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**CANADIAN
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JOURNAL**

VOL. IV.



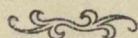
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Canadian Black Maple and Sugar Bush. Average height 120 feet, diameter 18 inches.

Canadian Forestry Journal.

VOL. IV.

MARCH, 1908.

No. 1

THE CANADIAN FORESTRY ASSOCIATION

NINTH ANNUAL MEETING

The Ninth Annual Meeting of the Canadian Forestry Association was held in Montreal, March 12th and 13th, in the Exchange Room of the Board of Trade. This meeting was one of the most representative in the history of the Association and during the two days it lasted the interest in the work of the Association grew from session to session, so much remaining to be said that the lateness of the hour alone brought the meeting to a close. The press of Montreal devoted much space to reports of the papers read and the discussions which followed them. Prominent public men were in regular attendance at all the meetings and high dignitaries of the Church by their presence and words helped arouse enthusiasm in the work that is being done by the Forestry Association.

Some of the papers read will be published in *The Forestry Journal*, all will be printed in the annual report of the Association, so that only a short synopsis need be given in this report. A feature of the meeting was its bi-lingual character. Several papers were read in French and many of the speeches were in that language.

The President of the Association, Mr. H. M. Price, occupied the chair, and on the platform with him at the opening meeting were: The Honorable Sydney Fisher, Minister of Agriculture; His Grace Archbishop Bruchesi; His Honor Sir Louis Jette, Lieutenant-Governor of Quebec; Monsignor J. U. K. Laflamme, and Mr. O. W. Price of the U. S. Forest Service. In a short address of welcome, the Lieutenant-Governor—who spoke in French—said that the chief reason for his presence was to testify to his high appreciation of the eminently patriotic and national work which was being carried on by the Canadian Forestry Association. “The great future,” he said, “Which is opening out before us is both full of promise and charged with

responsibilities. The wise and prudent men are those who know how to take advantage of what the future holds for them and are, at the same time, willing to accept its responsibilities. You are among those who see into the future, and you are trying to preserve our forest wealth, which will always be one of the greatest factors in the prosperity of our country, if it be wisely exploited and preserved. It is to assure this protection and this conservation of our forests that you have formed this Association and that you are meeting here to-day. I cannot too strongly congratulate you on this, for in our time association has become the strongest means of action that man can employ. Nothing can resist the solidarity of the Association, which, for the weakness of individual effort, substitutes the steady pressure of a mass animated by one idea and marching toward the same end. Your work, your studies, thanks to the publicity which will be given them, will awaken and fashion public opinion and will impose themselves upon the attention of public authorities for whom you will have thus facilitated the work that must be carried out by them. This will be your triumph and your reward, for you seek before everything the best interests of our common country."

The President of the Association briefly and felicitously addressed the meeting on the work of the Association and the need of arousing public opinion to the need of improved forestry methods and adequate protection from fire and other causes of the destruction of our forests. He congratulated the members on the presence of such eminent representatives of the Church as were then with them and spoke in terms of highest eulogy of what had already been accomplished by them in arousing interest in forest preservation, and even in reforestation, through their representatives in country districts. Mr. Price's address is printed in full elsewhere in this issue of *The Forestry Journal*.

His Grace, the Archbishop of Montreal, was received with applause that proved that those who were about to listen to him appreciated the importance of his presence and the impetus that would be given in the Province of Quebec to the work of the Forestry Association from the mere fact of his being present at and addressing the opening meeting. His Grace spoke in French, and even those who did not understand that language were captivated and encouraged by his evident earnestness and enthusiasm. After reading a few extracts from a recent article by Monsignor Laflamme whom he quoted as having said truly that the question of forestry was one of the most important of the age. His Grace continued:

"I have just read in your programme that your Association was founded in 1905, and I am astonished that no one thought sooner of establishing so beneficial an organization. But if there have been delays, we shall hope that they are at an end. We shall

work unceasingly to secure for our forests the protection that is so essential for their preservation. Everyone ought to join this Association. All that is necessary is to pay \$1.00 to merit the great honor of belonging to it and at the same time securing for oneself a mass of the most interesting pamphlets and books. It is my intention to encourage the clergy under my jurisdiction to do all in their power to aid in the work of your Association."

After drawing attention briefly to the work the clergy had already done for settlers not in regard to their spiritual wants alone, but also in relation to their temporal needs, His Grace said:

"If the clergy is already united in carrying on such a worthy work, it ought not to be difficult through them to increase the interest that is already being taken in such an important matter as the forestry question. What should we do if our forests are not to disappear altogether? It is not only necessary that we should give lectures and distribute pamphlets; we must agitate. And in order to advance this good work, I shall ask the clergy under my jurisdiction to do everything possible for the protection of our forests. For example, we will suggest to the settlers the prudence that they should exercise in the cutting of pulp-wood. If we lack practical knowledge" said His Grace, addressing the members of the Association, "Show us what to do and we shall repeat what you say to the settlers and others who ought to be instructed and directed." His Grace drew attention here to the good forestry work that had been done at Oka by Abbé Lefevre, "Where one saw formerly only an arid, sandy plain, there is now a real pine forest. Sixty-five thousand trees were planted and only five thousand at the most have perished. The name of this humble priest and the phenomenal work he has performed ought to be commemorated in such a way that it will never be forgotten."

The Hon. Sydney Fisher, Minister of Agriculture, then addressed the Association as follows:

I am very glad indeed, ladies and gentlemen, to be present at the opening meeting of this Forestry Conference in the great City of Montreal. I feel it is very appropriate that we should have a meeting of this kind in the commercial metropolis of the country. It is true that to a large extent, the commercial men of this city are not directly interested in forestry. But, I venture to think that there is nobody in the length and breadth of our country who is more directly interested in this work than are the great commercial men of this city. We have had for a long time the advantage of the study of this important question by political economists, by those who are responsible for the legislation of the country, and by the students in our universities and schools. But it is high time that the man on the street, the average man who is interested in the business

of the land, should take up this question, so as to understand it sufficiently at all events, to induce him to give his support to the governments which are working in the direction of the conservation of our forests, and of the students and political economists who are pointing the way for those in authority to act.

I am glad to-day to see the representatives of the King in our Province of Quebec present, to open this conference. It is fitting indeed that the head of the State should do this work. Especially is this the case in regard to forestry, because in the larger sense at all events, the Forestry of Canada applies chiefly and primarily to the Crown domain of our country, and the lands of our country which are chiefly under forest in regard to which forestry must be applied is chiefly the domain of the Crown. Especially is this the case in the various provinces, because in the Provinces in the perview and control of the Provincial Legislature is the Crown domain of our provinces, and the Dominion Government can only deal with and apply forestry to those Dominion lands which are outside the provinces, or which, to a certain extent, are still under the perview and control of the Government at Ottawa.

This subject may then naturally divide itself into three points

First, the dealing with forestry from the point of view of the Dominion Government, in regard to those lands in the western countries which are still under the direct control of the Dominion.

Second, with regard to those Crown domains in the various provinces, which are under control of the provincial authorities.

Thirdly and lastly, and very far behind in importance to the other two, those forests under the control of private proprietors.

Let me say, sir, that so far as the Dominion Government is concerned, and in this I speak for the Government, that the Dominion Government of the present day, is most earnestly enthusiastic in doing what it can to preserve our forest wealth in those lands over which we have control.

I have only to point to the fact that the first and greatest Forestry Convention of our Dominion was called at the instance of Sir Wilfrid Laurier a few years ago, when it was held at Ottawa, the Capital of the country, and that the Dominion Government on that occasion laid before the country through that Convention its work, programme and displayed its interest in this very important question. I think that Convention did great good in Canada. It is true before that time the students who were specially interested in this forestry work, and the lumbermen of the country, had been studying and thinking about the vast and terrible waste of our forest lands and

wealth. But, I venture to think that the public at large was aroused on that occasion to an interest in the work that it had never evinced before, and I fear it was only too late that this event occurred.

We boast that we are a young nation. We believe that we are a strong nation. We are proud of our material resources throughout the length and breadth of this vast area which is entrusted to our care. But as we are a young nation, I fear we have a great many of the faults of youth, and have been blind to the necessity for thrift in our forest wealth just as the young man is extravagant with his patrimony, whose resources he does not properly appreciate. We in Canada have had a great wealth committed to our charge. We have not properly realized its importance or vastness. We have thought that that wealth was inexhaustible, and we have drawn upon the bank of our supplies to such an extent, so wastefully, extravagantly and unscientifically that to-day we are face to face with the fact that our bank account is almost at an end, even though to-day, as was said a few minutes ago, it has probably the greatest wealth of forest resources of any country in the world.

But, country after country has found that they could not go on drawing upon this land without coming to an end, and we in Canada, young as we are, with the immense resources that we have, are face to face with the end of that account unless we take care to husband it and replace it by replanting of those trees that are necessary.

A reference was made by you, Mr. President, to a recommendation which was made at that convention for the establishment of Forest Reserves. Let me most heartily endorse that recommendation. I am glad to say that the Dominion Government, so far as its western lands are concerned, has to a considerable extent acted upon that recommendation, and the Minister of the Interior, during the last few years, has set aside large areas in the western provinces and in British Columbia as Forest Reserves.

I am glad to be in a position to-day to say further that in the near future it is the decision of the Government, that the whole eastern slope of the Rocky Mountains, stretching from the International Boundary Line northwards, almost indefinitely, shall be established as an inalienable Forest Reserve (loud applause), and let me say to those here who may be interested in lumbering, who may believe that even though we must conserve our resources, that we should at the same time enjoy them and reap the full benefit of them, and I agree with those gentlemen most emphatically, that the creation of a forest reserve does not necessarily mean that the trees and products of that reserve shall not be utilized for the present or future generations. A forest reserve must be kept in forests, but for

the highest development and utilization of those forests the crop must be cut year after year, time after time, so as to be utilized for the benefit of the people of the country.

And therefore, though this great eastern slope of the Rocky Mountains may be made a Forest Reserve, the people of the provinces which require that lumber will not be debarred from it, nor cut out from getting the lumber which is the natural produce from that slope. But this lumber will be cut at the proper time, under strict forestry regulations, in such a manner as to conserve its resources for a future generation, and still supply the immediate necessities of the settlers in the prairies, where lumber is so hard to get.

Let me now say another word in regard to the work of the Dominion authorities. In this eastern part of Canada people can hardly realize the necessities of Forest Plantation. I speak of the farmer, and I know that the farmers of these eastern provinces look upon the tree as their natural enemy. The tree, in the field cultivated for ordinary crops, is undoubtedly a difficulty, and an obstruction, and interferes to that extent with the agricultural operations of the land. But in the old days as our farmers and settlers were obliged to go to the woodlands of the eastern provinces, they could not make a farm without cutting down the trees. That generation which cut the trees down is passing or has passed away, but unfortunately the spirit that imbued them with the idea that the tree was the natural enemy to agriculture, still seems to possess a majority of their descendants, and to-day there are few farmers in these eastern provinces who realize that large bodies of woodlands are the best friends of agriculture in the eastern provinces as everywhere else.

The eastern people, therefore, can hardly realize or understand the necessities of the western farmer on the great untreed plains of our prairie provinces for plantation. Mgr. Bruchesi has instanced one of the most successful experiments at planting on record, even in this Forest Province of Quebec. If they had an opportunity of examining that Oka plantation—and let me say in that, just as in many other things quite apart from the religious aspect of the question, that the Roman Catholic Church has taken the lead in this country and given us an example which should be followed by the whole land—I am sure that the farmers of the older part of this province would receive a very useful lesson as to the necessities and advantages of re-forestation.

You know, sir, that in the original discoveries of this part of North America, the Missionaries of the Church carried the Cross into the forests, over the plains and up the rivers. We know that later on that the same Church glorified by the blood of its martyrs carried the progress of settlement in our land and

over our continent. But we know to-day that just as the Missionaire Agricole, many of whom I know well and have met in my work, is doing to-day for the farmers of the eastern provinces, the same work of preaching the gospel of agriculture that in the past days the Spiritual Missionaries did for the souls of their charges. And, sir, I hope in the future to see the Missionaire Agricole succeeded by the Missionaire Forestiere, and I am glad to see from what I have heard to-day from Archbishop Bruchesi, that in this as in the other two branches, the Roman Catholic Church will again take the lead and be in the forefront of this Forestry work in Canada. I am thankful to find Archbishop Bruchesi present at this meeting to give us words of encouragement and knowledge on this subject, and to tell us what advance and progress has been made under the lead of his church, which has set an example in this Province of Quebec, that may well be emulated throughout the Dominion.

That is an unusual thing in the Province of Quebec, but in the great West my friend, Mr. Sifton, then Minister of the Interior, having dwelt in the treeless prairie country, appreciated and understood years ago that the planting of trees there for wind-breaks, and to conserve the moisture necessary for the good growth of crops in that region, in order to help the settlers through the prairies, established a forestry branch of the Dominion Department of the Interior. I am glad to say that that Forestry Branch during the last seven or eight years has been able to plant millions of trees in the prairie districts of our Dominion, and as a general rule these trees have been successful, and show that it is quite possible, even on the treeless plains, and on what has been supposed to be our semi-arid region, it is possible to produce trees sufficient to shelter the homesteads and barns of the settlers.

I am also glad to say that we have been able, by the work of the Department of the Interior and my own Department of Agriculture, to show, not only that we can plant shelter trees, but I am in a position to-day to say that we can produce fruit trees in the far northern region of our western country, where up to a few years ago it was supposed to be absolutely impossible for the settlers to grow any kind of fruit fit for human use. This is a triumph I will not say of forestry but of horticulture, of which I am proud as a member of the Government of Canada, that it has been able to show such success.

A word or two in regard to forestry and agriculture, and as Minister of Agriculture I am particularly interested in that science.

I have dwelt very shortly on the importance of forestry production in the West for the agriculture of our treeless plains. Let me say a word here for the Province of Quebec in regard to the importance and necessity of forestry for the agriculture

even of the eastern provinces. Perhaps not so much in the Province of Quebec, but still a little in the great plain of the St. Lawrence, and much more in the older parts of Ontario. There is no doubt to-day that the farmers of these two provinces, are suffering from the fact that their forefathers swept the forests out of existence over large areas of what is at present cultivated land. It is not necessary in this country, especially where, as in Ontario and Quebec, stock-raising and keeping is the basis of agriculture, that it is absolutely necessary for the farmer to have abundant pasturage and forests throughout the hot season, as well as a good supply of water for his stock throughout the summer. What is the condition of affairs in many portions of these two provinces? In the old days on the hills and slopes, and even down through the valleys, there were large bodies of woodlands which conserved the moisture and prevented the too rapid melting of the snows in the spring, and great blocks of comparatively swamp land, which held like a sponge the water trickling down through the whole season to supply the lower lands and pastures with a constant unfailling and sufficient supply of moisture for the creeks, rivers and lakes of the country. As these bodies of wood have been cut away and the valleys denuded of trees, the result has been to change entirely the condition of the creeks, streams and rivers, so that while in former days they were constant in their flow, and had an abundance of water throughout the whole season, men living to-day can tell you that the streams are dried up in the hot months of July and August, where in earlier years there was a constant supply of water. The result is that to-day the pastures are dried and burnt in summer at the very time when their supply of food is most necessary for the cattle. While within the memory of many men living there used to be an abundant constant supply of fodder for the animals on the farms, to-day that is not the case, and this unfortunate change has been caused by the wasteful cutting away of the forests. It is time that the farmers and the owners of private properties, wherever they have lost uncultivable land, should immediately set to work to plant that land, and bring it back to its original condition, thus supplying those forest lands, so necessary not only for fuel and to beautify the landscape, but actually to supply them with the moisture necessary for their crops through the summer. And if they do not change their methods in this respect I venture to say to the farmers of Ontario and Quebec that their agriculture will decrease and that they cannot hope to be so successful in the future as in the past.

A word or two specially with regard to this Province of Quebec. We here, in Quebec, have the natural conditions most suitable to prevent the conditions I have just pictured. Our great cultivable section of Quebec Province lies on each side

of the St. Lawrence River. To the south we have the alluvial stretches of the counties bordering the south bank, and on the north we have the long strip stretching from Ottawa to Quebec of good cultivable land, between the Laurentian Mountains and the rivers. There lie the agricultural riches of the Province of Quebec, and it is necessary for the preservation of the richness of that piece of land that the rivers and streams in it should be kept at a constant flow throughout the whole season. It is necessary that the people should have a constant supply of good wholesome water the whole season through for themselves and their live stock. We have the natural conditions to give it to them, if we are only sensible in the conservation of those conditions. Take the southern bank of the St. Lawrence. While there is a broad plain of almost dead level land alongside that river in that valley which is suitable to agricultural work, but immediately to the south of that plain we have the mountainous regions of the eastern townships, the Adirondacks, and further east the Maine mountains extending into Canada. If we preserve the forests in that mountainous country, we have all the conditions necessary to supply an abundant, constant source of water to the plains between them and the river. Therefore, I venture to say for the Province of Quebec agriculture that it is absolutely necessary that the hillsides and mountain regions near the American frontier should be carefully preserved in forests and in blocks of forest land, so that the sources of the streams which flow into the St. Lawrence from the south, will be maintained as a reservoir for the water supply of that country, so that we may be able to utilize the blocks of forest lands on those mountains and hills to the best advantage of the people who own them, and of the country at large. This, if done under proper forestry conditions, will continue indefinitely the lumbering industry and the cutting of pulpwood in these regions in addition to benefitting the agricultural conditions below.

Again on the northern side of the St. Lawrence we have the strip of cultivable land between the Laurentians and the river. But back of it in the Laurentian Country we have a large area of land not particularly favorable or suitable to agriculture. It is rough, broken, hilly, and, with not very rich soil in most cases. If we can keep that district as a forest reserve, and preserve the great bulk of forest land in these hills, we have an assurance that the streams which come from it and break through the hills from the northern country, will be kept at an even flow of water, and will supply that strip of cultivable land between the Laurentians and the river with abundant water for the agricultural well being of that country.

You, gentlemen of Montreal, are dependent upon the maintaining of the water level of the St. Lawrence for your commerce. The depth of water in the channel is a measure of the advantages

of the port of Montreal, and if you are going to have large vessels coming to your wharves and quays to supply the commerce and trade of Montreal and to preserve it as a commercial metropolis of the Dominion, it is necessary that the water supply of the St. Lawrence should be maintained, and not be allowed to go down and down as it has in the past every summer. (Applause). You, therefore, you, merchants of Montreal, you people who are dependent upon the commercial progress and commercial success of this city, are vitally interested in the Forest Reserves which will maintain the summer level of your great river and its trade channel to the sea. It is only by these reservoirs of water, which will come down gradually from the mountains, that the high level during summer can be maintained.

Now, if I may say a word or two with regard to something the President alluded to, that is with regard to pulpwood. My lines have been laid for many years in the thick of political warfare throughout the country. During that time I have constantly been mixed up in public affairs, regarding them from a political standpoint. I agree with the President entirely that this question of pulpwood should not become a political question, and I wish to say a word or two entirely apart from political views, but regarding it from a purely economical standpoint. There has been an agitation, and it is spreading amongst those specially interested in Forestry, to put an export duty on pulpwood. I grant that as a forester and interested in forestry, at first sight I have been rather tempted to think that this should be a good thing. But the more I have examined it, and the more I have studied it, I find this, that every argument which can fairly be brought forward to put an export duty upon pulpwood is equally applicable to the putting of an export duty upon the pulp itself, and I was glad to hear in your President's address just now that he pointed out, that in the near future, and the nearer the better, the pulpwood of Canada would be made into pulp in Canada, and the pulp made into paper also in Canada.

If we are going to build up our industries in this country along that line, why not go to the full extent. Why stop short at the export of pulp and allow Americans and others making the paper for us or for themselves to do it with Canadian products. We have had instances of late years of the fact that the great industrial corporations in the United States have found it to their interest to establish branches in Canada and manufacture for the markets of the world under the protection of the British flag, rather than the Stars and Stripes. I am proud of that fact. I will go further and hope that in the near future the great paper manufacturing industry of the world will have its centre in this, our country, where the raw material of paper is the greatest of any part of the world, and that the



Yellow Oak. Height 125 feet, diameter 36 inches,

paper manufacturing of the world will be done under the British flag instead of the American.

This is an economic question, and we have a just right to look forward to an economic solution of it, and I think it is not beyond the proper ambition of the people of Canada to come to that point.

Sir, I hope and believe that this meeting here in Montreal will arouse an interest in a large number of classes of people in the country in this Forestry question—people who have hitherto been indifferent, to say the least, to the matter, and sometimes, perhaps, actively antagonistic. I have pointed out shortly why the people of Montreal particularly are interested in this question.

Let me say now, a word or two in regard to the lumbermen of the country, and the interests of Montreal are largely concerned in the way of investment in lumbering also. I want to say emphatically that in my opinion forestry is the best friend of the lumberman. Instead of there being any antagonism between the foresters and the lumbermen, the latter are the very people who most require education along forestry lines throughout the land. They own the limits and have the right to cut the wood. They own those limits practically in perpetuity. If they can conserve these limits indefinitely by scientific forestry methods, they have an asset, not only for their own future, but for the future generations of lumbermen in Canada, which is absolutely incalculable, and can be made just as advantageous and profitable to their great-great-grandchildren as it is to-day to them.

But if instead of doing this, and instead of the adoption of scientific methods they continue the crude and wasteful methods of making the largest profits they can to-day and leaving the to-morrow to take care of itself, they may make—I do not say they will, but they may—make a few more dollars to-day. But when they pass from this sphere, they will leave behind them an asset, which will be valueless, and earn for them the curses of the future generations instead of their blessing, and will show that they regard not at all the future of their children, or the future of the country.

I know that to-day the lumbermen of Canada have awakened to these facts, and that they have already adopted improved methods to a very large extent. I know that to-day the lumbermen are perhaps the best supporters of this Forestry organization in Canada, and I honor them for it, and congratulate them upon this change. I want to impress still more upon them that if they spent even more of their profits—and in that business their profits are large, very large, I do not know anybody in Canada making more money in Canada in the last few years than lumbermen. I say this without reflection or reproach. I congratulate them on it. It is their right, and it is wise that

they should do so. But they might spend a little more of these profits in the conservation of their patrimony, rather than try to make a little more money in immediate returns.

I have touched lightly upon a number of points which I think are of importance in connection with this question of Forestry. I do not intend to make any exhaustive address. I see by your programme that you have the advantage of papers or addresses by experts, and let me say here that this is a subject of science—a subject in which we require the aid of experts. The rule of thumb in methods of forestry and of lumbering in Canada, is no longer sufficient. We want to give the lead to the men who have studied these questions by scientific methods, who are experts. We have here on this programme, first Mgr. Laflamme; let me say again that I am proud and glad to find so distinguished a member of the Roman Catholic Church in Canada engaged in this research. Everywhere throughout Canada his name is known as a student, as an expert, and I am quite sure the paper he will read to us will be of the greatest value, not only to this Convention, but to the country, and I hope that later on it will be distributed everywhere. He is speaking for the farmer, and with due deference to my French-Canadian compatriots, I think there are no farmers in Canada to-day who require instruction upon forestry methods and the value of the tree to the practice of agriculture than our French-Canadian habitant. I say this without reflection or reproach. Our English-speaking farmers are only too near them in that respect. But I hope that as a result of the work of such gentlemen as Mgr. Laflamme, the French-Canadian habitant will speedily awake to the necessity of changing his methods, and to the importance of the conservation of what woodlands he has, and to the further importance of adding to it by planting, as it has been so well done at Oka.”

The afternoon Session was opened by Mgr. Laflamme, Dean of the Faculty of Arts at Laval, whose address on “The Way in Which Some Farmers Use the Wood on Their Land,” dealt chiefly with the Province of Quebec. His paper was read in French and as it is published in full in this issue of *The Forestry Journal*, only a brief resume is given here. After pointing out that the United States is the country using the greatest quantity of wood, he stated that we in Canada use relatively as much as is used there. It becomes necessary then for the farmer to preserve on his farm a large enough wood-lot to assure him sufficient wood for all the uses of the farm, and, if carefully looked after, he may also derive great profit from it. A farm which possesses a forest reserve is of greater value than one from which all the wood has been cut. In the older parishes of the lower part of the St. Lawrence one sees to-day the effect of the early practice of cutting down all the wood in order to utilize all

the land for agriculture. Besides that, fire has destroyed the forests of Kamouraska to a very considerable extent, and the farmers are obliged to bring the wood they need from a great distance and at very great expense. During the winter when the habitant should be otherwise employed, he must spend a great part of his time in drawing wood. In all the old counties wood is the important consideration; the cost increases annually and people are asking themselves where the next generation will procure it. Mgr. Laffamme would look favourably on the pulp industry and the money it brought to the farmers if this source of revenue were not of so temporary a character, but as things are now the farmer took more annually from his wood-lot than could be reproduced; for every 100 feet produced, 1,000 was cut. On some farms the wood was being cut so rapidly that there would soon be none left and then the settler would not only draw no further profit from his wood-lot, but would have to procure at great expense elsewhere what he needed for himself. These were the facts, but it would be unfair to generalize too quickly and believe that this state of things existed everywhere. This was not the case, and in some places sufficient care and foresight were exercised to preserve the privately owned forests; but, nevertheless, it must be admitted that with too great a number of the habitants there was a deplorable improvidence in this respect. It was necessary to inculcate into the interested parties the need of thinking of the future, to make them realize that they must not occupy themselves exclusively with the present; after they were gone their children would either profit by their wisdom or suffer from their improvidence. There was then an important social and patriotic work to be undertaken and followed to a satisfactory end. Naturally we cannot think of preventing owners of private wood-lands from exploiting their forest reserves, for very often the exploitation of his wood is made necessary by the conditions by which the colonist is surrounded. All that we can and ought to do is to suggest a rational means by which he can draw profit from them. We ought to make him understand that his duty is not to work in such a way as to cause this source of revenue to disappear forever; that they ought to demand from their wood-lands only the equivalent of what grows each year; that they ought to exploit them in a way that would add to instead of destroying their value; that they ought to renounce the large profits of to-day and content themselves with the modest but more permanent one that would continue forever. We should be able to make the farmers understand that it was to their interest to gradually re-forest their lands. It was necessary, above all, to make them understand that if they did not themselves enjoy the fruits of their work they would leave a valuable heritage to their children.

The address by Mr. E. G. Joly de Lotbiniere on "Compulsory

Reserves on Settlers' Lands" will be published in full in the next number of *The Forestry Journal*. It forms to some extent the complement to Mgr. Laflamme's paper and suggests a means by which the Province of Quebec could preserve a perpetual forest reserve for the settlers.

Mr. Overton Price, Assistant Chief of the U. S. Forest Service, in the course of an excellent address said that the real problem both in the United States and Canada was to awaken public sentiment to a realization of the necessity of stopping the terrific waste of forest products that had been going on for so long. As matters stood the whole available supply of standing timber in the United States would be used up in 20 or 30 years at the present rate of consumption, while in many districts the end was already in sight. It was to prevent such a catastrophe that they were working, and he regarded the case as far from hopeless, with the certainty that their campaign was already bearing fruit.

The last address of the day was by Mr. A. H. D. Ross, Lecturer on Forestry at the University of Toronto. This paper is printed in full in this issue of *The Forestry Journal*.

On Thursday evening Prof. Filibert Roth, Professor of Forestry at the University of Michigan, lectured in the Board of Trade Hall on "Forest Lands and Agriculture." The lecture was illustrated by stereoptican views and was greatly enjoyed by the fair-sized audience.

Prof. Roth first dealt with the objection to forestry advanced by those who said that the country was needed for farms. That plea was not new, he said, and many years ago France and Austria had had their forests practically ruined because royalty had believed this plea. But certainly this argument did not hold in the United States, though many haggled over the subject, bringing up as alleged proof facts, as for instance that good crops of clover could be raised on certain sandy lands, which they boasted of as the proof of experience, but which were really inconclusive.

In the oldest European countries at the present day only a small fraction of the land is tilled. In Great Britain this proportion is but a little over a quarter (28 per cent.) France and Germany tilled about fifty per cent. of their land; Austria, Spain and Italy, about 35 per cent. each; Russia, 22 per cent.; Sweden, 8 per cent., and Norway but 3 per cent.

European countries had been cleared—and that with fire—just as recklessly as America had been cleared.

China, the land of ancient civilization and untold millions of people, had cleared her mountains and her valleys alike; to-day her people were crowded in the deltas and large valleys of her rivers. In India the same thing had happened; now but twenty per cent. of her land was occupied. Even the Japanese tilled only about one-sixth of their land.

Much was expected by some of the work of the experiment stations in showing how the poorer land could be made productive for agricultural crops. But, as an offset to this, modern agriculture tended to practise intensive agriculture on good lands, and on good lands only—not to colonize poor land. The tendency to give up trying to cultivate poorer lands was shown by the fact that in Great Britain, during the twenty-four years ending in 1894, more than ten per cent. of all the tilled land had been abandoned. In 1880 there were eleven million acres of tilled land in New England; in 1900 forty per cent. of that land had been abandoned as far as tillage was concerned.

This abandonment could be partly accounted for by the migration from the country to the city. This migration was going on in Europe as well as in America, and there were sound economic reasons for it, because in the city one could obtain more comfort for the same amount. Every invention added to the tendency towards the city. In consequence of the movement farm help was becoming scarcer and less land could be tilled.

There was a great cry for population, more population, regardless of its quality. To get the people on the land was urged by many, and very often speculators got hold of the people who desired to own land of their own and imposed on their ignorance by selling them land that in a year or two these purchasers found by sad experience to be absolutely worthless for cultivation; and all because we were told that "all lands were valuable for agriculture." "Do not dilute the quality of your people by trying to force the settlement of non-agricultural land," was the lecturer's advice. Montreal was backed by a supply of "white coal" found, perhaps, nowhere else, and by a forest region probably unequalled in the world in general usefulness; but the land was poor and the climate a little bit rough. They should attack the problem fearlessly and repress the "boomer," trying to persuade him that the land must be populated at any price. The areas should be reserved, and there would then be time enough to pick out the regions which may be well suited or might be needed for agriculture. There were areas where the forester was more important than the farmer, and the crop of the former is now needed and will be needed in the future in the development of the greater Canada.

The lecture was beautifully illustrated by many valuable slides, depicting scenes in German forests and American forests and denuded lands.

At the close of the lecture a vote of thanks to the lecturer was moved by Messrs E. Stewart and W. C. J. Hall and carried with hearty applause.

The first paper read at the second day's session was by Mr. C. G. Piché, Forester to the Department of Crown Lands,

Quebec, who dealt with the question of "Conservative Lumbering in Quebec."

Mr. Piché dealt with the industry in the past and with its future prospects. He pointed out that the demand for lumber for exportation was increasing and there were now few countries which were in position to export. Canada was bound to become the greatest wood exporting country in the world, and the Province of Quebec, on account of its immense forests and other natural facilities, would take the lead in this respect. Mr. Piché gave a detailed description of the lands available and outlined the precautions that should be taken to preserve the timber as much as possible. He classified the land in Quebec according to the kind of proprietor and showed that the management of the woodland depended upon the will of its owner. The land belonging to farmers amounted to 5,000,000 acres, that belonging to timber limits 45,000,000 acres and the woodlands not yet explored were estimated at 85,000,000 acres of virgin forests. The lands in possession of farmers were almost entirely culled so they could not depend upon them for much in the future. With regard to the timber limits he recommended the practice of cleaning out the young wood, cutting all the trees which manifested signs of age, watching carefully the fires, and favoring the development of those trees the wood of which would be most valuable. He announced that the Gouin Government being desirous of encouraging the farmers to re-wood their land established last fall a farm for the raising of forest trees at Berthierville from which in 1910 they would be able to assist the re-forestation. It was the urgent duty of lumber merchants to retain a staff, competently directed, and to prepare plans of exploitation which were accommodated to present conditions and which would assure the perpetuation of the forests.

Very little information was yet available about the third group of forests though the reports of explorers indicated that there was still immense wealth of lumber, but the industries in the valley of the St. Lawrence should not count too much on that reserve for they would have to take into account the growth of immigration which would follow the expansion of the Grand Trunk Pacific.

Mr. E. Stewart, an ex-President of the Association and formerly Superintendent of Forestry for the Dominion Government, read a most interesting paper on "The Lumberman and the Forest."

Of all men the lumberman should, said Mr. Stewart, be the most interested in the forests of the country. The growing timber should be to him what the grain and root crops were to the farmer, and he should be just as solicitous that the land producing his timber might continue to reproduce indefinitely his supply as the farmer was that his fields might from year to year

continue to bring forth their accustomed yield. The only difference was in the length of time required for the maturity of the product. In the case of agricultural crops, one year was sufficient, while in that of timber about one hundred was required.

This great difference of time involved many questions worthy of attention. In the first place, if, through some misfortune, this year's crop should fail to mature, or be destroyed, it might be made up next year by an abundant yield. If the supply in the forest field was destroyed to-day, one hundred years must elapse before a similar quantity could possibly take its place.

If the lumberman, as was now generally the case, had only a limited period of time given him to cut out the timber from his holdings, with no certainty of a renewal of his license, his interest did not lie in maturing a future crop in which he had no guarantee interest, but rather in cutting and marketing everything that would give him a profit, at least as far as the regulations permitted.

A view of the conditions on this continent and in Europe would convince anyone that nothing less than a timber famine was in the future. Authorities of the highest standing in Europe were unanimous on that point, and quite recently Dr. Pinchot, who has charge of the forests for the Federal Government at Washington, made the prediction that in twenty-five years, with the present rate of consumption, the merchantable timber of the United States would be exhausted. Such being the case, the country that to-day possessed valuable forests would profit by them to a greater extent in the future than ever in the world's history. The aim then should be not to encourage, much less to compel, the cutting of our forests, but, on the contrary, their conservation.

Experience had shown that where timber was conveyed by the government along with the land in small quantities to farmers, it had not been in any sense in the best interests of the principles of forestry or in the best interests of the community. They had an example of this in the State of Michigan.

It was impossible to-day to conduct the lumbering business in the same way as it was done forty or fifty years ago, and there was no prospect of a return to conditions that would permit of the former methods. In the forests of the far north, in the forests of the west and northwest, and in British Columbia, and even in those eastern provinces, it would be impossible for any person or company successfully to carry on the manufacture of lumber in the small way in which it was conducted years ago; and in the matter of pulp manufacture, for which no country in the world offered such a field as Canada, it was still more impossible to work successfully on a small scale.

If these primitive methods were revived to-day the result would simply be that the cost of production would be so increased that the consuming public would have to pay double or treble what they now do under present conditions. Again, the large outlay in the way of plant which was necessary in order that the lumbering business might be profitably conducted, made it necessary that before capital was invested in such enterprises, the owners must have some assurance of their being able to obtain for a lengthened period, a supply for their use. That in most cases could only be obtained by their having acquired certain rights of timber for a number of years. In Canada this had been done by granting leases or licenses guaranteeing them this right.

The greater part of the merchantable timber of Canada to-day was growing on land which was not well adapted for agricultural pursuits, and in the vast majority of cases it would be more valuable if left permanently for the production of timber than for any other purpose.

Mr. Stewart had come to the conclusion that the governments should have constantly in view the following ideas:

(1) To retain the control of their forests. (2) To preserve them from utter destruction. (3) To grant privileges under certain conditions for the use of the mature timber crop. (4) To preserve for the future the growing crop, and to exact a reasonable royalty from those who may profit by any privileges that may be granted them.

The last paper read at the morning session was by Mr. R. R. Bradley on "Forestry in Eastern Canada." The substance of Mr. Bradley's paper was published in the March number of *The Forestry Journal*. He made it clear to all his listeners that conservative lumbering paid. During the time he had been forester for the Miramichi Lumber Company the company's business had increased fifty per cent. as a result of the practical forestry methods inaugurated by the company.

During the morning Mr. Sterling, Forester for the Pennsylvania Railway Company, addressed the meeting briefly and gave details relative to the forestry methods pursued by his road that were of great interest. His remarks are reproduced in full. He said:

I can say a little regarding the work of my road in forestry. Railways, as you know, are large wood-using corporations, and as such the Pennsylvania Railway has probably gone through the same experience as other similar corporations. Running as the original lines did through a fairly wooded country in Pennsylvania, Maryland and other States, they for many years drew on local supplies, and for a long time they took no account of the future, or even the present timber supply. As you know white oak is a standard railway timber for ties and car lumber.

Since this territory was richly productive of white oak, they drew their supply from it, and thought nothing more about it. But gradually as the timber was cut off, and other large wood-using corporations came in, they found they could not get the necessary amount of white oak. Then they were compelled to resort to the use of what we call mixed oaks, and imported timber from southern points. And so the thing has progressed until now the Pennsylvania Railroad has to go very far south for more than half its ties, and considerably more than half the car lumber. This condition of things has been exaggerated by the pulp people, the wood extract people, coopeage firms, and other large wood-using corporations, who strip the wood off the entire territory.

So, it has become obvious that something must be done to remedy this state of affairs. The Pennsylvania Railway cannot go south for ever and pay high freight rates on its ties, and it is very obvious that local supplies are almost going to be entirely gone very soon. So, for that reason the Pennsylvania Railway in 1902 began to think about forestry, and naturally their first thought was planting. They assumed that tree planting was the proper start, and so they began planting locust trees on the unused farms along the right of way. This movement has since progressed to a broad gauge policy.

The things we aim at are, to secure a perpetual supply of the wood necessary for this large corporation, and it is a pretty large supply that we need. Our demands amount at the present time to three million ties annually, five hundred thousand more for new work and one hundred million feet of lumber, and all of this merely for our lines east of Pittsburg and the Erie line. So we have a big corporation as a wood using and producing corporation. We have to find lands which produce the timber we need in enormous quantities, and it is becoming an increasingly difficult proposition to locate such lands to produce our timber supply indefinitely at a reasonable figure.

We have found that to economize our supply we must use some method of preserving our railway timber. Timber is adaptable generally to such treatment, and we must reduce our consumption by from one-half to one-third, and treat our ties and bridge timbers, telegraph poles and other wood product in order to increase their longevity. Here are the two big things for all the railroads of the east, and I presume the same problem affects your railroads in Canada. They must have a permanent timber supply to draw upon; they must have it properly managed, and they must preserve the timber by chemical treatment, when using it. There are other things in railroad work. One is planting work to utilize the lands. Any large railway in rebuilding its old lines and in building new lines acquires farms which are of very little use, and are often not even agricultural land. Obviously then the sensible thing is to utilize these

lands by re-afforestation so as to get a future crop. The Pennsylvania Railroad undertook this work, and we are now planting upwards of half a million trees a year, and already we have two and a half million trees planted. In addition to this we have started a twelve acre nursery so that we may grow our own stock, and with the help of this nursery we intend to try and fix up not only our own lands, but to teach the farmers in the district we cover to do something along the same line.

There is another thing we have undertaken which I presume should be of considerable use to your Canadian railways, and that is the adoption of live snow fences. On our lines near Buffalo we have considerable trouble with snow, and have had to build snow fences. We are now planting along the lines to replace these expensive wooden fences by strips of evergreen trees, which will serve the same purposes as the fences, and eventually will cost very much less.

Aside from this we have in a general way undertaken landscape gardening work, and this department is supposed to advise with regard to the shrubs and trees for ornamental work at stations, and the planting of hedges and other details of landscape garden work. These, I think, are in a general way the most important points of the Pennsylvania Railway operations.

The officers and members of the Association were the guests of the Canadian Club at luncheon, where they were addressed by Dr. B. E. Fernow, Dean of the Faculty of Forestry at Toronto University. Dr. Fernow traced the history of Forestry Associations in America, and told of the first meeting which had been held in Montreal in 1882. Three of those who sat beside him had been at that meeting and were chiefly instrumental in organizing the Canadian Forestry Association, which was started at that time. Dr. Fernow deplored the wasteful and destructive forestry methods which were practised in Canada, and emphasized the effect such methods were having on the water supply—floods at one season and dry water-courses at another, instead of a steady supply at all seasons, as would be the case if the forests were preserved.

At the afternoon session Mr. Achille Bergevin addressed the meeting in French, and spoke strongly in favor of the protection of our forests, game and fish. He advocated the establishment of more agricultural schools and colleges where the principals of silviculture would be taught. He believed, too, that tree-planting along roads should be encouraged, and that a special study should be made of our lands so that all should know whether they were best suited for agriculture or tree-planting.

He was followed by Mr. L. O. Armstrong, Chief of the Colonization Department of the C.P.R., who spoke on "The

Interest of Game Clubs in the Forest." He said that in his opinion the products of the forest should be under the control of the Government from the time the tree is cut down until it is turned into lumber. Canada possesses the richest and most beautiful forests in the world. They abound in game and the most valuable fur-bearing animals. These forests are veritable reservoirs for the water that goes to fill hundreds of rivers and lakes which teem with fish. They are also the Mecca of all those who in summer fly from the cities and towns to the woods in search of health.

The last address was by Dr. Robt. Bell, Chief Geologist of the Geological Survey, who told of the means by which trees are distributed. The climate in different parts of the country exercises a great influence on the development of the forests. In the south the trees are different from those in the north, and in the north the trees are very much smaller than the same species in the south.

The Committee on Resolutions presented the following resolutions, which were adopted by the Association.

1. RESOLVED.—That in view of the large losses of timber from fire along the line of the Transcontinental Railway already reported, this Association desires to again impress upon the Federal and Provincial Governments the urgency of Fire Patrol and other protective measures, as outlined in the memorial passed at the Annual Convention of the Association in 1907.

2. THAT WHEREAS it has become apparent that in parts of Ontario and Quebec the bush has been cleared away to such an extent as to seriously and adversely affect agricultural conditions, and it is becoming more and more evident that the individual land owner cannot be depended upon to restore the proportion between wooded and cleared land so necessary for our agricultural interests;

RESOLVED.—That this Association urges upon the Legislature of Ontario and Quebec the advisability of re-acquiring from the private owners, either for the Province or for the various municipalities, areas of broken or waste land to form forest reserves, and to provide measures for their management, with the added object of furnishing local supplies for timber and fuel purposes.

3. RESOLVED.—That this Association takes pleasure in expressing satisfaction at the warm and genuine practical interest shown by the Hon. Sydney Fisher, Minister of Agriculture, in all matters that will work toward the inauguration of a rational forest policy in the Dominion Crown Lands.

4. RESOLVED.—That this Association notes with satisfaction the announcement of a progressive Forest Policy on

the part of the Government of Ontario, involving an increase of efficiency in the fire-ranging service, and an extension of the forest reservation policy, the marketing of timber under forestry rule and technical supervision, also that the same satisfaction be expressed with regard to the action of the Province of Quebec in placing under reservation the bulk of its timber lands, organizing a department for administration and improving the fire protection service.

5. RESOLVED.—That this Association desires to express its appreciation of the active and intelligent interest in the Forestry Movement shown by His Grace Archbishop Bruchesi, Mgr. Laflamme and other dignitaries of the Roman Catholic Church in Quebec Province, and to tender them the thanks of the Association for their generous offer of co-operation in the work of education along forestry lines throughout this Province.

6. RESOLVED.—That the thanks of the Association be tendered to the Railway Companies which have kindly given reduced rates to members attending this meeting.

7. RESOLVED.—That the thanks of this Association be tendered the various newspapers and periodicals which have so kindly assisted in giving publicity to this meeting.

8. RESOLVED.—That the thanks of the Association be extended to the Montreal Board of Trade for their generous courtesy in granting the use of their room for the use of this Association.

AND THAT the Association personally thank Mr. Hadrill, the Secretary of the Board of Trade, and his assistant, Mr. Cook, for the personal trouble taken and time given by them in order to secure the comfort and meet all the wants of the Association.

Before the adjournment the following officers were elected: President, Mr. W. G. Snowball; Vice-President, Mr. Thomas Southworth; Secretary, Mr. A. H. D. Ross; Assistant Secretary, Mr. F. W. H. Jacombe; Treasurer, Miss Marion Robinson; and at the meeting of Directors, Mr. J. M. Macoun was re-elected Editor of *The Forestry Journal*. The resignation of Mr. R. H. Campbell as Secretary-Treasurer was received with many expressions of regret.



Forest Black Maple. Height 130 feet, diameter 34 inches.

THE CANADIAN SOCIETY OF FOREST ENGINEERS.

A striking indication of the advance in forestry in Canada is the formation of "The Canadian Society of Forest Engineers." This is designed to be essentially a society of professional foresters, enabling them to meet together and discuss technical topics and other matters of interest to the profession.

The object of the society, in the words of its constitution, is "the advancement of its members in the theory and practice of forestry by the discussion of technical and professional topics, the promotion of a better mutual acquaintance among Canadian foresters, and the cultivation of an esprit de corps among the members of the profession."

The formal organization of the society was effected on Friday evening, March 13th, 1908, when a number of professional foresters assembled at an informal dinner at the Place Viger Hotel, Montreal, at the close of the meeting of the Canadian Forestry Association. There were present, as guests, Mr. Overton W. Price, Associate Forester of the U.S. Forest Service; Prof. Filibert Roth, head of the Department of Forestry at the University of Michigan, and Prof. Hugh P. Baker, of Pennsylvania State College. The other gentlemen present were: Messrs. E. Stewart, former superintendent of forestry for the Dominion; Dr. Fernow, dean, and Mr. A. H. D. Ross, lecturer, of the Faculty of Forestry at the University of Toronto; Mr. Thos. Southworth, superintendent of colonization, Toronto; Mr. W. C. J. Hall, superintendent of forest protective service, Quebec; Mr. Abraham Knechtel, inspector of Dominion forest reserves, Ottawa; Mr. E. J. Zavitz, forester of the Ontario Department of Agriculture, Guelph, Ont.; Mr. Ellwood Wilson and Mr. Marshall C. Small, of the Laurentide Paper Company, Grand'mere, Que.; Reginald R. Bradley, of the Miramichi Paper Company, Chatham, N.B.; G. C. Piché, forester to the Department of Lands and Forests, Montreal, and F. W. H. Jacombe, technical assistant, Dominion forest service, Ottawa.

After dinner a short toast-list was honored, Mr. Ellwood Wilson acting as toast-master. Among the speakers were Prof. Roth, Dr. Fernow and Messrs. E. Stewart and Thos. Southworth.

The constitution, drafted by a committee appointed at an informal meeting on the previous evening, was then read, and after some amendment adopted. The election of officers was then held and resulted as follows:—

President—Dr. B. E. Fernow.

Vice-President—Mr. R. H. Campbell.

Secretary-Treasurer—Mr. F. W. H. Jacombe, of the Forestry Branch, Department of the Interior, Ottawa.

The Society is designed, as stated above, for professional foresters. Four classes of members are provided for: namely, Honorary, Active, Student and Associate. Active membership is confined to those engaged professionally in forestry work in Canada, and student membership to Canadian students in schools of forestry. To be eligible for associate membership a candidate must be "connected with the practice, teaching or administration of forestry, the lumber industry or other industry dealing with wood products."

Meetings are to be held annually at the time of the Canadian Forestry Association's meeting, and at such other times as the society may appoint.

The society starts off with a membership of thirteen, and it is hoped that great benefit will result to foresters and forestry in the Dominion through its work. It is designed to occupy among Canadian foresters a place similar to that which is filled in the forestry of the U.S. by the American Society of Foresters, and will no doubt become as valuable to Canadian forestry as the latter body is to the forestry of the Republic to the south.

Mr. W. H. Collins, of the Geological Survey staff, examined in 1906 the belt of country flanking the proposed route of the Transcontinental Railway westward from Lake Nepigon, his work terminating at Sturgeon Lake. Of the forests of the region traversed he says in his recently published report: "In most places there is an abundance of small timber suitable for firewood and mining purposes. Recent fires in the vicinity of Redhead and Onamakawash Lakes have left the country bare. Heavy timber is sparsely distributed. The best sections noted were near Houghton and Sassaganaga Lakes. Spruce, tamarac, poplar, birch and cedar are the ordinary trees. Their rate of growth is very dependent upon situation, being rapid on light dry soil, and exceedingly slow in muskegs. A few red and white pines were observed. Most of the better timber will be required for railway construction. Generally speaking the best timber and soil lie west of Allan Water."

PRESIDENT'S ADDRESS.*

First of all, I must congratulate our Association upon the fact that the annual meeting is held in Montreal as it is now some 26 years since the last (and at that time the first) meeting was held here by the American Forestry Association. This city is capable, with its great influence, of being almost a determining factor in movements in this province tending towards the good of our forests and water powers. I must mention that the desire of the Directors of the Association to come into closer touch with, get expression of opinion from and increase the interest of our French-Canadian friends, had much to do with the decision to hold the meeting here, as Toronto was anxious for the meeting to be held there.

We all hope that the two languages will be jointly used in papers and discussions, as in this way only a permanent interest can be worked up and a knowledge of the objects of the Association made widely known. We must reach the people in the country, and it can only be done by popularizing the subject, and we are now using articles for publication and for translation into the French Press. I trust that the Association will this year publish in English and French, as suggested by Mgr. Laflamme, the annual report, which will include a full account of this meeting.

It is most encouraging to see His Excellency the Governor-General and our Premier, Sir Wilfrid Laurier, leading the Forestry forces of progress in this country, and taking such a deep interest in everything appertaining to the subject and, at the same time, the President of the great and friendly nation to the south of us working along similar lines.

It appears to me that there is much to be done in this country as regards the people getting fuller information as to our true resources in the way of timber and wood generally, and, although I know that all these statements must be estimates, yet a beginning should be made, and I think that a report from the Forestry Branch of the Interior Department, somewhat on the lines of the publications issued by the Forest Service of the United States, such as "Forest Products of the United States," "The Use Book," etc., would be invaluable.

There is great need for a more thorough exploration of the timber to the North, not only of this province, but of Ontario, and the Dominion Government might explore the northern parts of Manitoba, Alberta and Saskatchewan, as our knowledge is

*Delivered at Montreal, March 12th, 1908.

very limited, and if it were ampler, it would be invaluable. The publication, "Canada's Fertile Northland," with the useful maps annexed, issued last year by the Railway and Swamp Lands Branch, Department of the Interior, giving, as it states, a glimpse of the enormous resources of a part of the unexplored regions of the Dominion, is a valuable contribution to what information we have on this subject.

As regards Canada's legislative action on such questions as export duty, etc., statistics should be issued annually as regards the cut and consumption of wood in Canada.

It has been suggested that a desirable means of encouraging the objects our Association has in view would be to establish Branch Associations in the different provinces, and then have them affiliated with the parent one. I would, therefore, ask those of our members who reside outside the Provinces of Quebec and Ontario if they would take up this question without delay. Perhaps, as the parent Society is at Ottawa, it would not necessitate branches in the Provinces of Quebec and Ontario. The parent Association would thus be in constant touch with the sentiment throughout the whole Dominion.

It is satisfactory to learn that Newfoundland has a Forestry Association well under way.

I would call attention to a condition in the Regulations, *re* licenses and permits to cut on Dominion Lands in Manitoba, Saskatchewan, Alberta, the Northwest Territories, and within twenty miles on either side of the C.P.R. in the Province of British Columbia, that the licensee shall keep in operation for at least six months in each year, a saw-mill capable of cutting 1,000 feet in every 24 hours for every $2\frac{1}{2}$ square miles under license. This is, in my opinion, an undesirable condition and tends in the contrary direction to an enlightened forestry policy. Better to raise the annual ground rent and spend more on fire protection in the northern parts of the above mentioned territories, than to make cutting compulsory: the timber is going fast enough.

My attention has been called to the large shipments of small spruce trees from the Province of Quebec, particularly in the Sherbrooke district, to the United States for Christmas trees. They run from 3 to 8 feet in height, and sell for from 10 to 25 cents each in Canada. This trade should be prohibited, as it has assumed large proportions, trees going as far south as Pennsylvania. It appears that the Commissioner for New York State Forest Game and Fish Commission has drawn the public attention to the grave consequences that must result from this great destruction in New York State.

Canada has immense forest areas and, in proportion, a smaller number of men to protect them against fire, compared

to the United States, although of late years more active measures have been taken against this enemy of our forests by all the provinces.

I think it right to say something on the much discussed question of an export duty on pulpwood, which, of late, has been brought prominently to the front by President Roosevelt's proposal to take the duty off wood pulp in return for free pulpwood from Canada. I believe this proposal might justly be made more favorable to Canada by lowering the duties on paper, as the freight on wood pulp is always a serious factor in its shipment.

That an arrangement in this direction is more desirable than an export duty on pulpwood, I strongly believe, having advocated at our Ottawa Convention in January, 1908, a policy of reciprocity as opposed to one of reprisal, and I have no doubt but that Canada will get a fair "quid pro quo" for her supply of pulpwood. The progress made by Canada the last six or seven years in the pulp and paper trades, has been in a greater ratio than that made by the United States. In connection with this export duty I may mention that the last report of the American Forest Service states that the average estimate of length of supply of pulpwood given by 164 mills was 21 years, and Mr. Gifford Pinchot last year estimated the timber supply of the United States would last, at present rate of cutting, from twenty to twenty-five years.

If we had careful estimates made in Canada by our Forestry Department, and information given by provinces as is given in the official publication, "Forest Products of the United States," we would get at an approximate estimate of our production and supply.

The Directors of the Association have decided that it is not expedient that any resolution shall be accepted on this subject at this meeting, lest it might have a political complexion, and as the subject is one on which strong differences of opinion exist. It is very probable that the report of the Royal Commission will be acceptable to the country as a solution of the question.

It is very encouraging to see that the principles advocated by various Forestry Associations are generally being put into practice throughout this continent, and I note that, in his last message to Congress, President Roosevelt, who is a strong friend of forestry, recommended the establishment of the Appalachian and White Mountain Reserves. This question of reserves is now generally recognized by all the provinces of the Dominion, and they are annually gradually increasing such areas.

The Government of the Province of New Brunswick held

a very successful Forestry meeting at Fredericton in February of last year, a full report of which they have issued, and it was generally admitted that it had the beneficial effect of spreading much information and securing many friends for the principles we advocate.

The good effects of the meeting of this Association in British Columbia, at Vancouver, in September, 1906, have been apparent in the increased precautions taken against fire, which that province was much in need of, and the live interest now taken in the subject of forestry generally.

I feel that it is not out of place on my part to suggest that the Federal and Provincial Governments procure and publish accurate reports on the water powers, and also the water storage facilities of this country.

The storage question will, at no distant date, be one of vital importance to Canada as it has now become in the United States, and was brought prominently before this Association by Mr. Cecil B. Smith in his address at the Ottawa Convention in 1906, who issued a note of warning, especially as electric roads run by water power can supplant steam and so prevent fires.

Storage means much to forest, animal and fish life, and to quote an expression: "And it is coming, because it will pay."

This Association is now eight years old, and our membership stands at about 1,200, but I trust that before this meeting terminates many new names will be added. I would ask every member to aid the work of the Association by handing in the name of a new member within a short time of this appeal reaching him, and request them to aid the work of our CANADIAN FORESTRY JOURNAL by contributions of interest on forestry and kindred questions, for our object is to make this journal one of general interest, and not purely academical.

This Association is greatly indebted to the Dominion Government, as well as to the Governments of the Provinces of Quebec, Ontario and British Columbia, for the grants made for the purpose of aiding the work of the Association.

I have no doubt that Mr. Campbell will give us useful information on the great work being done in the Northwest Territories by the Federal Government in the way of tree planting.

The Federal and Provincial Governments and all the Legislative bodies of the Dominion are united on the preservation of the forests and the necessity for preserving the sources of our water powers, and the ground is, therefore, ready for the seed that this Association is endeavoring to sow.

As regards some definite national policy to be advocated

by this Association, I think that outlined by Sir Wilfrid Laurier in his address at the Ottawa Convention in January two years ago, is the most definite and practical. It was that all the hills, mountains and plateaus which are the sources of flowing streams and rivers should never be allowed, for any consideration whatever, to remain anything else than forest. That these portions of the earth's surface should form part of the national domain and belong to the State, which includes Federal and Provincial Governments. That, where such portions of these watersheds have been alienated and transferred to private ownership, the policy should be to repurchase them for the national domain.

EDUCATION AND FOREST FIRES.

BY S. B. SINCLAIR, VICE-PRESIDENT, OTTAWA NORMAL SCHOOL.

During recent years the public have begun to awaken to a practical realization of the tremendous havoc wrought by forest fires, and of the immense national loss which is thus entailed. Two remedies have been emphasized, viz., the avoidance of kindling fires, and the reconstruction of forests by planting. In the Nature Study work of the schools much attention is now paid to seed germination, and in not a few schools every child is encouraged to raise a tree from the seed, an undertaking which, in the best possible way, brings him in contact with the problem of the proper soil, water, heat, and light conditions for tree growth. This is certainly a step in advance.

It must not be forgotten, however, that in Forestry, as in almost everything else, an ounce of prevention is worth a pound of cure. When we consider that ninety per cent. of forest destruction is due to fires we see that the problem really becomes one of the prevention of forest fire.

The laws regarding careless setting of fires are fairly rigid, and are growing more so every year, and public sentiment is being enlightened rapidly. Even in the schools many pupils are now taught the dangers of setting fires. But where, let me ask, does any one ever hear a word regarding the best method of extinguishing fires which have been started?

In 1894 a fire was started at Hinckley, Minnesota, which blotted out seven towns, destroyed over twenty-five million dollars' worth of property, rendered two thousand persons homeless, and cost five hundred lives. For many days before

the high wind came, the fire was burning slowly close to the town of Hinckley, and could easily have been extinguished.

Last summer at Portage Lake, Parry Sound District, I had an opportunity to see how successful a determined and well directed effort may be in resisting the progress of the flames. A fire had swept from the C.P.R. track over an area of a square mile and threatened to devastate a beautiful and extensive stretch of forest. There seemed a possibility of fighting it successfully at a certain point. Seven of the neighbors got together and set themselves systematically and heroically to the task. They dug trenches, carried water, felled trees, and adopted many other devices learned by long experience in such work. At the end of five days they had the fire stamped out, although everything was still as dry as tinder, and the wind blew almost constantly. During these days I had also an opportunity to learn many interesting facts well known to fire-fighters, but entirely unknown to the uninitiated. I learned for example, that fire usually travels very slowly (if at all) during the night. One night the fire travelled only a few feet, although the wind blew all night with considerable force. This dying down of the fire is said to be due to the cold and humidity. Another interesting fact is that sand extinguishes fire as effectively as water, and is usually much more easily obtainable.

Now there is no reason why such facts should not be taught systematically to everyone and especially to school children. The way to deal with the fire problem is not to ignore it, but to face it, to realize that fire is a good servant but a bad master, and that it should be carefully studied. The Arabic proverb still holds true that "The sage warms himself at the same fire with which the fool burns his tent."

The way to learn to control fire is to kindle fires and then extinguish them. A settler who has had forty years' experience with camping parties informs me that in the majority of cases a fire which is left by campers in the full confidence that it has been extinguished, is not really extinguished. The Muskoka fire to which I have referred sprang from a small fire which had smouldered for days and had been observed by many pedestrians going up the railway track who saw the smoke, but felt that it was not a matter for them to trouble about. After all, the question is largely one of social responsibility. Everyone must be brought to realize that it is his business to see that a fire smouldering in a dangerous locality is promptly and effectively extinguished. In the ultimate analysis it is the old question, "Am I my brother's keeper?"



Forest Pin Oak, Average height 125 feet, diameter 19 inches.

LA MANIÈRE DONT QUELQUES CULTIVATEURS USENT DU BOIS ET DE LEURS TERRES.*

BY MONSIGNOR J.-C. K. LAFLAMME.

Dans les quelques notes qui suivent, je ne m'occuperai que des cultivateurs de la province de Québec, et même je restreindrai encore le cadre de mon travail au district de Québec proprement dit, parce que c'est celui avec lequel je suis plus familier. Cependant, je crois que les conditions économiques du reste de la province sont sensiblement les mêmes, si l'on veut bien tenir compte des modifications résultant des conditions locales qui varient nécessairement d'un endroit à l'autre.

On sait, par les recensements officiels, que, de tous les pays du monde, c'est aux Etats-Unis que se fait la plus grande dépense de bois en proportion de la population. On avait cru dans le temps que l'usage qui se répand de plus en plus de matériaux de construction inconnus il y a cinquante ans—le fer et le béton—allait diminuer cette dépense de bois, mais, en réalité, il n'en a rien été. Au contraire, on constate que, d'une année à l'autre, la consommation du bois suit une progression croissante. Cette augmentation est due, en grande partie, au développement si rapide des chemins de fer, des lignes télégraphiques et téléphoniques, et surtout à la dévorante industrie de la fabrication de la pulpe.

Un document que je viens de recevoir de France affirme qu'il "est bien certain que, surtout les besoins de pâte à papier aidant, il s'exploite dans toute l'Amérique du Nord beaucoup plus de bois que la nature n'en produit. À ce train, s'il continue sans être au moins enrayé, la ruine totale de vos 500 millions d'hectares de forêts sera l'affaire tout au plus d'un siècle, peut-être d'un demi-siècle."

Voilà pour les Etats-Unis.

Les chiffres officiels que nous avons pour la province de Québec ne nous permettent pas de dire si le même état de choses existe ou non chez nous. Cependant il est infiniment probable que nous dépensons autant de bois que nos voisins, étant donné surtout que l'emploi de la houille pour le chauffage domestique est virtuellement inconnu dans toutes nos campagnes. Partout on se chauffe au bois, on construit les édifices privés en bois, on enclôt les champs avec des pieux de bois. Par conséquent chaque habitant de Québec dépense certainement autant de bois sinon

*Address delivered at Montreal, March 12, 1908.

plus que son voisin des Etats-Unis, et, ici comme chez nos voisins, cette dépense doit aller en augmentant.

C'est dire la grande valeur pour le cultivateur de la parcelle de forêt qu'il possède encore. En effet, c'est elle qui lui épargnera de grandes dépenses en lui assurant à la fois et le bois d'oeuvre et le bois de feu, et c'est encore elle qui lui permettra de réaliser de temps en temps des profits assez considérables par la vente des produits d'une coupe bien réglée, lorsque les circonstances le lui permettront ou le lui imposeront.

Aussi est-il admis par tous que, de deux fermes voisines, et, par conséquent, à sol également fertile, celle qui possède encore une quantité de bois capable de remplir toutes les conditions économiques qui viennent d'être énumérées a une plus grande valeur que l'autre. Elle est, si on peut dire, plus complète, et le propriétaire a l'avantage d'avoir à sa disposition, chez lui, tout ce qui lui est nécessaire. Et qu'on ne dise pas que ces acres de terre non défrichés donneraient de plus grands revenus si on les mettait en culture. Cela est possible dans quelques cas particuliers. Mais, en pratique, et pour les raisons ci-dessus énoncées, le cultivateur préférera toujours, avec raison, une propriété contenant quelques acres de forêt à une autre complètement déboisée.

Il est donc de suprême importance que le cultivateur possède sur sa propriété, ou dans son voisinage immédiat, une parcelle de forêt, sur laquelle il puisse prendre sans trop de frais tout le bois d'oeuvre et de feu dont il aura besoin.

Qu'on me permette de citer, à l'appui de cette affirmation, ce qui se passe dans un grand nombre de paroisses échelonnées de long de la rive droite du Saint-Laurent, depuis le comté de Bellechasse jusqu'à celui de Rimouski. Dans ces anciennes paroisses qui bordent le fleuve, presque toutes les terres ont été complètement défrichées. Elles étaient excellentes et les propriétaires ont tenu à les mettre en valeur dans toute leur étendue.

D'autant que dans les temps reculés des anciens défrichements, on trouvait encore le bois à une assez faible distance, du côté du sud, et, par suite, la question de son approvisionnement ne paraissait pas encore inquiétante. De plus, vers 1825, dans la région de Kamouraska, à la suite d'un été très sec, le feu consuma à peu près tout ce qui restait de forêt, à tel point que les cultivateurs purent parfaire le défrichement à très peu de frais. Ce fut la disparition définitive de la forêt.

Depuis, les cultivateurs de cette région sont obligés d'acheter et de transporter à grands frais, non seulement le bois d'oeuvre qui leur est nécessaire pour faire de nouvelles constructions ou pour réparer les anciennes, mais encore, et surtout, jusqu'au dernier morceau de bois de chauffage. Et aujourd'hui ce bois de feu, ils doivent l'aller chercher à douze ou quinze milles, du

côté de la montagne. Ceux qui le leur vendent vont eux-mêmes le moissonner à sept ou huit milles plus loin. Aussi les prix en ont-ils doublé depuis une quinzaine d'années. L'épinette qui se vendait jadis \$1.00 à \$1.50 la corde, a atteint de \$2.00 à \$3.00; l'érable est passé de \$2.50 à \$5.00 ou \$6.00.

L'hiver tout entier est à peu près exclusivement consacré à ce charroyage de bois, et le cultivateur doit y mettre tout son temps, soit qu'il achète son bois du marchand, soit qu'il aille le couper lui-même sur le lot à bois qu'il possède, lequel lot est toujours situé à une grande distance de sa résidence. Il est juste de dire que, durant cette saison, nos cultivateurs ont peu de chose à faire sur la ferme et que leur seule besogne se limite, en général, aux soins quotidiens à donner aux animaux domestiques. Par conséquent, rigoureusement parlant, ce charroyage de bois n'est pas une perte de temps. Cependant, je me figure que les habitants pourraient s'occuper avec plus de profit à autre chose qu'à fatiguer leurs chevaux et à détériorer leurs voitures dans ces courses sans fin, sans compter que la nourriture à donner à leurs bêtes doit être alors plus soignée, plus riche et, par conséquent, plus dispendieuse.

Cet état de choses se retrouve encore dans plusieurs anciennes paroisses des autres comtés de notre district, surtout sur la rive sud du Saint-Laurent. Partout, c'est une quasi disette de bois. Le prix de ce dernier augmente à mesure que la difficulté de se le procurer s'accroît, et les gens, qui prévoient l'avenir, se demandent où cette progression s'arrêtera, et où leurs enfants pourront bien trouver ce qui, plus tard, sera nécessaire à leur approvisionnement de combustible.

Telle est la situation des centres agricoles les plus anciens des environs de Québec. Doit-on en dire autant des paroisses relativement récentes de notre région, de celles, par exemple, où le travail de défrichement n'est pas encore terminé? Peut-on espérer que, là au moins, les défricheurs seront assez prudents pour conserver sur leurs propriétés une étendue de forêt capable de subvenir à tous leurs besoins présents et futurs? Il en était ainsi il y a une dizaine d'années. Sur chaque lot ou à peu près, on gardait une parcelle de forêt suffisante pour fournir le combustible et presque tout le bois d'oeuvre nécessaire.

Mais, à l'heure présente, les choses sont bien changées. Le bois de pulpe a acquis dernièrement une très grande valeur, et des essences qui jadis ne valaient que fort peu sont maintenant cotées à des prix relativement élevés. Le résultat a été que les cultivateurs se sont mis à exploiter leurs réserves forestières et à en vendre les produits, soit directement aux fabricants de pulpe, soit à des entremetteurs qui en font un commerce très lucratif.

Cette modification dans le marché a été une véritable bonne

fortune pour nos braves gens. Ils ont pu, de cette façon, améliorer leur situation, soit en éteignant des dettes criardes, soit en se procurant un confort dont ils n'avaient pas encore joui. Des curés de la région de la Beauce m'assurent que certains pères de famille réalisent de cette façon jusqu'à cinquante piastres par semaine. Ce gain, qui se prolonge pendant les mois d'hiver, les met décidément à l'aise, de sorte que tout le monde, créanciers et débiteurs, sont satisfaits.

En vérité, il n'y aurait rien à dire si ce commerce pouvait se continuer indéfiniment. On aurait tout simplement créé une nouvelle source de revenus et augmenté d'autant la richesse nationale. Malheureusement ces nouvelles conditions économiques, ces revenus inespérés ne seront que transitoires. Car les propriétaires, par cette exploitation intensive, demandent à leurs réserves forestières plus qu'elles ne produisent annuellement. Par exemple, sur des parcelles de forêt produisant annuellement disons cent pieds cubes de bois, on en coupe mille. Aussi les quelques acres boisées qu'on exploite de cette façon se dépeuplent-ils rapidement sous la hache du propriétaire. On prévoit que bientôt tout sera fini et alors le colon, non seulement ne retirera plus aucun profit de son lot de bois, mais encore il devra se procurer ailleurs, et à prix d'argent, la provision annuelle dont il aura besoin, tout comme dans les anciennes paroisses.

Ecoutez ce que me disait dernièrement un curé de la Beauce. "La moitié de ma paroisse est bonne au point de vue agricole; le reste est trop rocheux, la culture y est trop difficile pour être payante. On cultive peu en général; à peu près jamais de blé. Et même, chose étonnante, plusieurs paroissiens font venir de l'Ouest l'avoine nécessaire à la nourriture de leurs chevaux. On travaille aux mines—il y en a de riches dans la paroisse—surtout on vend du bois. Un père de famille avec ses garçons gagne ainsi jusqu'à cinquante piastres par semaine. Mais dans dix ou quinze ans tout sera fini, épuisé. Alors que fera-t-on? Comment vivra-t-on?"

Un autre m'assure que, dans vingt ans, le bois de commerce et même de feu aura disparu de sa paroisse; un autre croit que la crise arrivera chez lui dans quinze ans; un autre, curé d'une paroisse plus récente, recule la limite à vingt-cinq ans. Puis, comme ses confrères, il se demande ce qui adviendra ensuite. Et la réponse qu'il faisait, à cet angoissant problème, est bien caractéristique. Permettez-moi de la citer textuellement. "Alors, disait-il, on fera chez nous ce qui se fait maintenant dans quelques régions du Nord: on vendra pour 25 piastres des terres défrichées, bâties de grange et de maison."

Un missionnaire, fin observateur, qui a parcouru presque toute la province (région de Québec), et qui s'est bien rendu

compte de ce qui se passe, confirme en tous points les affirmations de ses confrères.

Dans une paroisse assez voisine de Québec, un cultivateur possédait une magnifique érablière qui lui donnait chaque printemps une bonne récolte de sucre. Un hiver, alors que le bois de chauffage avait atteint un haut prix, il abattit tous ses érables et les vendit comme bois de chauffage. Cette opération lui donna bien sur le coup quelques centaines de piastres; mais maintenant il ne retire plus un sou, car le sol où poussaient ses érables est trop rocheux pour donner une récolte de céréales qui vaille. Dans une autre paroisse plus rapprochée de Québec, quelques cultivateurs vendent leurs érablières à des commerçants de bois; ceux-ci coupent à blanc et laissent le sol complètement dénudé, couvert seulement des déchets de toute sorte, avec la perspective que cette forêt, si riche autrefois, ne se reproduira jamais. D'autres, plus avisés, ne vendent que leurs plus gros érables et en surveillent eux-mêmes la coupe. Une dizaine d'années plus tard, leurs érablières rajeunies pourront être soumises à une nouvelle exploitation et donner de bonnes récoltes de sucre.

Voilà des faits parfaitement exacts. Sans doute, nous aurions tort de généraliser trop vite et de croire que le même état de chose se rencontre partout. J'espère qu'il n'en est pas ainsi et que, dans des régions que je ne connais pas, on met plus de soin et de prévoyance à conserver les forêts privées. Mais tout de même, nous devons admettre que, chez un trop grand nombre de nos compatriotes, il y a une imprévoyance regrettable. C'est une mentalité à refaire, pour ainsi dire. Il faudrait inculquer aux intéressés le souci de l'avenir; leur faire comprendre qu'ils ne doivent pas s'occuper exclusivement du présent; qu'après eux, leurs enfants devront ou bien profiter de leur sagesse, ou bien pâtir des suites de leur imprévoyance. Et je crois que c'est de ce côté que nous devons diriger tous nos efforts, nous qui avons mission d'éclairer l'opinion publique.

Car aujourd'hui, je le sais, si on demandait à ces prodiges de leur fortune ce que deviendront leurs héritiers, quand ils auront compromis de cette façon le meilleur de leurs revenus, ils répondraient sans broncher: "Nos enfants, ils feront comme nous, ils se débrouilleront." C'est faire preuve d'une grande impéritie, trop grande, à vrai dire, pour n'être pas coupable au moins dans une certaine mesure.

Il y a donc là une importante oeuvre sociale et patriotique à entreprendre et à mener à bonne fin. Naturellement, nous ne devons pas songer à défendre à ces propriétaires de forêts privées d'exploiter leurs réserves. Ce serait justement le moyen de n'aboutir à rien. Car très souvent, l'exploitation de ces bois est nécessitée par la gêne à laquelle se trouvent acculés acciden-

tellement certains colons. Tout ce que nous pouvons et devons faire, c'est de leur suggérer un moyen rationnel d'en tirer profit. Nous devons leur faire comprendre que leur devoir est de ne pas agir de façon à faire disparaître à tout jamais cette source de revenu, qu'ils ne doivent demander à leurs forêts que l'équivalent du bois qui y pousse chaque année; qu'il leur faut les exploiter de manière à les améliorer et à en augmenter le rendement, et non pas à les ruiner. En un mot, il s'agit de les convaincre que leur intérêt bien entendu exige qu'ils renoncent à ces profits d'aujourd'hui, élevés, je le veux bien, mais transitoires, pour se contenter de gains plus modestes, mais qui dureront toujours. On peut espérer atteindre ce résultat pourvu qu'on y mette beaucoup de tact et de prudence. Alors nos gens "moissonneront" leurs forêts comme ils le font de leurs champs cultivés, mais ne les détruiront pas.

En pratique, on pourrait peut-être commencer cette éducation en conseillant aux cultivateurs qui sont plus à l'aise de reboiser les parties dénudées de leurs terres, celles qui ne rapportent rien au point de vue agricole et sur lesquelles on n'aurait jamais dû abattre les arbres. Mais si l'on trouvait des gens dociles à ces conseils, il faudrait leur faire clairement comprendre que ce faisant, ils travaillent surtout pour leurs enfants et que si, personnellement, ils ne peuvent songer à profiter d'une récolte qui ne sera mûre que dans quarante ou cinquante ans, leurs enfants, eux, en jouiront et béniront leur souvenir. A vrai dire, cette idée d'aménager la forêt pour n'en jouir que dans un avenir plus ou moins éloigné, très difficile à saisir pour des gens à courte vue et qui ne pensent qu'aux intérêts présents, est une de celles que nous devons travailler de toutes nos forces à répandre dans le peuple. C'est d'elle en effet que nous devons attendre les résultats les plus fructueux. Car le jour où le peuple comprendra clairement que la forêt peut, non seulement durer indéfiniment, mais encore augmenter en rendement par un aménagement rationnel, il sera le premier, j'en suis sûr, à demander d'être renseigné sur ce point et à suivre les directions scientifiques qu'on voudra bien lui donner.

A ce point de vue, les Etats-Unis nous donnent un exemple qui vaut d'être étudié et imité dans la mesure du possible. Persuadé de l'importance qu'il y a pour le bien de la nation de conserver et d'améliorer les parcelles de forêts privées, le gouvernement américain a créé un service spécial dont le but est de donner aux propriétaires tous les renseignements nécessaires pour atteindre cette fin. Sur simple requête, le gouvernement envoie à n'importe qui le demande, un expert en science forestière qui examine le lot à planter ou la parcelle de forêt à développer. Après étude sur les lieux, le forestier officiel enseigne aux intéressés quelles sont les meilleures méthodes à suivre et en surveillance lui-même, d'une année à l'autre, l'application.

Les conventions entre le gouvernement et les propriétaires sont très simples. Le gouvernement paie tous les frais d'examen, et le propriétaire s'engage à exploiter sa forêt, à son propre profit personnel, mais en suivant rigoureusement les directions qui lui ont été données. S'il arrive qu'à raison de circonstances spéciales le propriétaire se voit dans la nécessité de pousser un peu son exploitation, s'il s'agit, par exemple, de faire face à des besoins imprévus ou de suppléer à l'insuffisance d'une récolte défectueuse, le forestier de l'État est là pour indiquer comment s'y prendre. C'est surtout alors que ses conseils sont précieux, puisqu'ils permettront au cultivateur de pousser sa vente sans compromettre trop gravement son capital forestier. Enfin, comme ces conventions entre le gouvernement et les propriétaires sont faites, intentionnellement et exclusivement, pour l'avantage de ces derniers, ceux-ci peuvent les rompre à dix jours d'avis, sans avoir à en donner les motifs aux autorités.

Devrait-on tenir ici la même ligne de conduite? Le pourrait-on? Ce n'est pas à moi de répondre. Un service de ce genre demande un personnel technique dont nos gouvernants ne disposent peut-être pas encore.

Il y aurait bien un moyen de combler cette lacune: ce serait de fonder une école forestière régulièrement organisée, dont les élèves gradués seraient comme une pépinière de spécialistes éclairés.

On parle beaucoup à l'heure actuelle d'écoles spéciales de diverses sortes; on veut en ouvrir en différentes villes du pays, et l'on fait très bien. On finira un jour, j'en suis sûr, par penser aux écoles forestières. Les richesses forestières que nous avons sont plus que suffisantes pour légitimer cette dépense. D'autant que celles-ci sont loin de coûter autant que les écoles techniques proprement dites. De plus, il est très probable que les exploitants de limites seraient heureux de s'assurer les services de ces spécialistes, tout comme la chose se pratique aux États-Unis. Déjà le gérant de très importantes limites m'a laissé entendre la chose. D'autres l'imiteraient sans doute. Ce serait comme une nouvelle carrière ouverte à notre jeunesse instruite.

En Suède le gouvernement a créé comme des écoles modèles de science forestière. Il y en a un grand nombre disséminées en différents coins du pays. On y enseigne juste assez de théorie pour servir de base aux connaissances pratiques qu'on donne aux élèves. Car c'est vers ce côté pratique que les études des élèves sont surtout dirigées, vu que le gouvernement recrute parmi eux tous ses employés officiels, garde-forestiers, garde-feux, surveillants généraux, etc. On peut se demander dans quelle mesure une semblable organisation serait possible parmi nous.

Dans tous les cas, en attendant le jour béni où cela sera possible, travaillons de toutes nos forces à répandre dans notre

population agricole de saines idées sur la conservation des forêts privées. Je l'ai dit et je crois l'avoir démontré plus haut, les lots à bois courent des grands dangers, et il ne faut rien moins que le concours de toutes les bonnes volontés pour sauver de la destruction complète cette partie notable de la fortune publique et privée.

Au risque de commettre une grosse indiscretion, j'ajouterai que le clergé canadien-français peut jouer ici un rôle de la plus haute importance. En contact perpétuel avec le peuple, jouissant auprès de ses paroissiens d'une haute autorité, ses conseils seront toujours écoutés avec grande déférence et finiront certainement par produire des résultats surprenants. Il ne s'agit pas pour lui de faire grand bruit, de donner des conférences retentissantes, de se mettre en frais d'éloquence. Au contraire; les conversations privées produiront beaucoup plus d'effet. Un bon conseil donné en passant, mais à propos, fera réfléchir le cultivateur; puis l'idée lui viendra d'essayer, et alors le salut sera proche.

Mais en tout cela il y a un point de la plus haute importance dont il faut que nos gens soient bien pénétrés. Je l'ai déjà mentionné plus haut et permettez-moi de le répéter en terminant: c'est de convaincre les intéressés que la forêt ne donne pas des moissons à courte échéance, comme les céréales. Elle est plus lente à mûrir. Par conséquent, en travaillant aujourd'hui à l'aménager convenablement, on peut bien espérer travailler un peu pour soi, mais c'est surtout à l'avenir, à ses héritiers qu'il faut songer. Faut-il le dire? Les plus grands obstacles viendront peut-être de ce côté.

The Lumbermen's Association of Western Nova Scotia, at a recent meeting, passed a resolution urging the government to have a general forest survey of the province made as soon as possible, and pointing out the inadequate knowledge of the timberland at present. What is wanted is a survey showing the area of the country forested, an approximate estimate of the quantity of pine, spruce, hemlock and hardwoods, and the position of these studies of their growth, a statement of the area of burnt and untillable lands, a sketch of the watersheds and water courses, with a view to furnishing information as to usable water powers, a report to the government on the value of ungranted Crown lands, and the possibility of increasing the growth of wood or reclaiming swamp or overflowed lands. It is pointed out that in regard to the forest resources of the province there is absolutely no official information to be obtained beyond the fact that there are 1,469,640½ acres still ungranted in the province, and even this is said to be approximate.



Forest Maple. Height, 130 feet, diameter 40 inches.

FOREST SURVEY METHODS.*

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A complete Forest Survey includes (1) A more or less accurate plane and topographic survey of the tract under examination; (2) A careful estimate of the amount of timber upon it; (3) A determination of the rate at which the timber is growing, and (4) A study of the conditions of light, moisture, soil and other factors which influence both the present and the future condition of the forest crop.

DEGREE OF ACCURACY REQUIRED.

The accuracy of the methods employed to bring together information of this sort will, of necessity, be determined by (1) The use that is to be made of it, and (2) The time and money allowed for the collection of the necessary data. For example, if a woodsman is given a month to look over a township and is required to bring in a report on the amount of standing timber, and the cost of logging it without regard to the conditions most favourable for the securing of another crop from the cut-over area, his report will deal almost entirely with the amount of lumber that is likely to be obtained and the cost of logging it per thousand feet, board measure. It will say very little, if anything, about the leaving of seed trees to fill with their progeny the openings made in the forest by the loggers; the age, density and condition of the seedlings which have already established themselves; the precautions necessary to protect the seedlings from destruction by fire and browsing animals; the effect of opening up the forest upon the trees that remain, as regards liability to windfall and increased rate of growth; the effect of leaving undesirable species in possession of the soil; and other matters that must be considered when it is proposed to prevent the destruction of our rapidly diminishing forested areas.

If, however, it is proposed to diminish the possible revenue that may be obtained by the present destructive methods of lumbering, and to so manage the woodlands that they will always regulate the flow of water in the streams and yield a perpetual supply of timber, it will be necessary to establish permanent roads for the removal of forest products and the protection of the growing stock from fire. It will also be neces-

*Read at Montreal, March 12, 1908.

sary to know exactly the amount of growing stock, and the rate at which it is increasing, so that it may not be removed at a faster rate than it is being replaced. To lay out roads to the best advantage, whether for destructive lumbering or for the purpose of deriving a sustained yield, it is necessary to have exact information regarding the topography of the tract, and before it is possible to put it under proper management it is necessary to know its sylvicultural condition. Thus it appears that the forest engineer who would make a complete survey of a tract of timber must be familiar with the methods of plane and topographic surveying, so that he may properly mark the boundaries of his timberland and prepare an accurate map showing the size and location of the various ridges, gullies, swamps, lakes, streams and other topographical features that will determine the location and character of the necessary roads, dams, bridges, etc. He must also be able to estimate the amount of standing timber and know how to make accurate studies of its rate of growth. Without this information he would not know how much timber it would be safe to remove at each cutting, without diminishing the value of the property.

From this it will be seen that the essential difference between a forester and an old-time lumberman is that one makes provision for the production of future crops, the other does not. Heretofore, it has not been considered necessary to make such provision, but the truth is rapidly being forced home upon us that if we are wise in our day and generation we must speedily correct the error of our ways and make a determined effort to get our forest areas managed in a less suicidal manner than in times past.

TOPOGRAPHIC METHODS.

In a rough way every logger is his own topographer, and has acquired his knowledge by cruising, but unfortunately it is apt to be inaccurate, is easily forgotten and cannot be transferred to his successor, who has to acquire his knowledge of the locality all over again. Thus, to the man who directs the conduct of a large business from a central point, an accurate map showing the topography of the tract is simply invaluable, because its topography very largely determines the course of all woods work. The essential features of such a map are that it clearly indicates the positions of ridges and streams, the shape and steepness of slopes, the areas of valleys and lakes, and the grade of roads that it may be necessary to build.

METHOD OF COLLECTING DATA.

The method of securing the necessary data for such a map is somewhat as follows:—

From points of known elevation, along railways, etc., a line of levels is run to the ponds and other suitable places well

distributed throughout the township to be surveyed. From the places whose heights above sea level are thus determined, it is customary to work out with aneroid barometers, which give the approximate elevations with sufficient accuracy for all kinds of woods work. In determining the grades of roads which it may be desirable to build, it is found that any Abney clinometer is much lighter, quicker and almost as serviceable as a land level. Usually the land is blocked out into mile squares, and easily found marks are made every quarter of a mile. These marks serve as starting points for the examination of the interior of any given "forty" (see Estimation of Timber on Forty Acre Squares), and enable the cruisers to locate themselves quite accurately on a line by pacing. With practice, measurements by pacing can be made much more accurately than would be supposed. Steps taken to get round obstacles are not counted, and on strong slopes discount is made. On very steep ground, indeed, steps taken are not a guide to distance, and judgment has to be resorted to in order to fill in the count. The count tells us when a line is approached, and enables us to pick it up with certainty, though it may be blind. By this means location may be made with considerable accuracy along the whole line. Having traversed the lines of a lot, noted the crossings of brooks and divides, taken the heights of essential points and noted and sketched whatever topography can be seen, we may then start from the middle of one side to run a line across the lot. In doing so it is best to use a pocket compass with a needle less than 2 inches in length, because a man climbing over the debris left by cutting or shoving his way, head down, through dense thickets of young fir will lose his direction in the course of a few rods. Now if he has a compass in hand, he will stop and look at it, but he would do so less often if he had to set a staff, level a 3 inch compass with folding sights and wait for the needle to come to a stand. From what has been said it is evident that a pedometer is of little use in this kind of work. For smooth going it answers very well, and does away with the necessity of counting, but on rough land its readings are no guide for distance.

On simple ground it is generally found that pacing once across each forty acre lot gives sufficient data to map the topography with sufficient accuracy for all ordinary purposes. Elsewhere there may be roads and streams to locate and divides that should be carefully put in. Here the compass and pacing method is still used, tying to the lines as often as may be. Travel in parallel straight lines is better, however, provided it is sufficient for the immediate purpose in hand. The reasons for this are, first, that it gives more accurate results, and second, that systematic travel of this kind enables the timber land topographer to see a fair sample of all the timber on the land.

In times past, one of the principal reasons for the notoriously inaccurate estimates given by many timber cruisers was that they did not get a fair average of all the timber, which they would have been able to get by travelling along evenly spaced and parallel straight lines running across the tract.

IS IT PRACTICAL?

To those who say it is not practical to prepare a reliable topographic map by the methods just described, or that the cost is prohibitive, I would reply that in the autumn of 1896, Mr. Austin Cary, a practical timber cruiser, a graduate of the Yale Forest School and now Professor of Forestry at Harvard University, prepared such a map of Township 3, Range 5, in Franklin County, Maine. This township is 6 miles square, heavily timbered with spruce, and was gone over from 4 camps in a little over 6 weeks' time. Two weeks were then required in the office to work up the data collected in the field and prepare the map, which proved so valuable to the firm of Hollingsworth & Whitney, of Waterville, Maine, that other concerns were led to desire similar maps. The result was that, during the next few years, Mr. Cary's services were greatly in demand for work of this nature, and that he has prepared maps of this description for 200,000 acres of timber lands. Most of them are drawn to a scale of 4 inches to the mile, and have 50 foot contour lines representing the topography. As some woodsmen cannot easily read such maps, it was found advisable, in a few cases, to prepare cardboard or veneer models, which represent the land in miniature and show its main features just as clearly as if the men were on the land.

Taking the stumpage price of spruce at \$3.50 per M, and assuming that a township, containing 36 square miles, will average 5,000 board feet per acre, it is seen that we are dealing with a property worth \$403,200 in its present wild state, and easily worth \$500,000 by the time it can be got under proper management. From this it will be seen that an outlay of less than \$2 for every \$1,000 worth of property, or 4 cents per acre, will secure to the owners a first-class map of the topography of the entire township, which will enable them to sit in the office and discuss plans or let contracts with the same clearness as to details as if the men were on the land.

THE ESTIMATION OF TIMBER.

Where the supply of timber is both plentiful and cheap, timber cruisers or "timber lookers" are generally employed to make ocular estimates of the contents of stands, but where it commands a better price it is now customary to constantly check the judgment of the estimators by means of measurements on sample areas properly distributed over the whole tract.

At the outset it should be clearly understood that ability

to estimate the merchantable contents of a stand of timber can be acquired only through practice and experience in the woods. The estimator must be able to recognize the external signs of defect and have some knowledge of the loss due to hidden imperfections. He should also know the local conditions of lumbering and be able to judge the cost of logging and milling before he can place a value on the stumpage. All this information is a matter of field training, and cannot be learned in a purely theoretical manner. It is a matter of good judgment and experience and not a matter of mere method. This does not mean that there should not be any method in the procedure of making such an estimate, nor does it mean that one method is just as good as another. It does mean, however, that an estimator who is familiar with several methods of cruising is in a position to apply the method most suitable for the particular locality in which he happens to be working, and that his returns will be much more reliable than mere guesses.

In the case of ocular estimates, each cruiser does his work in his own way. Some multiply the *estimated* number of trees by the contents of the *average tree*, making due allowance for defects; others count the trees and multiply by the *estimated* contents of average trees, allowing for defects; and still others estimate the contents of each tree separately, making deductions for unsoundness and other imperfections. In the case of irregular hardwood stands, this latter is the only reliable method of estimating, because many of the older trees are almost worthless for saw timber, and would not pay for the cost of removing them.

The more defective the trees are, the more preferable is the judgment of estimators who have had long experience in the mill and in the woods, to the methods of mere measuring. In sound timber, however, the method of measuring the trees on a known percentage of the total area is much preferable to the ocular estimate of a timber cruiser—no matter how experienced. Furthermore, a cruiser may be able to estimate pretty closely in the locality in which he has had long experience, and in a new region find himself very much "at sea." Possibly this fact explains the origin of the term "cruiser." Be that as it may, the cruiser finds it necessary to establish a new standard which will enable him to estimate correctly the contents of stands in the new region in which he finds himself. The quickest and surest way to establish such a standard is by a careful selection and exact measurement of representative trees in the stand. Having established his new standard of reference he is then in a position to correctly estimate the volume of the timber in the new locality in which he finds himself. When the timber is fairly uniform in size and evenly distributed over the tract it may suffice to estimate the yield of a few sample acres, find

their average and multiply by the total acreage. Usually, however, the timber is not uniform, and it is necessary to estimate the lower slopes of a mountain separately from the upper, the north slopes separately from the south, and the water-sheds, swamps and other special types, separately also. To meet this difficulty, the plan of estimating the timber on sample areas aggregating a given percentage of the whole tract has been devised. If properly distributed they give a very close average for the timber on the whole tract.

SAMPLE PLOT METHODS.

Many methods have been devised for the proper location and rapid laying out of sample plots. Usually they are laid out in the form of circles, squares or rectangular strips, and in area generally vary from one-quarter of an acre to a whole acre. A quarter acre circle has a radius of 19.62 yards, and an acre circle a radius of 39.24 yards. In the form of a square, each edge of the acre is 69.57 yards, and of the quarter acre 34.78 yards.

In open stands of timber one of the quick methods is to travel in parallel lines a quarter of a mile apart and stop every quarter of a mile to lay out an acre (with a radius of 39 yards or a side of 69 yards), and estimate the timber upon it. This would give us 16 sample acres equally spaced over each square mile, and therefore represents one-fortieth, or $2\frac{1}{2}\%$, of its area. With a little practice the estimator soon learns to judge whether a tree is within 39 yards or not of the centre of the circle where he stands. Another plan is to place a flag at the centre and walk through the timber within 39 yards of it, making the estimate by eye, by counting trees, or by measuring. Returning to the flag he can then pick up his compass direction, pace a quarter of a mile, and estimate the next acre. In dense stands it is not easy to see all trees within 39 yards, and it is preferable to use either half acre or quarter-acre circles instead, with radii of 24.75 yards and 19.62 yards, respectively. For rough estimating it is customary to use circular plots, but for more accurate work square plots are preferable, because they are generally laid out more carefully. They may be laid out by either pacing or measuring their sides and turning the corners with a magnetic compass or a cross-staff head.

THE ESTIMATION OF FORTY ACRE SQUARES.

In fairly even aged timber growing on land comparatively easy to travel, it is often a good plan to block out forty acre squares here and there and estimate all the timber on each "forty." Each edge of a "forty" is 440 yards long, and it is advisable to blaze the boundaries so the estimators will know when they come to them. For convenience in estimating, the large square is usually divided into 16 smaller squares of $2\frac{1}{2}$ acres each, and therefore with edges 110 yards long. Starting

at any given corner of the "forty," say the south-east, a flag is placed at the centre of the first small square, each edge of which will then be 55 yards from the flag, and can be easily located by eye measurement, or by pacing. The estimator then goes through the timber on the square, records his estimate, returns to his flag, and goes on to the remaining squares in the order indicated by the diagram, which you see on the wall here.

Having determined the amount of merchantable timber, it is a good plan to prepare on transparent tracing cloth a map showing its location and the character of the growth. Such a map can be laid over the one showing the topographical features of the tract, and thus show at a glance the relations between the two. Furthermore, we may represent on the tracing cloth the extent and location of each year's cutting, and thus have a complete record of the work done from the beginning.

THE DOMINION FOREST SURVEY, OR STRIP METHOD.

When it is necessary to get an accurate estimate of the amount of timber on a very large tract of land, and also to obtain a clear notion of its topography for mapping purposes, the most satisfactory method is to run parallel strips across it every quarter of a mile. Strips $\frac{1}{4}$ of a mile apart and 4 rods wide cover 5% of the tract. If only $2\frac{1}{2}\%$ is required they may be placed half a mile apart, or else made only 2 rods wide. The advantages of the strip method are (1) It gives data which enables us to show the topography of the region; (2) It enables us to map the distribution of the different forest types; (3) It gives a good average of all the timber on the tract, and (4), when combined with studies in volume, it enables us to predict the growth per acre per year in cubic feet, cords, board feet, or any other desired unit of measurement.

During the last three years this method has been used by the Dominion Forest Survey parties sent out to the Forest Reserves in Manitoba for the purpose of getting accurate information regarding the topography, distribution of forest types, kind, location, amount and condition of the standing timber, to make studies of the rate at which it is growing, to study the amount and character of the reproduction, note the effect of the forests upon stream flow, devise means for protecting them against fire and timber thieves, and other matters necessary to know if they are to be put under proper management and preserved from absolute destruction. During the past summer I had charge of a party of 12 men collecting information of this sort in some of the unsurveyed townships along the eastern side of the Riding Mountain Reserve, in north-western Manitoba. This reserve contains over a million acres, nearly half of which have been burned over in recent years. The timber remaining consists of aspen, "balm," or balsam

poplar, white and black spruce, Jack pine, some larch or "tamarack," patches of scrub oak, and, along the streams, some green ash, "Manitoba maple" or box elder, elm, etc. In another year it is expected that the survey of this reserve will be completed, that all squatters will have been peaceably removed, that an efficient system of fire ranging will be in force and that at least part of the reserve will be put under management designed to make it a constant producer of wood crops.

HOW MEASUREMENTS ARE OBTAINED.

In running out the strips a magnetic compass is used to keep them parallel, and the distances are measured either by pacing or by dragging a light "chain" 4 rods, or 66 feet, in length. The ordinary "link" chain used by land surveyors is seldom used for this work because it is constantly getting tangled up in the undergrowth and fallen branches, and thus delays the progress of the party. A light, well tempered steel tape slips easily along the ground, and is therefore very much preferable. The great advantage of chaining over pacing is that we do away with the necessity of counting paces and get a much more exact measurement of distances. Each party usually consists of four men, viz.: A compass-man, who keeps the direction, drags the tape and keeps the silvicultural notes; two caliper-men—one on each side—to measure the diameters of all trees within 2 rods of the tape; and a tallyman to record diameters, to keep a record of distances chained, and to note changes in elevation and other data required to sketch in the topography of the country traversed. The caliper men measure the diameters of the trees at "breast height," or $4\frac{1}{2}$ feet above the ground. The reasons for this are (1) It is a convenient height at which a measurement can be rapidly made; (2) It avoids the "flare" or "root swelling" found in most merchantable timber; (3) The volume of the tree is a function of the diameter at this height. In large timber the diameters are returned in 2 inch classes, but in small timber by inch classes.

Care must be taken to see that the caliper men do not measure dead or defective trees, that they don't get too far from the "chain," or make the strip too narrow, that all measurements are made at right angles to the stems of the trees, and that they keep the calipers up to "breast height." Towards the end of the day they are apt to drop them, and thus raise the estimate for the volume of the stand. When there is a dense stand of small timber or it is difficult to get through the undergrowth, it is advisable to make the strips only 2 rods wide, thus giving each caliper-man a strip of timber only a rod wide to look after. In turns they call to the tallyman first the species, and then the diameters. If the strips are 4 rods, or a chain wide, the party only needs to go 10 chains to complete a strip

whose area is one acre, but if the strips are only 2 rods wide, they must go 20 chains. The compass-man keeps count of the number of chains, and at the end of every 10th or 20th chain, depending upon the width of the strips, calls out "Acre." Whenever the forest type changes, the silvicultural notes are written up on the back of the sheet and a new one is taken. The tally on the face of each sheet shows what distance the party has gone, and consequently the number of acres and fraction of an acre measured before the type changed. In open stands of timber, such as longleaf pine, where the going is easy, a party of 4 men may do as much as 60 acres in a day, but if they have to fight their way through a dense undergrowth, they may not be able to do more than 14 or 15 acres. If a fifth man can be secured to direct the work of the other four and keep the topographical and silvicultural notes, the progress of the party is much more rapid and the accuracy of the work is increased.

THE RELATION OF DIAMETER TO VOLUME.

A careful study of the shapes of the trunks of forest-grown trees shows (1) That each species has a characteristic shape or "form," and (2) That there is a tolerably constant relationship existing between its diameter at breast height and its volume.

The method of determining this relationship for any given species is to select a large number of sound trees having the typical shape of forest grown trees whose diameters range from a few inches up, measure their diameters at breast height to the nearest tenth of an inch, fell them, cut them into 10 foot lengths, until a diameter of 3 or 4 inches is reached and measure to the nearest tenth of an inch the average diameters at the ends of the logs, first outside the bark and then inside the bark. From the measurements thus obtained we then compute, to the nearest hundredth part of a cubic foot, the total volume of each log, of the stump and of the unused top; also the volume of the wood inside the bark for the different sections of the tree. The object of making two sets of measurements and calculations is to find what percentage the solid wood inside the bark is of the total volume. Several mathematical formulae have been devised for the computation of these volumes, but are of too technical a nature to be dealt with in such a paper as this. Having found the volumes of all the trees analyzed, the next step is to plot, on cross-section paper, the breast high diameter of each tree as a horizontal distance and its volume as a vertical distance. From the points thus located we can then draw a curve showing the relationship that exists between the volume of an average tree and its diameter at breast height. The accompanying diagram shows such a curve based upon the analysis of 66 aspens measured last summer in the Riding Mountain Forest Reserve. Some of the technically trained

foresters present will probably object to my basing Diameter-Volume curves upon the analysis of so few trees. The explanation is that we have only made a start in the work of studying growth of these species. Next year more stem analyses will be made, which, with those already obtained, will give a fair average for aspen, balm, white spruce and Jack pine.

To find the number of cubic feet of wood per acre for any given species, we first find out from the tally sheets how many trees of each diameter class there are per acre, multiply by the volumes indicated by the Diameter-Volume Curve of the species under consideration, and add together the products. In the case of trees less than a foot in diameter it is found that a standard cord of stacked wood contains only about 90 cubic feet of solid wood; hence if our figures indicate 1,080 cubic feet of wood per acre, we say that there are 12 cords to the acre. Where the trees are large enough for saw-timber we may scale the logs down to any given diameter, by whatever Log Rule is in use in the district, and then construct a curve showing the relationship between the breast high diameters of the trees and their merchantable contents in board feet. Our next diagram shows a curve of this nature, which naturally falls away below the total volume curve. (1) Because of the volume lost in the tops not large enough to make sawlogs; (2) The volume of the stumps; (3) The volume of the bark (about 15% for spruce), and (4) The loss due to sawdust, slabs, edgings and trimmings.

TURTLE MOUNTAIN RESERVE.

In the case of the Turtle Mountain Forest and Game Reserve, about 40 miles south of Brandon, Manitoba, Mr. R. D. Craig, B.S.A., F.E., late Inspector of Dominion Forest Reserves, found by the methods I have just described that the unburned area, of 1,611 acres, has standing on it enough small aspen to yield 19,825 cords of wood, of the balm 7,007 cords, of birch 7,695, of green ash 1,068, of burr oak 1,379 and of elm 593; a total of 37,567 cords. On the partially destroyed area of 6,371 acres the smaller living trees would yield about 39,520 cords of wood and the standing dead trees about 28,250 cords. The dead and down timber amounts to nearly ten cords per acre, or 63,710 altogether. Of the living trees large enough for saw timber it was found that the unburned area yielded 453 board feet per acre, and the partially destroyed only 122 board feet; making a total of about 1,507,000 for the whole tract. Thus the total stock was found to consist of 77,087 cords of green timber large enough for firewood, 91,960 cords of dry fuel and 1½ million board feet of small saw timber. The remaining 63,872 acres, 83% of the total area, include the lakes, open prairie-like spots and areas which have been completely destroyed by fires.

MOOSE MOUNTAIN RESERVE.

In the Moose Mountain Forest and Game Reserve there are about 4,000 acres of merchantable timber, and about 80,000 acres covered with an excellent young growth of aspen and balsam which followed the fires of 1885 and 1897. The ten-year old trees are now 10 to 14 feet high, and the 22-year old trees 30 to 35 feet—all growing in dense enough stand to form tall, straight, clean-boled trees, if protected from fire. In the mature timber the average yield is about 23.4 cords per acre, or 93,600 cords altogether. Of dead and down timber there is probably 100,000 cords which Forest Ranger Rutherford is having removed in as rapid and systematic a manner as possible. The saw-timber is so scattered that it is hardly available for milling, but the amount estimated to be present is 4,520,000 board feet of aspen, 760,000 of balsam and 368,000 of birch.

RIDING AND DUCK MOUNTAIN RESERVES.

In the Riding Mountain and Duck Mountain Forest and Game Reserves there are many stands of spruce, larch, balsam, fir and Jack pine yielding over 6,000 feet, board measure, to the acre, or 4,000,000 board feet per square mile. Besides yielding valuable saw timber these reserves are especially important as regulators of stream flow for nearly half the tributaries of the Assiniboine River, and all the streams watering the rich agricultural lands extending from Dauphin to Swan River. In the eastern and northern part of the Riding Mountain Reserve, elk and moose are plentiful, whilst in the Duck Mountain Reserve the moose are even more abundant than the elk.

GROWTH STUDIES.

The ultimate object of nearly all studies of growth is to predict the number of cubic feet of wood per acre per year that will be added to the growing stock. Studies of this sort are of too complicated a nature to be dealt with in a paper of this kind, but perhaps I may be permitted to state that they depend upon a knowledge of the volume of the stand, during the different periods of its growth from youth to maturity. During the last 3 years the Dominion Forest Service has been collecting data for studies of this nature, but, as yet, no attempt has been made to work up the material. This is due partly to the fact that during the winter months the men with the training necessary to do work of this nature were required to do the office work connected with the distribution of planting material in the Prairie Provinces, and partly to their leaving the service almost as soon as the data collected in the field were available for growth studies. It is hoped, however, that all the material collected will soon be worked up and put in such a shape that we will know definitely what the annual rate of increase is in the present wild, fire-scarred timber of our western Forest

Reserves. Not until we have full and definite information regarding the location, the amount, the silvicultural condition and the annual rate of growth of the more important species, will we be in a position to devise satisfactory rules and regulation of these reserves, and to keep them in perpetual forest for an ever increasing population.

THE ENORMOUS COST OF PLANTING.

If you draw the attention of the "man in the street" to our rapidly diminishing supplies of timber, he will in nine cases out of ten say: "Yes! That's so. Why, the Government ought to go to work and plant up the open spots." Let us examine the practicability of such a scheme. With a large and well equipped nursery for the growing of forest tree seedlings, and with labor at \$2.00 per day, it is possible to reduce the cost of planting, five feet apart each day, to between \$7 and \$8 per acre. For sake of argument, let us assume that it can be done for \$5.00 per acre, or \$3,200 per square mile. At this rate the planting of a township only six miles square would require the enormous expenditure of \$115,200. The "man in the street" will do some pretty hard thinking before he will consent to pay his share of the cost of such an undertaking, yet he will read in his morning paper that 30 townships, or more than a thousand square miles, of woodlands in northern Alberta, Saskatchewan or Manitoba have been destroyed by fire, and scarcely give the matter a passing thought.

NEED FOR PROTECTION.

Would it not be very much more to the purpose to take time by the forelock and use the money required to plant up a single township for the maintenance of an efficient fire-ranging system, similar to the one already established in Ontario? To my mind, the problem pressing hardest upon the Dominion Forest Service for solution is the protection of the western woodlands from fire. The new railways being built through them, and the settlement that will quickly follow will be a constant source of danger, but if fire rangers who feel the responsibility of their positions, and with the necessary diligence, firmness and tact to faithfully perform their duties and secure the co-operation of the settlers and the railway companies, can be found and retained in the service, a great deal may be done to save invaluable forested areas from ruthless destruction.

MORE RESERVES NEEDED.

As far as I understand the situation, the second great problem pressing for solution is, to secure definite information regarding the location, kind, condition, and amount of timber which SHOULD be placed in forest reserves before it is encroached upon, and either partially or wholly destroyed by axe and fire.

NEED FOR FOREST SURVEYS.

The third great problem will naturally be to gradually place all the reserves under management designed to make them perpetual producers of wood crops, improve their condition, and make them regulate the flow of water in our streams for irrigation and industrial purposes. Before they can be placed under such management, however, it will be necessary to study their condition, i.e., to make regular Forest Surveys. In conducting these surveys it will be impossible to lay down cast iron rules, because of the widely varying conditions. The important thing is to thoroughly understand the different methods of making such surveys, and to know which one gives the best solution of the particular problem presented.

QUALIFICATIONS NECESSARY FOR A FOREST ENGINEER.

Thus it appears that the Forest Engineer is constantly called upon to deal with problems of a decidedly practical nature. He is not a mere botanist let loose to air his knowledge at the expense of others; neither is he a fire ranger, a lumberman, a sportsman, an arboriculturist, a dendrologist, a silviculturist or a political economist. He must understand *all* these phases of the questions he is constantly called upon to deal with—many of them of tremendous magnitude and far-reaching importance. His profession touches life at many points, and it would be decidedly unsafe to follow his recommendations if they were not based upon a careful consideration of the factors likely to affect the general result. From this, I think it should be plain that the academic training of a forest engineer should be so designed that it will give him a clear view of the whole field of Forestry Science, and thus enable him to get a proper conception of the relationships of things that at first sight do not seem to be related—even in the remotest degree. Without this conception he will be decidedly unpractical; with it, he will be thoroughly practical, in the larger and better sense of the term. Regarding his field training, there is only one way to acquire it, namely, by experience in the woods. No amount of reading or theorizing can give him this experience. It must be learned at first hand, but there can scarcely be any doubt that the man who goes into the woods with the broad general outlook that a thorough academic training in the science of Forestry gives him, will acquire this kind of knowledge very quickly, and, what is of more importance, know how to apply it in cases where the man without similar training would utterly fail, and thus prove himself thoroughly unpractical.

Such then, is the argument in favor of placing technically trained men in charge of all important surveys made for the purpose of studying the condition of our Forest Reserves, so

that we may know how to manage them intelligently, improve their condition, and make them produce wood crops for all time.

PLANTING IN ONTARIO.

The Ontario Department of Agriculture is continuing its tree distribution work under the supervision of Mr. E. J. Zavitz. It is expected that about 500,000 trees will be sent out this spring. Some of these trees will be planted in nearly every county in the province, and by the end of the spring's planting, every county in the province will be included on the list of those to which trees have been sent. Many who got trees last year are continuing their planting this spring.

The trees used are the White Pine, Scotch Pine, Norway Spruce and Black Locust. Of these the Black Locust—the only broad-leaved species used—are sent out when but one year old, owing to the difficulty of handling them when further grown. The White Pines used are three-year-old stock (one year transplants). The Scotch Pine are two-and-three-year-old stock (one year transplanted). Some of the Norway Spruce is three years old only, but the most of the trees—and these the better class—are four-year-old trees, transplanted two years ago.

The Ontario Government is also to be congratulated on having taken a forward step in the direction of planting up waste lands, of which, by the way, there is a far greater area than most Ontarians realize. The sum of \$5,000 has been placed in the supplementary estimates to be devoted to this purpose. With this sum waste land will be bought in the county of Norfolk. On the land which it is proposed to purchase, there is a good site for a nursery, and here will be grown the young trees to be used. As additional money is provided, land will be secured for this purpose in adjacent counties, and also in other parts of the province. The provincial government has in this action taken a step in the right direction, and it is to be hoped that the near future will see more—and much longer—steps in the same direction.

PINE NEEDLE BLIGHT.

The following circular has been issued by the U.S. Bureau of Plant Industry, and readers of *The Forestry Journal* are asked to reply to as many of the questions asked as it may be in their power to do.

During the past few years a constantly increasing number

of complaints of a disease of white pine in the Northern States has been received by the United States Department of Agriculture. This disease attacks the needles and is commonly limited to the youngest ones, while the two-year-old needles are more or less immune to the trouble. The affected needles commonly turn reddish brown at the tips, and the browning may progress backward to the base of the leaf, entirely killing it, or it may kill but a portion of the leaf, leaving the basal part alive and green. In the early stages of disease only the youngest needles are affected, these being partially browned. In the last stages the two-year-old needles have dropped prematurely, and the new leaves are shorter than normal ones. The tree gets weaker and weaker until it finally dies outright. There are indications, however, that some of the affected trees recover. A tree having most of its young needles attacked presents a brown appearance throughout, although the older needles may still be green and healthy. This is because the one-year-old needles are on the new growth at the tips of the twigs, where they hide the two-year-old leaves behind them unless one is standing directly beneath the tree and looking up at the branches.

This disease seems to be assuming more and more threatening proportions and is causing alarm among timber owners where it occurs. It seems to occur more or less locally, and its distribution is very imperfectly known. In order to obtain some definite data concerning the more important facts of its occurrence, spread, etc., the present circular has been prepared and distributed. Your active assistance is asked in answering the following questions. Also, if the disease is in your locality, *enclose specimens of affected twigs.*

1. Does the disease occur in your locality?
2. How plentiful is it?
3. How long have you known it?
4. Does it affect more trees now than when you first noted it?
5. Do affected trees ever recover?
6. At what date in the season have you first noted it?
7. Does it seem to cause the two-year-old needles to fall?
8. Are old trees affected more than young ones?
9. Are trees affected worse in open than in close stands?
10. Do the affected trees occur in bunches, or are they scattered among the healthy ones?
11. How long may a tree be affected before it dies?
12. Does the disease appear on the upper branches and leader before it does on the lowest branches?
13. What month do the trees die?
14. Has any fire been over the diseased area during the past four years?
15. General remarks.

(SIGNED) HAVEN METCALF,
U.S. Bureau of Plant Industry,
Washington, D.C.

Printed forms covering all the above questions may be obtained on application to Mr. Metcalf.

CORRESPONDENCE.

An important debate lately took place in the Nova Scotia Legislature on the question of the crown lands policy of the province. The debate was on a resolution introduced by Mr. Wilcox, M.P.P., the text of which is as follows:

That whereas it is in the public interests that the wood asset of the province should be better conserved, and the practicability of forest reserves and forest planting enquired into, this house is of opinion:—

(1) That pending full enquiry no further crown lands should be leased or granted except for bona fide settlement for farming purposes.

(2) That survey and investigation of all crown lands should be made with the purpose of obtaining information of the acreage, topography and general character thereof, and particularly of the following classes:—

- (a) Lands suitable for farming.
- (b) Lands wooded with merchantable timber.
- (c) Wooded lands which have been culled.
- (d) Burnt lands.
- (e) Barren or rock lands.
- (f) Land covered with water.

Mr. Wilcox, in an address of some length, discussed the importance of keeping intact the forests at the head of streams, insisted that the wood crop should be treated the same as any other crop, touched on the suitability of the province as a wood-producing country, and emphasized the need of careful survey.

The address was very favorably received. Hon. W. T. Pipes, Commissioner of Crown Lands, intimated that the government was practically of the same mind in the matter as the mover of the resolution.

The Belleville and Bay of Quinte Forest and Stream Game and Fish Protective Association, at their meeting on March 23rd last, passed a resolution strongly commending the Ontario Government for their action in establishing the Faculty of Forestry at the University of Toronto, and praising the work of Dr. Fernow, Dean of the Faculty, and his assistants in educational work, both at the university and among the public.

An appropriation of \$25,000 has been asked for by the United States Forest Service for the purpose of carrying out a timber census of the country.

The Brantford Board of Trade is endeavoring to secure the co-operation of other Ontario Boards of Trade in memorializing the Ontario Government to protect the forests of Ontario and restore them as far as possible. Special attention is called to the greater frequency of floods on Ontario rivers now in comparison with former times.

Experiments carried on at Eberswalde and elsewhere in Germany with regard to manuring of forest trees lead to the conclusion that in nurseries of conifers on sandy soils, nitrogenous manures, especially if acting slowly and continuously have the best results. The cultivation of lupins which were afterward allowed to die down, the placing of peat in holes between the plants and pine-dust or other similar litter similarly applied were the most successful ways of applying this nitrogen. Pines under thirty years were benefitted by applications of basic slag and sulphate of ammonia, also by mechanical cultivation. Nitrate of soda washed away too soon.

Mr. E. N. Lewis, Member for West Huron, brought to the attention of Parliament during the session of April 29th the immediate necessity of action being taken by the Government in reference to the appointment of a committee of members of the House to ascertain the facts relative to the forest resources of Canada and the United States. He suggested that a small committee should be appointed to get together the official facts during recess and report next session. He asked that members of the Geological Survey staff and others be called before the proposed committee and be examined on the timber resources of the northern country. As is not perhaps generally known, between twenty and thirty parties are sent out from the Geological Survey Department each year and the reports of these men, if correlated, would give a better idea of the forest resources of the north than could be got from any other source.

TO THE EDITOR OF FORESTRY JOURNAL,

Dear Sir:—When reading the reports of the speeches that appear from time to time in the Press as they are spoken on public occasions by those who are intrusted with the interests of the people, it is concluded that the preservation of what is frequently termed "Our Grand Heritage," is one of the chief concerns of our Legislators, but when we read of the efforts that are being made to cultivate forests in the treeless plains of the West, or on the sand dunes of Ontario under great difficulty and at great cost, the reader is inclined to doubt the

sincerity of the interest that he hears mentioned so frequently, when he remembers that to the east of Georgian Bay millions of acres of rock-strewn Laurentine hills, which have contributed untold wealth to the coffers of the country, are now neglected, no provision being made for the protection of the second-growth timber from the ravages of the frequently recurring fires, or from the depredations of men preying on the new timber as soon as it is of value for any purpose whatever. In many places, chiefly in the valleys, the second growth hardwood with occasional white pines show that this new timber if protected and judiciously thinned would in fifty years be an asset of great value, as in twenty or twenty-five years since the last fire passed over there are white pines up to 12 or 15 inches in diameter, and where growing in groves of poplar and white birch are tall and straight and promise well for the future. Private individuals are unable to cope with this matter, but the government should feel in duty bound to take possession of the lands that have been stripped of the original timber. Many lots through this country, which once settled on have been deserted when the timber was gone, should revert to the Crown and not pass into the hands of others who keep stripping the land until at last the fire having passed more than once over the rocky ridges, makes the growth of another crop of timber slow and almost at times impossible.

Yours respectfully,

T. M. R.

Gravenhurst, 5th March, 1908.

YALE UNIVERSITY FOREST SCHOOL

NEW HAVEN, CONNECTICUT, U. S. A.

A TWO YEARS GRADUATE COURSE is offered, leading to the degree of Master of Forestry. Graduates of Collegiate Institutions of high standing are admitted upon presentation of their College diplomas.

THE SUMMER SCHOOL OF FORESTRY is conducted at Milford, Pike County, Penn. The session in 1908 will open July 5th and continue seven weeks.

FOR FURTHER INFORMATION ADDRESS

HENRY S. GRAVES, DIRECTOR
NEW HAVEN, CONN.