlings are gathered on the sandbars of the large rivers. The people through whom our supply is obtained, state that owing to the cutting of the old seed trees along the river banks, seedlings are becoming scarcer year by year, and it is quite possible that in a few years we shall be forced to propagate this variety from cuttings. This, however, is a very expensive method and does not produce nearly as healthy stock.

The elm bore a fairly good crop of seed this summer and about 50 lbs. was collected. Three acres were sown in drills 30 inches apart and now show a very fair stand, which should result in the neighbourhood of 300,000 seedlings next fall. This is the first season since 1903 that we have been at all successful in securing seed of elm. It is a very desirable variety for planting

Forest Nursery Station, Indian Head.

Spruce and Larch planted 1904, at Forest Nursery Station.

in the west and it is unfortunate that the supply of seed should be so uncertain. In 1905, as no seed could be obtained in the west, a quantity was procured in the Eastern States. The stand produced during the first season was very good, but every seedling was killed during the winter, proving conclusively that the seed must be collected in this country. Some years ago we had a similar experience with the Manitoba maple. Owing to a scarcity of seed here, a quantity was purchased in Minnesota. The seedlings however did not mature and although not actually killed outright, were in such poor condition that we would not distribute them.

The fact that wood for fuel can be grown most profitably in this country is demonstrated more clearly every season. In some districts wood can be obtained from natural timber belts with little difficulty, but away from these restricted areas, the settlers are limited to the supply brought in on the railways, poplar wood of only average quality being worth $6.50 per cord. There is not the least doubt in the mind of the writer as to the possibility of growing fairly good fuel within 6 to 8 years, when cottonwood or willow are used, and when the trees are properly set out and cared for. In the spring of 1903 we were using some land on the Experimental Farm at Indian Head for our nursery work and in order to obtain a quick shelter a few rows of cottonwoods were planted. The total length of the rows would be about 700 yards, the trees being set 30 inches apart and were about 1½ feet high. We are now giving up this land and consequently had to cut out these hedges, which in 4 years have made great growth. The trees average 15 feet high and many are over 6 inches in diameter at the ground. We have now cut up and piled over 3½ cords of wood cut from these hedges. This wood is not of course best quality, though it is just as good as hundreds of settlers get after travelling to the bluffs in the winter and probably taking three days for the round trip. At the present time growing trees for profit on the prairies has not received any general consideration, but before many years it is hoped that every farmer may devote a few acres to this purpose.

At the nursery station it is intended to establish several large plantations, which will be sample plots to test the value of the different hardy varieties planted in mixture and pure st nd and at different distances apart. As a considerable area of land will be necessary for this purpose, an additional ¼ section adjoining the one already under cultivation has been reserved for the work. At present the land is unbroken. Fifty to sixty acres will be ploughed and backset next season; part of this may be planted the following spring, but most will be put into oats, after which the land will be summer fallowed and got into a better condition for planting.

Throughout the country general interest in tree planting is rapidly increasing. Applications from settlers wishing to avail themselves of the Government distribution are being received daily. The tree planting inspectors report that the plantations are set out and cared for in a more intelligent manner than formerly, and particularly it is noticed that more care is given to the preparation of the ground.

It is encouraging to note that the C.P.R. are undertaking the planting of trees for snow breaks along their tracks and are also about to experiment in the growing of wood for ties and posts. It is to be hoped that the first plantings will prove successful and that this line of work may be more extensively carried on.

DESTRUCTION OF PINES NEAR BANFF.

During the fall of 1905, I noticed a stretch of timber with all the appearance of having been burnt over—this was while coming back from a day's work on Sulphur Mountain. I had no reason to believe that it had been burnt over, as no forest fire had been in the neighborhood, to my knowledge. The matter having been brought to my attention by another observer, I resolved to visit the locality when opportunity afforded.

About a year went by before I had an opportunity of examining into the cause for such a phenomenon. On September 5th last, in the morning, I walked to Rundle Mountain—the locality—arriving at my destination within 2 hours, and took the following notes of the surroundings: About 1000 feet above the Spray River (possibly more above the town), and 5500 feet or so above sea level, I found from 1 to 2 miles or thereabouts of dead or nearly dead pines (*Pinus Murrayana*), that is from the appearance of the leaves. These ran from E.S.E. to W., the width about 600 ft., or more in places. The leaves on the trees were yellow, many having been blown to, or fallen on, the ground, the tops were green as a rule, the dying leaves only covering part of, and seldom the end of, the branch.

These trees are in what might be called rather open woods and run up to a rocky ledge; above this a few yards on, are spruces which remain uninjured; below, there is a continuation of pine (*Pinus Murrayana*), growing more densely and much smaller in size, gradually merging from trees whose top only was scorched with those uninjured. The bark was in no way injured, but

dead leaves ran up the trunks and on others these had fallen off branches growing closely to the ground on a fairly gradual slope. A few balsam poplars (*Populus balsamifera*) were dead, about the margins of dried rivulets. Some spruces (species uncertain) held dead or partly dead leaves. Gravel, loose rock, and earth formed a soil which was overgrown by grass, bearberry (*Arctostaphylos Uva-ursi*), etc.

I was careful in going over the ground to look for insects or disease, but an examination of a number of trees gave me no reason to suspect that either of these had affected the trees. As the meteorological conditions during the last two years may have caused the conditions described above, especially the amount of moisture precipitated, the following data are submitted:

The snowfall from January to October, inclusive, was for:—

1902	1903	1904	1905
97.45 in.	78.83 in.	50.14 in.	21.25 in.

The rainfall was for:—

1902	1903	1904	1905
20.96 in.	16.04 in.	7.89 in.	13.18 in.

The snow on the mountain slope would possibly be more than in the valley.

As to the temperature for October.

The lowest recorded was 3.3 on the 18th October, 1905, with about 2 inches of snow in the open valley; the lowest previously recorded, occurred on the 31st of October, 1893, with about 8 inches of snow in the open valley.

The snow on the ground for October 1904 was on the 7th, 0.65 in. with practically none to the 20th November, when 5.25 in. fell, and from 5 inches to 1.75 in. to end of November. For December practically none to the 16th, then 5 to 8 in. to the end of month October 1905, no snow on the ground till the 17th, then 2.45 in., from the 20th practically none till the 26th November, when 2 in.

The snowfall for 1905 was exceptionally light. Precipitation below the average for 1904 and 1905.

I therefore attribute the dying of these trees to the low temperature coming rather suddenly, and earlier than usual, after comparatively mild weather, with perhaps insufficient moisture and winter protection, as a secondary cause. I would ask what is the opinion of others.

N. B. SANSON, Curator,
Rocky Mountains Park Museum,
Banff, Alberta.

VIEWS OF A DISTINGUISHED FORESTER.

Sir Dietrich Brandis, the father of the present system of Forestry in India, in a letter to Mr. E. Stewart, Dominion Superintendent of Forestry, makes some valuable suggestions. He says:

"I cannot sufficiently urge upon you the necessity of concentrating all your energies upon one point, that is the constitution of as large an area of State Forests as possible, to enable Canada (I mean the Dominion) to supply the greater portion of the coniferous timber now imported into Great Britain, permanently.

The timber now imported into Great Britain annually amounts to over nine million tons, valued at £24,000,000; and the greater part of this is coniferous timber. Of this quantity

Sweden and Norway supply.....	5	million tons.
Russia supplies.....	2	" "
Dominion of Canada supplies.....	2	" "
	9	" "

Russia, as soon as the present troubles have been overcome, will develop its trade and industries in a manner not anticipated at present, and the result will be that they will consume all the timber this country can produce. Germany formerly was a timber exporting country and it now imports five million tons a year. And this, though the area of productive forests has been steadily increasing, and the annual yield per acre is now much larger than it was thirty years ago.

Sweden and Norway, tempted by the high prices and the ready market in England, are cutting more than what their forests annually produce. At the same time industry and manufactures are increasing, and the result will be, that that source also will come to an end.

The United States export very little to England now, and the Dominion of Canada is the only country from which, if the forests are properly managed, a permanent supply of coniferous timber for Great Britain can be expected.

All this means that prices will rise steadily, and it is for you in Canada now to seize this opportunity and to lay the foundation for a magnificent future development of your wealth.

Hence it is necessary that you should form as large an area as possible of State forests, and that you should place them under efficient, systematic management so as to secure ample regeneration of the species you want, either naturally or by planting.

I hope you will not establish a Forest School before you have forests under systematic management where your students can learn what is wanted. You will, of course, require a number of Forest Officers. Government forest management in India on a large scale, did not commence until in 1866 I obtained sanction to select two first rate German foresters, Schleich and Ribbentrop, who both were my successors, and to organize the professional training of young Englishmen for the Indian Forest Service in Germany and France, one of whom (the late Mr. Hill) was my third successor.

The United States would have done well, had they followed this example. But my young friend and pupil, Gifford Pinchot, thought that for political reasons it was necessary to proclaim the principle: "The American forests for the Americans." He and the small number of those who have received their professional training in the forests of France, Germany and Switzerland under my guidance are doubtless doing their best to bring the enormous area of forest reserves into working order, but in my opinion they would have done well had they strengthened their hand by the introduction of a limited number of men from Germany, of Dr. Schenck's knowledge and experience.

I doubt whether your hand will be free to act in this matter, and I will not therefore, in any way urge suggestions that may not be practicable. Fortunately the Forest School under Mr. Graves at Yale College and the Biltmore Forest School are, I understand, so far advanced that you can get men from these sources for your work. And you can wait until more of your forests are in proper working order before you establish a forest school of your own.

As soon as you have a suitable area of State forest entirely at your disposal, then place the most competent man you can get, and let him commence the management of that estate. The first operation will be to divide the area into compartments; in hilly country following the configuration of the soil; on level ground with uniform soil and other conditions, rectangular areas with due regard to river roads and other natural features. The Forest Ranger in charge is not master of the position unless he has divided his range into compartments.

When one forest range has been brought into working order then you will have to select from among the assistants whom you should at the outset give to each forest ranger, the most competent to take charge of a second range and so on, until gradually a good system of work has been introduced in the whole of your State forests.

By all means arrange for the exploration of your northern wilderness region, for the reservation of lands from settlement at the sources of your great rivers and for tree planting on the

plains. But your first work must be, to place those forests in working order which yield the timber used in your country and exported abroad.

At the outset this, as all similar operations, will entail expense, which you will I hope, be able to get Parliament to sanction. But after a few years, the revenue from these forests will far exceed the annual outlay, and then you will be independent, and can think of other branches of your business. Your aim should be, to make yourself financially independent as soon as possible.

In the teak forests in Burma, I commenced work in January, 1856, and in 1860 I was so far as to make a good annual surplus, and to sell at my Rangoon timber depot, timber of the first quality. Then, however, the timber merchants at Rangoon, who at first had looked with contempt upon my operations, demanded that the forests should be made over to them, and with the help of their friends, the powerful firms at Calcutta, they induced the Government of India to send orders to Rangoon (February, 1861), to throw open the forests to private enterprises.

Your Government will, I trust, be more far-sighted when the time comes, and I have no doubt they will be glad to have the revenue which your forests will produce, and which, under good management, will eventually become very large.

You will naturally ask: Why is not the coniferous timber which Great Britain imports, produced in this country? The reply is, that the land is nearly all private property, and as a rule the great proprietors are too rich to feel the necessity of increasing their incomes by making their forests pay. There is an immense deal of talking and writing regarding the necessity of planting up the waste lands, and managing the existing woodlands to greater avantage. In my younger days I have talked and worked in this direction, and since Dr. Schlick has taken charge of the Cooper Hill Forest School in 1885, he has been indefatigable in writing and speaking publicly. I have purposely kept in the background during this time, as it was better that the movement should be in one hand, and as Dr. Schlick had thrown himself into it heart and soul."

THE MACKENZIE BASIN.

Mr. E. Stewart, Superintendent of Forestry, is now preparing a report for publication of his visit during the past summer down the Mackenzie River and as far as the delta of that stream. In returning he crossed the mountains with Indians to the Porcupine River which he followed to its junction with the Yukon at Fort Yukon where he got a steamer south to Dawson, coming from there to Vancouver by the usual route via Skagway. About three months were spent on the trip and the distance covered from Edmonton to Vancouver was upwards of 4000 miles.

Mr. Stewart's main object was to gain a knowledge of the timber in the basin of the great Mackenzie River, but he also took note of the general character of the country and its natural resources, as far as a hurried journey would permit.

The area drained by this stream, including its tributaries, many of which, such as the Athabasca, Peace and Liard, are themselves great rivers, is greater than that drained by the St. Lawrence above Montreal, including the Great Lakes, and nearly three times that of the Saskatchewan.

From Athabasca Landing to Fort McPherson, a distance of 1854 miles was made by water, first down the Athabasca to Lake Athabasca; across a bay of that lake; then down the Great Slave River and across Great Slave Lake; then down the Mackenzie proper, nearly a thousand miles to the delta; then a short distance up the Peel River to Fort McPherson, which lies well within the Arctic Circle and is the most northerly of all the Hudson Bay Company's posts.

It is not possible here to give details of this interesting trip, but members of the Forestry Association will be supplied with copies of the report now in course of preparation as soon as it is issued.

Mr. Stewart says, among other things which greatly impressed him, was that the general character of the land, on the route from Athabasca Landing to Fort McPherson, is that of a rich, alluvial deposit, similar in appearance to that of our great prairies. Vegetable gardens were found at the different posts, as far north as Fort Good Hope, which is within twenty-five miles of the Arctic Circle. Another point was that he was never at any time beyond the limit of tree growth. Even at Fort McPherson, in latitude 67° 26′, the houses are built of spruce timber cut nearby, while the lumber for general use in flooring, sheeting, etc., is whip-sawed into lumber from logs, some of which were a foot in

diameter. There was also a vast quantity of spruce observed along the route, which is rather too small for lumber, but would furnish a world's supply of pulpwood.

The driftwood carried down to the Slave and Mackenzie rivers by such streams as the Peace and the Liard, is conclusive evidence that there is large timber up these rivers.

The fish in these northern waters, especially in Athabasca and Great Slave lakes, are of excellent quality and will some day be of great value.

The weather during the latter part of June and the beginning of July was exceedingly hot, and with the almost constant sunshine, vegetation was forced with hot-house rapidity.

The general conclusion arrived at, was that this country, both in climate and soil, is quite equal to northern Europe, and that when the more southerly lands are appropriated settlers will find comfortable homes in portions of the Mackenzie watershed that are now generally regarded as unfit for settlement.

SPRUCE INJURED BY FUNGUS NORTHWEST OF LAKE WINNIPEG.

In making a geological exploration of the country between the lower Saskatchewan and Churchill rivers during the past summer, the white spruce, over a tract of forested land between Lat. 54° 45′ and Lat. 55° 30′, and extending to about half a degree east and west of Long. 100°, were found to be all more or less withered and yellow, as though a fire had run through the moss covering their roots. Closer examination shewed that the damage was caused by a cup-shaped fungus growing on the leaves. Specimens of this were collected and submitted to Professor John Macoun, who was able to identify it as a species of *Peridermium*, a fungus attacking all the spruces.

Ascending the Burntwood River, a tributary of the Nelson River from the west, the spruces were first found to be affected on July 23rd, at a point on the river a few miles below Burntwood Lake, where the tips of the branches, the growth of this year, were quite yellow, and where the surface of the water was covered with a bright red powder, made up of the spores of the fungi that were shaken off in clouds by every breeze.

Spruce along the Athabasca River, 300 miles north of Edmonton.

Ramparts of the MacKenzie, above Ft. Good Hope.

A little further west, on Burntwood Lake, and southerly up the File River, the damage was more striking, whole trees, instead of only the tips of branches, standing yellow and apparently dead, the boughs wreathed with cobwebs.

Along the Grassy River, another tributary of the Nelson, about sixty miles south of the Burntwood, the trees were affected in like manner to a point a little east of Wekusko Lake. It was noticed that on points projecting from the north shore of the lake, trees on the east side were quite yellow, while those on the west side were only tipped, and generally the more exposed sides of the trees everywhere were most affected.

Throughout the whole region, white spruces alone were attacked, though black spruces are common, and often grow in close association with the white. A small branch, with the fungi, was sent by Prof. Macoun to Prof. Geo. F. Atkinson of Cornell University, who writes:

"It is *Peridermium decolorans* Pk., 27th Rept. N.Y. State Mus. Nat. Hist., 104, 1875. This has a wide distribution in alpine regions and northern North America. It occurs on *Picea Mariana, rubra, Engelmannii, Sitchensis* and *Canadensis*, the latter one being the white spruce.

Here it occurs along the mountains of the Pacific from Banff, British Columbia, into Alaska. Probably the reason it does not occur on the black spruce, is because this form on the white spruce may be a biological or physiological form. You will find an account of its distribution on pages 428 and 429 of the August, 1906, number of the Bulletin of the Torrey Botanical Club."

The attack of this fungus, though probably only in extreme cases resulting in the death of the tree affected, must retard its growth, and, if recurring year after year, to a very marked degree.

There are specimens in the herbarium of the Geological Survey, collected by Prof. Macoun in 1881 near Lake Manitoba, but no serious injury to spruce trees in that region has been reported.

WILLIAM McINNES.

Geol. Survey, Ottawa, Canada.

The Annual Meeting of the American Forestry Association will be held in Washington on Wednesday, January 9th, 1907. Reduced rates on all railways have been secured for members and friends. Programmes, full particulars as to rates, etc., and other information may be had from the Secretary of the Association.

NOTES.

The National Lumber Manufacturers' Association of the United States has undertaken to raise an endowment fund of $150,000 for a chair of practical lumbering at the Yale Forest School. The work will be under the direction of a committee of lumbermen until the full amount of the fund has been raised, and no professor of lumbering will be appointed until the full amount of the endowment has been collected. In the meantime lectures and class work will be conducted by practical lumbermen from different parts of the country and in addition to these special lectures, instruction will be given at New Haven in the economics of the lumber industry in the nation, its position in commerce, industries dependent upon it, cost of logging, and in fact on all branches of the lumber industry.

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